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**Department of Defense
Fiscal Year (FY) 2012 Budget Estimates**

February 2011



Army

Justification Book Volume 3

Research, Development, Test & Evaluation, Army

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Army • President's Budget FY 2012 • RDT&E Program

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**FY 2012 RDT&E, ARMY
PROGRAM ELEMENT DESCRIPTIVE SUMMARIES**

Introduction and Explanation of Contents

1. **General.** The purpose of this document is to provide summary information concerning the Research, Development, Test and Evaluation, Army program. The descriptive summaries are comprised of R-2 (Army RDT&E Budget Item Justification – program element level), R-2A (Army RDT&E Budget Item Justification – project level), R-3 (Army RDT&E Cost Analysis), R-4 (Schedule Profile Detail) and R-5 (Termination Liability Funding for MDAPs) Exhibits, which provide narrative information on all RDT&E program elements and projects through FY 2012.

2. **Relationship of the FY 2012 Budget Submitted to Congress to the FY 2011 Budget Submitted to Congress.** This paragraph provides a list of program elements/projects that are major new starts, restructures, developmental transitions, newly established, terminated or for which funding existed in the FY 11 budget but no longer exists in the FY 12 budget. Explanations for these changes can be found in the narrative sections of the Program Element R-2A Exhibits.

A. New Start Programs:

<u>PE/PROJECT</u>	<u>PE TITLE</u>	<u>PROJECT TITLE</u>
0604115/DS3	Technology Maturation Initiatives	Technology Maturation Initiatives
0203735/DS5	Combat Vehicle Improvement Program	Armored Multi Purpose Vehicle (AMPV)
0604808/434	Close Combat Capabilities Eng Dev	Anti-Personnel Landmine Alternatives
0603820/D20	UAS Modifications/Product Imp Prg	VTOL MODS/PIP
0603807/VS7	Medical Systems Advanced Dev	MEDEVAC Mission Equipment Package
0603817/S52	Soldier Systems – Adv Dev	Soldier Support Equipment – AD
0604270/VS6	EW Development	Integrated Electronic Warfare Sys
0604818/JN1	Army Tac Comm & Cont Hardware And Software	*Joint Network Node (JNN) Testing
0604820/E10	Radar Development	Sentinel
0203726/33C	Advanced Field Artillery Tactical Data System	Improved Position Azimuth Determining System (IPADs)
0303141/VU2	Global Combat Support System	Installation Fixed Base (IFB)
	*Program Re-start	

B. Program Element/Project Restructures:

Old		New
<u>PE/Project</u>	<u>New Project Title</u>	<u>PE/Project</u>
0601104/J22	Network Science and Technology Research Center	0601104/H50
0602787/878	Warfighter Health Prot and Perf Stds	0602787/869
0602787/879	Warfighter Health Prot and Perf Stds	0602787/869
0603005/C66	Tractor Nail	0603130/DS8
0603006/DF7	Tractor Eggs	0603131/DS9
0603308/978	Tractor Jute	0604131/DT1
0604270/L20	Common Missile Warning System (CMWS)	0604270/VU7
	Common Infrared Counter Measure (CIRCM)	0604270/VU8
0604805/589	Army Sys Engineering & Warfighting	0604805/593
0305204/114	RQ-7 Shadow UAV	0305233/RQ7
0305204/D10	RQ-11 Raven (MIP)	0305232/RA7
0604710/L76	Dismounted Fire Support Laser Targeting System	0604710/L79
0604817/482	Ground Combat ID	0604284/VU4
0605605/E97	DOD HELSTF	0605601/F30
0605857/061	Material Sustainment Support AD	0603804/K42
0203759/122	Joint Battle Command – Platform	0604805/593
0203801/DF8	Tractor Barn	0203808/DS1
0203801/DF9	Tractor PUMA	0203808/DS2

C. Developmental Transitions:

Old		New
<u>PE/Project</u>	<u>New Project Title</u>	<u>PE/PROJECT</u>
0603804/L04	Joint Light Tactical Vehicles (JLTV) – SD	0604804/L50
0603827/S49	Ground Soldier Ensemble	0604827/S75

D. Establishment of new FY 2012 Program Elements/Projects. (Does not include any major new starts)

<u>TITLE</u>	<u>PE/PROJECT</u>
Surface Science Research	0601102/VR9
Center for Advanced Research	0601104/VS2
Expeditionary Mobile Base Camp Technology	0602786/VT4
Expeditionary Mobile Base Camp Demonstration	0603001/VT5
Tractor Nails	0603130/DS8

Tractor Eggs	0603131/DS9
*High Performance Computing Modernization Program	0603461/DS7
Tractor Jute	0604131/DT1
Soldier Protective Equipment	0603827/VS4
Combat Service Support Systems – AD	0603804/VR8
Joint Effects Targeting Systems (JETs)	0604710/L79
Combat Service Support Systems	0604804/VR7
TWV Protection Kits	0604622/VR5
*transferred from RDT&E,DW PE 0603755D8Z	

E. Program Terminations.

<u>TITLE</u>	<u>PE/PROJECT</u>
Electric Gun Technology	0602618/H75
Aircraft Weapons	0603003/435
BCT Non-Line-of-Sight Launch System	0604646/F72
BCT Reconnaissance (UAV) Platforms	0604662/FC3
Close Combat Capabilities Eng Dev	0604808/016

F. Programs for which funding existed in the FY 11 budget but no longer exists in the FY 12 budget.

<u>PE/PROJECT</u>	<u>TITLE</u>	<u>Brief Explanation</u>
0601104/J22	Network Science & Tech Res	Restructure to 0601104/H50
0602618/H75	Electric Gun Tech	Termination
0602787/878	Hlth Haz Mil Material	Restructure to 0602787/869
0602787/879	Med Fact Enh Sold Eff	Restructure to 0602787/869
0603003/435	Aircraft Weapons	Termination
0603005/C66	DC66	Restructure to 0603130/DS8
0603006/DF7	DF7	Restructure to 0603131/DS9
0603308/978	Space Control	Restructure to 0604131/DT1
0603804/K42	Material Sustainment Support	Transition to Army Supply System
0603804/L04	Jt Light Tact Vehicle (JLTV)-AD	Transition to 0604804/L50
0603827/S49	Ground Soldier System (GSS)	Transition to 0604827/S75
0604270/L20	ATIRCM/CMWS	Restructured to 0604270/VU7 & VU8
0604609/198	Target Defeating System	Completed R&D
0604609/200	Smoke/Obscurant System	Completed R&D
0604622/659	Family of Hvy Tac Veh	Transition to production

0604642/E40	LTV Prototype	Completed R&D
0604646/F72	BCT NLOS Launch Sys	Termination
0604710/L76	Dismounted Fire Support Laser Targeting System	Restructured to 0604710/L79
0604804/L47	Improved Environmental Control Unit	Transition to production
0604805/589	Army Sys Engr & Warfighting	Restructured to 0604805/593
0604808/016	Close Combat Capabilities ED	Termination
0604817/482	Ground Combat ID	Restructured to
0605013/087	Distributed Learning System	Transition to production
0604662/FC3	BCT Reconnaissance (UAV) Platforms	Termination
0605605/E97	DOD HELSTF	Restructured to 0605601/F30
0203759/122	Jt Battle Command Platform	Restructured to 0604805/593
0203801/DF8	DF8	Restructured to 0203808/DS1
0203801/DF9	DF9	Restructured to 0203808/DS2
0305204/114	Tactical Unmanned Aerial Vehicles (MIP)	Restructured to 0305233/RQ7
0305204/D10	SUAV (MIP)	Restructured to 0305233/RA7
0305208/D15	MUSE & TES TADSS (MIP)	Completed R&D

3. **Classification:** This document contains no classified data. Appropriately cleared individuals can obtain further information on Classified/Special Access Programs by contacting the Department of the Army (ASA(ALT)) Special Programs Office.
4. **Performance Metrics.** Performance metrics may be found in the Department's Performance Budget Justification Book, dated February 2012.

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Exhibit R-1

Summary

10-Feb-2011

Summary Recap of Budget Activities		Thousands of Dollars				
		FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
Basic research		420,190	406,873	436,920	0	436,920
Applied Research		1,321,605	841,364	869,332	0	869,332
Advanced technology development		1,366,194	696,592	976,812	0	976,812
Advanced Component Development and Prototypes		982,111	804,148	753,084	0	753,084
System Development and Demonstration		4,285,025	5,035,046	4,190,788	0	4,190,788
Management support		1,487,815	1,142,383	1,048,671	8,513	1,057,184
Operational system development		1,843,989	1,553,445	1,403,837	0	1,403,837
Total	RDT&E, Army	11,706,929	10,479,851	9,679,444	8,513	9,687,957

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Exhibit R-1

Appropriation: 2040 A RDT&E, Army

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Line No	Program Element Number	Act	Item	Thousands of Dollars				
				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
Basic research								
1	0601101A	01	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	19,278	21,780	21,064		21,064
2	0601102A	01	DEFENSE RESEARCH SCIENCES	196,921	195,845	213,942		213,942
3	0601103A	01	UNIVERSITY RESEARCH INITIATIVES	96,409	91,161	80,977		80,977
4	0601104A	01	UNIVERSITY AND INDUSTRY RESEARCH CENTERS	107,582	98,087	120,937		120,937
Total: Basic research				420,190	406,873	436,920	0	436,920
Applied Research								
5	0602105A	02	MATERIALS TECHNOLOGY	88,022	29,882	30,258		30,258
6	0602120A	02	SENSORS AND ELECTRONIC SURVIVABILITY	82,449	48,929	43,521		43,521
7	0602122A	02	TRACTOR HIP	13,807	14,624	14,230		14,230
8	0602211A	02	AVIATION TECHNOLOGY	44,810	43,476	44,610		44,610
9	0602270A	02	ELECTRONIC WARFARE TECHNOLOGY	23,581	17,330	15,790		15,790
10	0602303A	02	MISSILE TECHNOLOGY	69,871	49,525	50,685		50,685
11	0602307A	02	ADVANCED WEAPONS TECHNOLOGY	19,906	18,190	20,034		20,034
12	0602308A	02	ADVANCED CONCEPTS AND SIMULATION	22,070	20,582	20,933		20,933
13	0602601A	02	COMBAT VEHICLE AND AUTOMOTIVE TECHNOLOGY	79,649	64,740	64,306		64,306
14	0602618A	02	BALLISTICS TECHNOLOGY	73,456	60,342	59,214		59,214
15	0602622A	02	CHEMICAL, SMOKE AND EQUIPMENT DEFEATING TECHNOLOGY	8,706	5,324	4,877		4,877
16	0602623A	02	JOINT SERVICE SMALL ARMS PROGRAM	9,001	7,893	8,244		8,244
17	0602624A	02	WEAPONS AND MUNITIONS TECHNOLOGY	140,727	42,645	39,813		39,813
18	0602705A	02	ELECTRONICS AND ELECTRONIC DEVICES	134,946	60,859	62,962		62,962
19	0602709A	02	NIGHT VISION TECHNOLOGY	48,250	40,228	57,203		57,203
20	0602712A	02	COUNTERMINE SYSTEMS	27,892	19,118	20,280		20,280
21	0602716A	02	HUMAN FACTORS ENGINEERING TECHNOLOGY	30,395	21,042	21,801		21,801
22	0602720A	02	ENVIRONMENTAL QUALITY TECHNOLOGY	17,545	18,364	20,837		20,837
23	0602782A	02	COMMAND, CONTROL, COMMUNICATIONS TECHNOLOGY	31,691	25,573	26,116		26,116
24	0602783A	02	COMPUTER AND SOFTWARE TECHNOLOGY	9,896	6,768	8,591		8,591
25	0602784A	02	MILITARY ENGINEERING TECHNOLOGY	60,536	79,189	80,317		80,317

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Line No	Program Element Number	Act	Item	Thousands of Dollars				
				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
26	0602785A	02	MANPOWER/PERSONNEL/TRAINING TECHNOLOGY	16,358	22,198	18,946		18,946
27	0602786A	02	WARFIGHTER TECHNOLOGY	37,040	27,746	29,835		29,835
28	0602787A	02	MEDICAL TECHNOLOGY	231,001	96,797	105,929		105,929
Total: Applied Research				1,321,605	841,364	869,332	0	869,332
Advanced technology development								
29	0603001A	03	WARFIGHTER ADVANCED TECHNOLOGY	51,596	37,364	52,979		52,979
30	0603002A	03	MEDICAL ADVANCED TECHNOLOGY	336,741	71,510	68,171		68,171
31	0603003A	03	AVIATION ADVANCED TECHNOLOGY	104,229	57,454	62,193		62,193
32	0603004A	03	WEAPONS AND MUNITIONS ADVANCED TECHNOLOGY	92,638	64,438	77,077		77,077
33	0603005A	03	COMBAT VEHICLE AND AUTOMOTIVE ADVANCED TECHNOLOGY	261,689	89,499	106,145		106,145
34	0603006A	03	COMMAND, CONTROL, COMMUNICATIONS ADVANCED TECHNOLOGY	12,074	8,102	5,312		5,312
35	0603007A	03	MANPOWER, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY	7,220	7,921	10,298		10,298
36	0603008A	03	ELECTRONIC WARFARE ADVANCED TECHNOLOGY	55,903	50,359	57,963		57,963
37	0603009A	03	TRACTOR HIKE	10,945	8,015	8,155		8,155
38	0603015A	03	NEXT GENERATION TRAINING & SIMULATION SYSTEMS	25,895	15,334	17,936		17,936
39	0603020A	03	TRACTOR ROSE	13,997	12,309	12,597		12,597
40	0603105A	03	MILITARY HIV RESEARCH	29,277	6,688	6,796		6,796
41	0603125A	03	COMBATING TERRORISM - TECHNOLOGY DEVELOPMENT	11,366	10,550	12,191		12,191
42	0603130A	03	TRACTOR NAIL			4,278		4,278
43	0603131A	03	TRACTOR EGGS			2,261		2,261
44	0603270A	03	ELECTRONIC WARFARE TECHNOLOGY	23,766	18,350	23,677		23,677
45	0603313A	03	MISSILE AND ROCKET ADVANCED TECHNOLOGY	83,649	84,553	90,602		90,602
46	0603322A	03	TRACTOR CAGE	11,741	9,986	10,315		10,315
47	0603461A	03	HIGH PERFORMANCE COMPUTING MODERNIZATION PROGRAM			183,150		183,150
48	0603606A	03	LANDMINE WARFARE AND BARRIER ADVANCED TECHNOLOGY	35,765	26,953	31,541		31,541
49	0603607A	03	JOINT SERVICE SMALL ARMS PROGRAM	8,683	9,151	7,686		7,686
50	0603710A	03	NIGHT VISION ADVANCED TECHNOLOGY	81,157	39,912	42,414		42,414
51	0603728A	03	ENVIRONMENTAL QUALITY TECHNOLOGY DEMONSTRATIONS	16,584	15,878	15,959		15,959
52	0603734A	03	MILITARY ENGINEERING ADVANCED TECHNOLOGY	40,423	27,393	36,516		36,516

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				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
53	0603772A	03	ADVANCED TACTICAL COMPUTER SCIENCE AND SENSOR TECHNOLOGY	50,856	24,873	30,600		30,600
Total: Advanced technology development				1,366,194	696,592	976,812	0	976,812
Advanced Component Development and Prototypes								
54	0603024A	04	UNIQUE ITEM IDENTIFICATION (UID)	1,990				
55	0603305A	04	ARMY MISSILE DEFENSE SYSTEMS INTEGRATION	80,079	11,455	36,009		36,009
56	0603308A	04	ARMY SPACE SYSTEMS INTEGRATION	126,189	27,551	9,612		9,612
57	0603327A	04	AIR AND MISSILE DEFENSE SYSTEMS ENGINEERING	165,515				
58	0603619A	04	LANDMINE WARFARE AND BARRIER - ADV DEV	29,399	15,596	35,383		35,383
59	0603627A	04	SMOKE, OBSCURANT AND TARGET DEFEATING SYS-ADV DEV	5,607	2,425	9,501		9,501
60	0603639A	04	TANK AND MEDIUM CALIBER AMMUNITION	33,202	42,183	39,693		39,693
61	0603653A	04	ADVANCED TANK ARMAMENT SYSTEM (ATAS)	96,269	136,302	101,408		101,408
62	0603747A	04	SOLDIER SUPPORT AND SURVIVABILITY	40,392	76,456	9,747		9,747
63	0603766A	04	TACTICAL ELECTRONIC SURVEILLANCE SYSTEM - ADV DEV	17,023	17,962	5,766		5,766
64	0603774A	04	NIGHT VISION SYSTEMS ADVANCED DEVELOPMENT	8,000				
65	0603779A	04	ENVIRONMENTAL QUALITY TECHNOLOGY - DEM/VAL	20,203	4,695	4,946		4,946
66	0603782A	04	WARFIGHTER INFORMATION NETWORK-TACTICAL - DEM/VAL	164,014	190,903	297,955		297,955
67	0603790A	04	NATO RESEARCH AND DEVELOPMENT	4,848	5,060	4,765		4,765
68	0603801A	04	AVIATION - ADV DEV	13,177	8,355	7,107		7,107
69	0603804A	04	LOGISTICS AND ENGINEER EQUIPMENT - ADV DEV	56,153	80,490	19,509		19,509
70	0603805A	04	COMBAT SERVICE SUPPORT CONTROL SYSTEM EVALUATION AND ANALYSIS	9,898	14,290	5,258		5,258
71	0603807A	04	MEDICAL SYSTEMS - ADV DEV	32,851	28,132	34,997		34,997
72	0603827A	04	SOLDIER SYSTEMS - ADVANCED DEVELOPMENT	75,833	48,323	19,598		19,598
73	0603850A	04	INTEGRATED BROADCAST SERVICE	1,469	970	1,496		1,496
74	0604115A	04	TECHNOLOGY MATURATION INITIATIVES			10,181		10,181
75	0604131A	04	TRACTOR JUTE			15,609		15,609
76	0604284A	04	JOINT COOPERATIVE TARGET IDENTIFICATION - GROUND (JCTI-G) / TECHNOLOG			41,652		41,652
77	0305205A	04	ENDURANCE UAVS		93,000	42,892		42,892
Total: Advanced Component Development and Prototypes				982,111	804,148	753,084	0	753,084

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Line No	Program Element Number	Act	Item	Thousands of Dollars				
				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
System Development and Demonstration								
78	0604201A	05	AIRCRAFT AVIONICS	76,491	89,210	144,687		144,687
79	0604220A	05	ARMED, DEPLOYABLE HELOS	61,643	72,550	166,132		166,132
80	0604270A	05	ELECTRONIC WARFARE DEVELOPMENT	168,496	177,669	101,265		101,265
81	0604280A	05	JOINT TACTICAL RADIO		784			
82	0604321A	05	ALL SOURCE ANALYSIS SYSTEM	12,562	30,674	17,412		17,412
83	0604328A	05	TRACTOR CAGE	20,564	23,194	26,577		26,577
84	0604601A	05	INFANTRY SUPPORT WEAPONS	64,930	80,337	73,728		73,728
85	0604604A	05	MEDIUM TACTICAL VEHICLES	5,460	3,710	3,961		3,961
86	0604609A	05	SMOKE, OBSCURANT AND TARGET DEFEATING SYS - ENG DEV	939	5,335			
87	0604611A	05	JAVELIN		9,999	17,340		17,340
88	0604622A	05	FAMILY OF HEAVY TACTICAL VEHICLES	8,072	3,519	5,478		5,478
89	0604633A	05	AIR TRAFFIC CONTROL	8,453	9,892	22,922		22,922
90	0604642A	05	LIGHT TACTICAL WHEELED VEHICLES	1,140	1,990			
91	0604646A	05	NON-LINE OF SIGHT LAUNCH SYSTEM	88,205	81,247			
92	0604660A	05	FCS MANNED GRD VEHICLES & COMMON GRD VEHICLE	231,103				
93	0604661A	05	FCS SYSTEMS OF SYSTEMS ENGR & PROGRAM MGMT	847,011	568,711	383,872		383,872
94	0604662A	05	FCS RECONNAISSANCE (UAV) PLATFORMS	92,444	50,304			
95	0604663A	05	FCS UNMANNED GROUND VEHICLES	122,418	249,948	143,840		143,840
96	0604664A	05	FCS UNATTENDED GROUND SENSORS	39,664	7,515	499		499
97	0604665A	05	FCS SUSTAINMENT & TRAINING R&D	685,524	610,389			
98	0604710A	05	NIGHT VISION SYSTEMS - ENG DEV	56,992	52,549	59,265		59,265
99	0604713A	05	COMBAT FEEDING, CLOTHING, AND EQUIPMENT	2,010	2,118	2,075		2,075
100	0604715A	05	NON-SYSTEM TRAINING DEVICES - ENG DEV	29,187	27,756	30,021		30,021
101	0604716A	05	TERRAIN INFORMATION - ENG DEV			1,596		1,596
102	0604741A	05	AIR DEFENSE COMMAND, CONTROL AND INTELLIGENCE - ENG DEV	32,450	34,209	83,010		83,010
103	0604742A	05	CONSTRUCTIVE SIMULATION SYSTEMS DEVELOPMENT	32,126	30,291	28,305		28,305
104	0604746A	05	AUTOMATIC TEST EQUIPMENT DEVELOPMENT	11,737	14,041	14,375		14,375
105	0604760A	05	DISTRIBUTIVE INTERACTIVE SIMULATIONS (DIS) - ENG DEV	15,184	15,547	15,803		15,803
106	0604778A	05	POSITIONING SYSTEMS DEVELOPMENT (SPACE)	7,275				

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				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
107	0604780A	05	COMBINED ARMS TACTICAL TRAINER (CATT) CORE	25,241	27,670	22,226		22,226
108	0604802A	05	WEAPONS AND MUNITIONS - ENG DEV	99,626	24,345	13,828		13,828
109	0604804A	05	LOGISTICS AND ENGINEER EQUIPMENT - ENG DEV	35,046	41,039	251,104		251,104
110	0604805A	05	COMMAND, CONTROL, COMMUNICATIONS SYSTEMS - ENG DEV	57,040	90,736	137,811		137,811
111	0604807A	05	MEDICAL MATERIEL/MEDICAL BIOLOGICAL DEFENSE EQUIPMENT - ENG DEV	37,572	34,474	27,160		27,160
112	0604808A	05	LANDMINE WARFARE/BARRIER - ENG DEV	89,064	95,577	87,426		87,426
113	0604814A	05	ARTILLERY MUNITIONS - EMD	40,856	26,371	42,627		42,627
114	0604817A	05	COMBAT IDENTIFICATION	7,740	29,884			
115	0604818A	05	ARMY TACTICAL COMMAND & CONTROL HARDWARE & SOFTWARE	72,820	60,970	123,935		123,935
116	0604820A	05	RADAR DEVELOPMENT			2,890		2,890
117	0604822A	05	GENERAL FUND ENTERPRISE BUSINESS SYSTEM (GFEBS)	23,712	13,576	794		794
118	0604823A	05	FIREFINDER	19,534	24,736	10,358		10,358
119	0604827A	05	SOLDIER SYSTEMS - WARRIOR DEM/VAL	20,602	20,886	48,309		48,309
120	0604854A	05	ARTILLERY SYSTEMS - EMD	152,935	53,624	120,146		120,146
121	0604869A	05	PATRIOT/MEADS COMBINED AGGREGATE PROGRAM (CAP)	570,831	467,139	406,605		406,605
122	0604870A	05	NUCLEAR ARMS CONTROL MONITORING SENSOR NETWORK	6,860	7,276	7,398		7,398
123	0605013A	05	INFORMATION TECHNOLOGY DEVELOPMENT	108,146	23,957	37,098		37,098
124	0605018A	05	ARMY INTEGRATED MILITARY HUMAN RESOURCES SYSTEM (A-IMHRS)		100,500	68,693		68,693
125	0605450A	05	JOINT AIR-TO-GROUND MISSILE (JAGM)	118,459	130,340	127,095		127,095
126	0605455A	05	SLAMRAAM		23,700	19,931		19,931
127	0605456A	05	PAC-3/MSE MISSILE		62,500	88,993		88,993
128	0605457A	05	ARMY INTEGRATED AIR AND MISSILE DEFENSE (AIAMD)		251,124	270,607		270,607
129	0605625A	05	MANNED GROUND VEHICLE	76,861	934,366	884,387		884,387
130	0605626A	05	AERIAL COMMON SENSOR		211,500	31,465		31,465
131	0303032A	05	TROJAN - RH12		3,697	3,920		3,920
132	0304270A	05	ELECTRONIC WARFARE DEVELOPMENT		21,571	13,819		13,819
Total: System Development and Demonstration				4,285,025	5,035,046	4,190,788	0	4,190,788
Management support								
133	0604256A	06	THREAT SIMULATOR DEVELOPMENT	23,120	26,158	16,992		16,992

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Exhibit R-1

Appropriation: 2040 A RDT&E, Army

10-Feb-2011

Line No	Program Element Number	Act	Item	Thousands of Dollars				
				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
134	0604258A	06	TARGET SYSTEMS DEVELOPMENT	13,183	8,614	11,247		11,247
135	0604759A	06	MAJOR T&E INVESTMENT	49,942	42,102	49,437		49,437
136	0605103A	06	RAND ARROYO CENTER	17,257	20,492	20,384		20,384
137	0605301A	06	ARMY KWAJALEIN ATOLL	157,391	163,788	145,606		145,606
138	0605326A	06	CONCEPTS EXPERIMENTATION PROGRAM	26,168	17,704	28,800		28,800
139	0605502A	06	SMALL BUSINESS INNOVATIVE RESEARCH	273,678				
140	0605601A	06	ARMY TEST RANGES AND FACILITIES	346,015	393,937	262,456	8,513	270,969
141	0605602A	06	ARMY TECHNICAL TEST INSTRUMENTATION AND TARGETS	82,054	59,040	70,227		70,227
142	0605604A	06	SURVIVABILITY/LETHALITY ANALYSIS	44,728	41,812	43,483		43,483
143	0605605A	06	DOD HIGH ENERGY LASER TEST FACILITY	7,307	4,710	18		18
144	0605606A	06	AIRCRAFT CERTIFICATION	3,745	5,055	5,630		5,630
145	0605702A	06	METEOROLOGICAL SUPPORT TO RDT&E ACTIVITIES	8,173	7,185	7,182		7,182
146	0605706A	06	MATERIEL SYSTEMS ANALYSIS	20,970	18,078	19,669		19,669
147	0605709A	06	EXPLOITATION OF FOREIGN ITEMS	5,403	5,460	5,445		5,445
148	0605712A	06	SUPPORT OF OPERATIONAL TESTING	78,360	68,191	68,786		68,786
149	0605716A	06	ARMY EVALUATION CENTER	63,961	61,450	63,302		63,302
150	0605718A	06	ARMY MODELING & SIM X-CMD COLLABORATION & INTEG	5,885	3,926	3,420		3,420
151	0605801A	06	PROGRAMWIDE ACTIVITIES	76,503	73,685	83,054		83,054
152	0605803A	06	TECHNICAL INFORMATION ACTIVITIES	77,926	48,309	63,872		63,872
153	0605805A	06	MUNITIONS STANDARDIZATION, EFFECTIVENESS AND SAFETY	84,951	53,338	57,142		57,142
154	0605857A	06	ENVIRONMENTAL QUALITY TECHNOLOGY MGMT SUPPORT	4,991	3,195	4,961		4,961
155	0605898A	06	MANAGEMENT HQ - R&D	15,772	16,154	17,558		17,558
156	0909980A	06	JUDGMENT FUND REIMBURSEMENT	226				
157	0909999A	06	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS	106				
Total: Management support				1,487,815	1,142,383	1,048,671	8,513	1,057,184
Operational system development								
158	0603778A	07	MLRS PRODUCT IMPROVEMENT PROGRAM	26,624	51,619	66,641		66,641
159	0603820A	07	WEAPONS CAPABILITY MODIFICATIONS UAV			24,142		24,142
160	0102419A	07	AEROSTAT JOINT PROJECT OFFICE	317,132	372,493	344,655		344,655

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Exhibit R-1

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Line No	Program Element Number	Act	Item	Thousands of Dollars				
				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
161	0203347A	07	INTELLIGENCE SUPPORT TO CYBER (ISC) MIP		2,360			
162	0203726A	07	ADV FIELD ARTILLERY TACTICAL DATA SYSTEM	29,127	24,622	29,546		29,546
163	0203735A	07	COMBAT VEHICLE IMPROVEMENT PROGRAMS	169,400	204,481	53,307		53,307
164	0203740A	07	MANEUVER CONTROL SYSTEM	36,131	25,540	65,002		65,002
165	0203744A	07	AIRCRAFT MODIFICATIONS/PRODUCT IMPROVEMENT PROGRAMS	240,321	134,999	163,205		163,205
166	0203752A	07	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	767	710	823		823
167	0203758A	07	DIGITIZATION	8,218	6,329	8,029		8,029
168	0203759A	07	FORCE XXI BATTLE COMMAND, BRIGADE AND BELOW (FBCB2)		3,935			
169	0203801A	07	MISSILE/AIR DEFENSE PRODUCT IMPROVEMENT PROGRAM	37,731	24,280	44,560		44,560
170	0203802A	07	OTHER MISSILE PRODUCT IMPROVEMENT PROGRAMS	3,979				
171	0203808A	07	TRACTOR CARD	19,249	14,870	42,554		42,554
172	0208053A	07	JOINT TACTICAL GROUND SYSTEM	13,189	12,403	27,630		27,630
173	0208058A	07	JOINT HIGH SPEED VESSEL (JHSV)	2,961	3,153	3,044		3,044
174	0301359A	07	SPECIAL ARMY PROGRAM					
175	0303028A	07	SECURITY AND INTELLIGENCE ACTIVITIES	17,348		2,854		2,854
176	0303140A	07	INFORMATION SYSTEMS SECURITY PROGRAM	61,313	118,090	61,220		61,220
177	0303141A	07	GLOBAL COMBAT SUPPORT SYSTEM	138,764	125,569	100,505		100,505
178	0303142A	07	SATCOM GROUND ENVIRONMENT (SPACE)	32,453	33,694	12,104		12,104
179	0303150A	07	WWWCCS/GLOBAL COMMAND AND CONTROL SYSTEM	13,683	13,024	23,937		23,937
180	0305204A	07	TACTICAL UNMANNED AERIAL VEHICLES	262,655	54,300	40,650		40,650
181	0305208A	07	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	191,253	119,202	44,198		44,198
182	0305219A	07	MQ-1 SKY WARRIOR A UAV		123,156	137,038		137,038
183	0305232A	07	RQ-11 UAV		1,599	1,938		1,938
184	0305233A	07	RQ-7 UAV		7,805	31,940		31,940
185	0307207A	07	AERIAL COMMON SENSOR (ACS)	115,432				
186	0307665A	07	BIOMETRICS ENABLED INTELLIGENCE		14,114	15,018		15,018
187	0708045A	07	END ITEM INDUSTRIAL PREPAREDNESS ACTIVITIES	106,259	61,098	59,297		59,297
Total: Operational system development				1,843,989	1,553,445	1,403,837	0	1,403,837

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Line No	Program Element Number	Act	Item	Thousands of Dollars				
				FY2010	FY2011	FY2012	FY2012 OCO	FY2012 Total
Total: RDT&E, Army				11,706,929	10,479,851	9,679,444	8,513	9,687,957

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Appropriation 2040: Research, Development, Test & Evaluation, Army*

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31	03	0603003A	AVIATION ADVANCED TECHNOLOGY.....	Volume 3 - 68
32	03	0603004A	Weapons and Munitions Advanced Technology.....	Volume 3 - 85
33	03	0603005A	Combat Vehicle and Automotive Advanced Technology.....	Volume 3 - 104
34	03	0603006A	Command, Control, Communications Advanced Technology.....	Volume 3 - 137
35	03	0603007A	Manpower, Personnel and Training Advanced Technology.....	Volume 3 - 143
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39	03	0603020A	TRactor rose.....	Volume 3 - 176
40	03	0603105A	MILITARY HIV RESEARCH.....	Volume 3 - 180
41	03	0603125A	Combating Terrorism - Technology Development.....	Volume 3 - 185
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48	03	0603606A	Landmine Warfare and Barrier Advanced Technology.....	Volume 3 - 224
49	03	0603607A	JOINT SERVICE SMALL ARMS PROGRAM.....	Volume 3 - 232
50	03	0603710A	NIGHT VISION ADVANCED TECHNOLOGY.....	Volume 3 - 236
51	03	0603728A	Environmental Quality Technology Demonstrations.....	Volume 3 - 248
52	03	0603734A	Military Engineering Advanced Technology.....	Volume 3 - 258
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Combating Terrorism - Technology Development	0603125A	41	03.....Volume 3 -	185
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Electronic Warfare Technology	0603270A	44	03.....Volume 3 -	193
Environmental Quality Technology Demonstrations	0603728A	51	03.....Volume 3 -	248
JOINT SERVICE SMALL ARMS PROGRAM	0603607A	49	03.....Volume 3 -	232
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MEDICAL ADVANCED TECHNOLOGY	0603002A	30	03.....Volume 3 -	20
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 (Listing by Budget Activity, then Program Element Number)

BA# 03: Advanced Technology Development (ATD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
29	03	0603001A	Warfighter Advanced Technology	51.596	37.364	52.979	-	52.979
30	03	0603002A	MEDICAL ADVANCED TECHNOLOGY	336.741	71.510	68.171	-	68.171
31	03	0603003A	AVIATION ADVANCED TECHNOLOGY	104.229	57.454	62.193	-	62.193
32	03	0603004A	Weapons and Munitions Advanced Technology	92.638	64.438	77.077	-	77.077
33	03	0603005A	Combat Vehicle and Automotive Advanced Technology	261.689	89.499	106.145	-	106.145
34	03	0603006A	Command, Control, Communications Advanced Technology	12.074	8.102	5.312	-	5.312
35	03	0603007A	Manpower, Personnel and Training Advanced Technology	7.220	7.921	10.298	-	10.298
36	03	0603008A	Electronic Warfare Advanced Technology	55.903	50.359	57.963	-	57.963
37	03	0603009A	TRACTOR HIKE	10.945	8.015	8.155	-	8.155
38	03	0603015A	Next Generation Training & Simulation Systems	25.895	15.334	17.936	-	17.936
39	03	0603020A	TRactor rose	13.997	12.309	12.597	-	12.597
40	03	0603105A	MILITARY HIV RESEARCH	29.277	6.688	6.796	-	6.796
41	03	0603125A	Combating Terrorism - Technology Development	11.366	10.550	12.191	-	12.191
42	03	0603130A	TRACTOR NAIL	-	-	4.278	-	4.278
43	03	0603131A	TRACTOR EGGS	-	-	2.261	-	2.261
44	03	0603270A	Electronic Warfare Technology	23.766	18.350	23.677	-	23.677
45	03	0603313A	Missile and Rocket Advanced Technology	83.649	84.553	90.602	-	90.602
47	03	0603322A	TRACTOR CAGE	11.741	9.986	10.315	-	10.315

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Master Exhibit R-1
(Listing by Budget Activity, then Program Element Number)

BA# 03: Advanced Technology Development (ATD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
48	03	0603606A	Landmine Warfare and Barrier Advanced Technology	35.765	26.953	31.541	-	31.541
49	03	0603607A	JOINT SERVICE SMALL ARMS PROGRAM	8.683	9.151	7.686	-	7.686
50	03	0603710A	NIGHT VISION ADVANCED TECHNOLOGY	81.157	39.912	42.414	-	42.414
51	03	0603728A	Environmental Quality Technology Demonstrations	16.584	15.878	15.959	-	15.959
52	03	0603734A	Military Engineering Advanced Technology	40.423	27.393	36.516	-	36.516
53	03	0603772A	Advanced Tactical Computer Science and Sensor Technology	50.856	24.873	30.600	-	30.600
Total: Advanced Technology Development (ATD)				1,366.194	696.592	793.662	-	793.662

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	51.596	37.364	52.979	-	52.979	40.814	43.658	43.802	44.211	Continuing	Continuing
242: <i>AIRDROP EQUIPMENT</i>	3.684	3.801	3.860	-	3.860	3.926	3.999	4.065	4.134	Continuing	Continuing
543: <i>AMMUNITION LOGISTICS</i>	1.308	1.347	2.187	-	2.187	2.285	2.484	2.504	2.247	Continuing	Continuing
C07: <i>JOINT SERVICE COMBAT FEEDING TECH DEMO</i>	2.331	2.361	2.413	-	2.413	2.467	2.516	2.553	2.566	Continuing	Continuing
J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>	28.953	29.855	42.419	-	42.419	29.136	31.019	30.830	31.624	Continuing	Continuing
J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	15.320	-	-	-	-	-	-	-	-	Continuing	Continuing
VT5: <i>EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION</i>	-	-	2.100	-	2.100	3.000	3.640	3.850	3.640	Continuing	Continuing

Note

FY12 funding increase for high priority efforts.

A. Mission Description and Budget Item Justification

This program element (PE) provides Soldiers and Small Combat Units with the most effective personal clothing, equipment, and rations at the least weight and sustainment burden. This PE supports the maturation and demonstration of technologies associated with air delivery of personnel and cargo (Project 242), rapid ammunition/munitions deployability and resupply (Project 543), combat rations and combat feeding equipment (Project C07), combat clothing and personal equipment (including protective equipment such as personal armor, helmets, and eye wear) (Project J50) and expeditionary base camps (Project VT5). Project J52 funds congressional special interest items. The projects in this PE adhere to Tri-Service Agreements on clothing, textiles, and food with coordination provided through the Cross-Service Warfighter Equipment Board, the Soldier as a System Integrated Concepts Development Team, and the DoD Combat Feeding Research and Engineering Board.

Work in this PE is related to, and fully coordinated with, PE 0602786A (Warfighter Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602624A (Weapons and Munitions Technology), PE 0602705A (Electronics and Electronic Devices), PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603008A (Command, Control, Communications Advanced Technology), PEs 0602623A and 0603607A (Joint Service Small Arms Program) and PEs 0602784A (Military Engineering Technology) and 0603734A (Military Engineering Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>
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Work is led, performed, and/or managed by the Natick Soldier Research, Development, and Engineering Center (NSRDEC), Natick, MA and the Armament Research, Development, and Engineering Center (ARDEC), Picatinny, NJ.

B. Program Change Summary (\$ in Millions)	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	54.290	37.364	38.411	-	38.411
Current President's Budget	51.596	37.364	52.979	-	52.979
Total Adjustments	-2.694	-	14.568	-	14.568
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-1.592	-			
• SBIR/STTR Transfer	-1.102	-			
• Adjustments to Budget Years	-	-	14.568	-	14.568

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603001A: <i>Warfighter Advanced Technology</i>				242: <i>AIRDROP EQUIPMENT</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
242: <i>AIRDROP EQUIPMENT</i>	3.684	3.801	3.860	-	3.860	3.926	3.999	4.065	4.134	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates equipment and innovative techniques for precision aerial delivery of cargo and personnel. Aerial delivery is a key capability for rapid force projection and global precision delivery. These efforts are designed to advance state of the art precision delivery technologies for currently equipped aircraft, unmanned aerial systems (UAS) and advanced rotary wing aircraft. These efforts provide the Warfighter with highly accurate, timely cargo/payload delivery and resupply in all terrain and weather conditions. Precision delivery/resupply reduces vulnerability of ground soldiers (lessens exposure to IEDs and other battlefield threats), aircraft and crew. Precision aerial delivery supports remote warfare with activities such as placement of battlefield sensors, reduction of Soldier load and initial delivery of key expeditionary base camp assets. Demonstrated technologies transition to Product Manager (PM)-Force Sustainment Systems (PM FSS), PM-Soldier Clothing and Individual Equipment (PM-SCIE) as well as other Army PMs.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is led, performed and/or managed by the Natick Soldier Research, Development, and Engineering Center (NSRDEC), Natick, MA.

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

	FY 2010	FY 2011	FY 2012
Title: Advanced Precision Aerial Delivery of Cargo	3.684	3.041	2.895
Description: This effort demonstrates enhancements for increasing the precision of aerial delivery using components and technical breakthroughs from PE 0602786A/project 283. Projects transition to the Joint Precision Airdrop System (JPADS).			
FY 2010 Accomplishments: Matured and demonstrated emerging Guidance Navigation & Control (GN&C) software component technologies and transitioned promising GN&C components candidates to PM -FSS and demonstrated technologies for low velocity, light payload (5K-20K lb.) airdrop.			
FY 2011 Plans: Mature and demonstrate precision airdrop sensor technologies for real-time monitoring of height (height sensors integrated with terrain data) as well as air properties (temperature, air density, velocity, changing pressure); conduct scaled (i.e., weight, altitude and number of parachutes) airdrop testing of the low velocity, heavy payload (22K-42K lb) technologies. Evaluate results and select full scale design for Above Ground Level (500 ft.) delivery of heavy payloads.			
FY 2012 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>		PROJECT 242: <i>AIRDROP EQUIPMENT</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
Will mature, demonstrate and transition sensor technologies for real-time monitoring of weather to PM-FSS JPADS ; mature advanced rotary wing aerial delivery sling load net technologies for low cost one-time-use.					
Title: Advanced Airborne Insertion (Personnel Airdrop)			-	0.760	0.965
Description: This effort demonstrates technical breakthroughs identified by PE 0602786A/Project 283 which provide safety and security enhancements for the aerial insertion of Airborne troops.					
FY 2011 Plans: Transition mature chest-mounted navigational aid and display technologies to PM-SCIE and demonstrate payload-to-payload and jumper-to-jumper in-flight communications.					
FY 2012 Plans: Will mature technologies for cargo/jumper locators and demonstrate payload-to-payload, jumper-to-jumper and payload-to-jumper in-flight communications.					
Accomplishments/Planned Programs Subtotals			3.684	3.801	3.860
C. Other Program Funding Summary (\$ in Millions) N/A					
D. Acquisition Strategy N/A					
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army								DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>				PROJECT 543: <i>AMMUNITION LOGISTICS</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
543: <i>AMMUNITION LOGISTICS</i>	1.308	1.347	2.187	-	2.187	2.285	2.484	2.504	2.247	Continuing	Continuing

Note

Not applicable

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies for rapidly deploying and resupplying munitions and improving the return of unused ammunition from deployment. This effort contributes to force readiness and reduction in the logistics footprint through improvements in Materials Handling Equipment (MHE), ammunition and missile packaging/palletization, explosives safety, weapons re-arm, and asset throughput/management.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed and managed by the US Army Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ.

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

	FY 2010	FY 2011	FY 2012
Title: Tactical Ammunition Accountability (TAA)	1.308	1.347	-
Description: This effort demonstrates advanced supply chain procedures coupled with state-of-the-art remote surveillance devices at the weapon system/munition level to provide precise knowledge of ammunition count, location and health status throughout an Area Of Responsibility (AOR).			
FY 2010 Accomplishments: Fabricated an automated ammunition expenditure reporting design mounted on a surrogate weapon system and conducted demonstration of ammunition consumption transactions from the weapons system to Army's property recording system			
FY 2011 Plans: Complete development of the automated expenditure reporting design; conduct demonstration in a tactically relevant environment.			
Title: Automated Material Handling Technology	-	-	1.300
Description: This effort demonstrates smart sensors and robotic technology as add-on kits for side loading forklifts used in ammunition storage igloos and tactical forklifts to provide quick, safe, and cost effective transfer of munitions pallets between storage areas and transportation assets.			
FY 2012 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011				
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>		PROJECT 543: <i>AMMUNITION LOGISTICS</i>			
B. Accomplishments/Planned Programs (\$ in Millions)				FY 2010	FY 2011	FY 2012
Will apply automated capabilities to a manually operated forklift and evaluate performance within an ammunition igloo.						
Title: Weapon System Rearm Technology				-	-	0.887
Description: This effort demonstrates automated modular re-arm systems for the medium caliber ground combat vehicle, as well as towed and self-propelled howitzers.						
FY 2012 Plans: Will select concepts and preliminary designs for re-arm system designs.						
Accomplishments/Planned Programs Subtotals				1.308	1.347	2.187
C. Other Program Funding Summary (\$ in Millions) N/A						
D. Acquisition Strategy N/A						
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.						

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army								DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>				PROJECT C07: <i>JOINT SERVICE COMBAT FEEDING TECH DEMO</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
C07: <i>JOINT SERVICE COMBAT FEEDING TECH DEMO</i>	2.331	2.361	2.413	-	2.413	2.467	2.516	2.553	2.566	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies for military combat feeding systems and combat rations. Demonstration areas of emphasis include: enhanced nutrient composition to maximize cognitive and physical performance on the battlefield; cutting edge food stabilization and preservation techniques that increase the variety and quality of rations used by the Joint Services; novel ration packaging technologies to minimize degradation of combat rations during storage; field portable biosensors for foodborne detection and identification; and predictive modeling tools to protect the warfighter from foodborne illnesses. This project demonstrates combat feeding technology with reduced logistics (in component parts, weight, volume, fuel, and water) and labor requirements, while improving the quality of food service. The project, a Department of Defense (DoD) program for which the Army has Executive Agent responsibility, provides technology development for Joint Service Combat Feeding. The DoD Combat Feeding Research and Engineering Board provides oversight for this project. Demonstrated field feeding equipment technologies transition to Product Manager (PM)-Force Sustainment Systems (PM FSS).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led, performed and/or managed by the US Army Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA. This project has collaborative efforts with the US Army Research Institute for Environmental Medicine.

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

	FY 2010	FY 2011	FY 2012
Title: Combat Feeding Equipment Technologies	0.893	0.903	1.091
Description: This effort demonstrates equipment and energy technologies to enhance effectiveness and reduce logistics footprint of field feeding systems.			
FY 2010 Accomplishments: Integrated and demonstrated an ethylene control system in refrigerated containers to extend the shelf-life of fresh fruits and vegetables, integrated technology improvements for waste to energy systems.			
FY 2011 Plans: Demonstrate a JP8 powered flameless individual in-line water heater for heating dehydrated rations and beverages; demonstrate a passive container cooling system for rations stored in high ambient temperature to reduce ration spoilage.			
FY 2012 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>	PROJECT C07: <i>JOINT SERVICE COMBAT FEEDING TECH DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will demonstrate a fully integrated Battlefield Kitchen with improved habitability and safety, as well as reduced fuel consumption; demonstrate a grey water recycling system for mobile kitchens to manage liquid waste on the battlefield; demonstrate mission tailorable, man-portable appliances capable of integrating into current kitchen platforms.				
Title: Ration Stabilization, Packaging, Nutrient Delivery and Food Safety Technologies		1.438	1.458	1.322
Description: This effort demonstrates technologies for enhancing nutrition, food stabilization, ration packaging and food safety to support warfighters physical and cognitive performance on the battlefield.				
FY 2010 Accomplishments: Demonstrated shelf stability of probiotic enhanced ration components and encapsulated oils for ration systems; prepared field manual on validated assays/surveys for the analysis of food pathogens and biological agents and transitioned to the Veterinary Services Activity/Office of the Surgeon General; and demonstrated the optimal use of analytical food pathogen detection diagnostics and the accompanying procedures for high throughput screening of foods.				
FY 2011 Plans: Demonstrate shelf stable sandwiches with emulsion based fillings; health benefits of probiotic ration components for bacterial reductions in fresh vegetables and component food. Develop packaging prototypes using novel multilayer polymer films to enhance barrier's mechanical and insulating properties and transition ration, packaging and nutrient delivery technologies.				
FY 2012 Plans: Will demonstrate ration packaging permeability models that will be used to develop better ration packaging systems to decrease battlefield waste and packaging weight; will demonstrate fortified ration components that will result in a wider variety of eat-on-the-go rations with nutrient composition optimized for warfighter physical and cognitive performance for specific missions.				
Accomplishments/Planned Programs Subtotals		2.331	2.361	2.413
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>				PROJECT J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>	28.953	29.855	42.419	-	42.419	29.136	31.019	30.830	31.624	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures, demonstrates and integrates high-payoff technologies to provide the Soldier and Small Combat Units (SCU) with the most effective personal protective clothing, electronics subsystems, and mission specific equipment while reducing weight, sustainment and cognitive burden. Efforts in this project focus on maturation, integration and demonstration of technologies such as personal armor and headgear; lightweight, ruggedized, durable electronic components for situational awareness and network connectivity; Soldier load-optimization and power/power management components/systems for the individual Soldier and SCU. These efforts utilize field demonstrations to obtain relevant user feedback for design and performance validation.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led, performed and/or managed by the US Army Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA. The Soldier Ballistic and Blast Protection task is executed in collaboration with the DoD Medical Research Program for Prevention, Mitigation and Treatment of Blast Injuries and leverages and integrates technologies developed in PEs 0602786A/project H98 and 0602787A/project 878.

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

	FY 2010	FY 2011	FY 2012
Title: Soldier/Small Unit Ballistic and Blast Protection	4.420	3.521	8.290
Description: This effort matures and demonstrates Soldier systems level modeling, test devices, protocols and technologies to improve Warfighter survivability against blast and ballistic (B&B) threats. Work in this project is fully coordinated with PEs 0602786A/Project H98 (Warfighter Technology), 0602618/Project 61 (Ballistics Technology) and 0602787A/Project 878 (Medical Technology). Demonstrated technologies transition to Product Manager-Soldier Protection and Individual Equipment and/or industry partners.			
FY 2010 Accomplishments: Matured materials for individual blast protection concept, blast assessment protocol; used ballistic and blast protective materials from PE 0602786A/project H98 and PE 0602105A/project H84 to demonstrate enhanced ballistic and blast protection system for thorax area; matured and demonstrated breadboard enhanced helmet to address emerging threats.			
FY 2011 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>	PROJECT J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Develop and refine test devices and protocols for additional injury mechanisms of blast and ballistic events; refine and evaluate ballistic and blast protection system prototypes and obtain user feedback; develop/refine combat effectiveness metrics linking physical effects of load to cognitive performance. FY 2012 Plans: Will improve the body armor assessment protocol by validating range of motion measurements with operationally-relevant Soldier agility assessment techniques; will demonstrate head and face protection retrofit for existing helmets and will transition detailed specification and prototypes; synchronize and focus Modeling and Simulation programs to analyze existing data (mobility, protection, payload, lethality) and establish trade space, quantify risk/tradeoffs to optimize protection concepts and advance state-of-the-art design rules for individual armor.				
Title: Soldier /Small Unit Integrated Protection and Capability Enhancement Description: This effort matures Soldier protection technologies, integrates components and demonstrates innovative capability enhancement technologies for the Soldier/Small Combat Unit. This work is fully coordinated with PE 060786A/Project H98 (Warfighter Technology), PE 0602716A/Project H70 (Human Factors Engineering Technologies) and PE 0602705/Project H94 (Electronics and Electronic Devices). Demonstrated technologies transition to various PEO-Soldier Product Managers. FY 2010 Accomplishments: Evaluated Microclimate Cooling (MC) technologies from PE 0602786A/project H98 in load carriage context; conducted joint technical demonstration with Joint Science and Technology Office Chemical and Biological Defense (JSTO CBD) for advanced Soldier CB protection to determine thermal burden; selected promising battlefield noise, laser protection technologies (0602105A/project H84), displays, sensors, interfaces and battle command applications for next generation Soldier-centric headgear. FY 2011 Plans: Fabricate, evaluate and optimize interfaces for Soldier-centric headgear components; refine headgear system design based on sizing, shape, stability and balance; use human performance, Soldier load, and threat assessment data to begin optimization of modular Soldier as System protection variants; identify baseline data required to support development of leader mission planning tools to assist leaders in the field in the selection of appropriate mission specific modular load configurations. FY 2012 Plans: Will continue to refine and improve the integrated Soldier-centric headgear design and conduct system evaluations; select promising Flame Resistant, visual, thermal, ballistic and concealment/signature management technologies; and baseline mission specific equipment for modular Soldier as a System protection variants.		3.341	4.183	4.440
Title: Soldier/Small Unit Load Management and Mobility Enhancement		3.669	3.129	4.530

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011				
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>		PROJECT J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>			
B. Accomplishments/Planned Programs (\$ in Millions)				FY 2010	FY 2011	FY 2012
<p>Description: This effort uses a system engineering approach to reduce Soldier and Small Combat Unit load by integrating lighter weight materials into components, employing energy/power management strategies and devising mechanisms/equipment to offload some mission equipment.</p> <p>FY 2010 Accomplishments: Evaluate performance of Full Body Human Augmentation (exoskeleton) system, optimize and mature low power components to provide a more agile and efficient lightweight LBHA System; conducted technical and biomechanical tests to investigate spatial information to enhance mechanical assist mobility by understanding and remembering user's movements.</p> <p>FY 2011 Plans: Investigate load carriage options for placement of Soldier loads (i.e., fuel, batteries) on the Lower Body Human Augmentation (LBHA) System; draft technical and operationally-based system assessment protocols and analyze of components of Soldier Load which could be matured with lighter weight raw materials, reduced packaging or maturing technologies.</p> <p>FY 2012 Plans: Will focus on a holistic approach to identify capabilities that enable the Small unit to efficiently shoot or move across varying terrain; will devise measures to assess the impact of load on marksmanship performance; will conduct field validation of mobility aids to exploit Soldier's use and application of spatial information; will develop Soldier/Small Unit applications to be incorporated into mission planning tools for load management, Soldier cross-loading and resupply analysis.</p>						
<p>Title: Small Combat Unit C4 Interfaces</p> <p>Description: This effort matures and demonstrates a modular, open architecture personal area networks with graphical user interface for Soldier-borne technologies. Effort is coordinated with PE 0602786A/H98 (Warfighter Technology), PE 0603710A/K70 (Night Vision Advanced Technology) and PE 0602624A/Project H18 (Weapons and Munitions Technology), PE 0603005/Project 497 (Combat Vehicle and Automotive Advanced Technology), and PE 0603004/Project 232 (Weapons and Munitions Advanced Technology).</p> <p>FY 2010 Accomplishments: Examined interfacing and interference characteristics of wireless protocols with communication devices in relevant field environments; designed Soldier system interface protocols to enable robotic control and image dissemination across the squad.</p> <p>FY 2011 Plans:</p>				6.219	6.823	6.952

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>	PROJECT J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Conduct laboratory analysis and conduct field demonstrations of Soldier-borne wireless personal area network (WPAN) system and obtain National Security Agency (NSA) approvals; demonstrate an on-Soldier system architecture that tightly couples three existing subsystems (battery, radio, headset), analyzes system performance/efficiency and develop user interface technologies.</p> <p>FY 2012 Plans: Will continue gunfire detection, optical weapon sights and target identification efforts started in Small Combat Unit Lethality Integration effort and integrate into Soldier network; increase WPAN functionality to connect a wide range of Soldier-borne hardware components (such as sensors for weapon target pairing) and optimize form factor for efficient operation and layout; will conduct field trials to characterize the system architecture with the complete integration of the WPAN and develop and demonstrate user interface technologies for mission command networking of Soldier and unmanned sensors; will conduct field demonstrations of capabilities Small Units employ during intelligence gathering, training, and other operations; will optimize Soldier acceptance parameters including form factor graphical user displays for efficient task completion and power management.</p> <p>Title: Soldier and Small Unit Power and Energy</p> <p>Description: This effort matures and demonstrates technologies to achieve capability improvements in lightweight Soldier power and power management components and subsystems. This effort is fully coordinated with 0602705A/Project H11 (Electronics and Electronic Devices).</p> <p>FY 2010 Accomplishments: Conducted user assessments of high-energy density LiCFx primary batteries at half the size, conformal rechargeable batteries, and hybrid power systems (reformed methanol and direct methanol fuel cells); matured an engine based portable power source which enables self-contained power capability.</p> <p>FY 2011 Plans: Conduct field evaluation of fuel cells (reformed and direct methanol); demonstrate improved hybrid power technology components which can supply a 24 hour mission; conduct field demonstrations of engine based generator and charger system for tactical battery charging; mature a conformal headgear power source and wireless power transfer from body to weapon or helmet.</p> <p>FY 2012 Plans: Will demonstrate central conformal headgear power source; will demonstrate wireless power transfer from body to weapon or helmet; and mature multi-fueled (JP8, DF, kerosene) man-packable tactical power source and battery charger; will evaluate laboratory data assessing network power requirements and mature smaller, lighter wearable hybrid power source to enable extended missions. Effort is coordinated with PE 0602705A/projects H11 and H94.</p>		3.200	3.687	3.335
Title: Small Combat Unit Lethality Integration		3.328	3.590	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>	PROJECT J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort pursues distributed unmanned sensors, integrated gunfire detection system, optical weapon sight with net-centric tactical fire control software that utilizes human decision aides to improve the lethality and combat effectiveness of the Soldier and Small Combat Unit. This project is fully coordinated with PE 0602624A/Project H18 (Weapons and Munitions Technology) and PE 0603004/Project 232 (Weapons and Munitions Advanced Technology).</p> <p>FY 2010 Accomplishments: Miniaturized Soldier-borne gunfire detection system; evaluated data filtering of information and improved network performance; fused air and ground sensor assets with Soldier-borne network; detected and identified enemy targets and passed information to target identification network; evaluated strategies and minimized time of digital call for fire and lethal effects.</p> <p>FY 2011 Plans: Mature and demonstrate Soldier-borne 3D gunfire detection capabilities and technologies; demonstrate optical weapon sight (smart sight) using ballistic tables to accurately laze target and perform cooperative engagement; incorporate unmanned assets (Air Vehicles, Ground Vehicles and Ground Sensors) into target identification network and demonstrate target (Soldier and Vehicle) of destruction through innovative message processing, synchronization and accumulation of internal platoon fire assets such as 40 mm grenades, 60 mm Mortars, 120 mm Mortars and Javelin Weapon System. Work in this area will transition in FY12 to Small Combat Unit C4 Interfaces.</p>				
<p>Title: Small Unit Systems Engineering, Integration and Demonstration</p> <p>Description: This effort develops tools to mature, demonstrate and assess the interoperability of Soldier-borne electronic hardware and software equipment with current and emerging Army mission command systems to improve Soldier mission performance. This effort is coordinated with PE 0603004A/project 232.</p> <p>FY 2010 Accomplishments: Continued to develop and improve simultaneous constructive, virtual and live simulation modules to assess interoperability and maturity of the Soldier-borne network components to include lethality and survivability systems and assessed simulation tools in field relevant environment.</p> <p>FY 2011 Plans: Complete enhancement of simulation tools for improved assessment of Soldier networked systems and develop, integrate and demonstrate embedded laboratory data collection tools for assessing network power requirements and mobility technologies; develop and demonstrate networked Soldier System interoperable information management algorithms, software, hardware</p>		4.776	4.922	4.872

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>		PROJECT J50: <i>FUTURE WARRIOR TECHNOLOGY INTEGRATION</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
and network component interfaces and power centric architectures; demonstrate and assess the interoperability of existing and emerging networked hardware and software technologies in field relevant environments. FY 2012 Plans: Will develop, integrate, and demonstrate embedded laboratory data collection tools for assessing cognitive burden associated with information management algorithms and physical burden associated with hardware and network component interfaces; continue assessing maturity of Soldier-borne technologies and power centric architectures in simulated field relevant environments.				
Title: Small Combat Unit Load Reduction Description: Identify technologies to improve Soldier and Small Unit mobility and endurance. Analyze reductions in physical load and load related injuries as well as impacts to cognitive behavior and mission success. Conduct concept and technology assessments of components and subsystems or systems models and demonstrate general military utility when applied to different types of military techniques. Work in this effort is fully coordinated with all other tasks in this PE. FY 2012 Plans: Define a Small Combat Unit representative load baseline; survey Government and Industry to identify and harvest opportunities to reduce or better manage loads; identify tools necessary to diagnose and visualize load effects of equipment as well as measure mission effectiveness and mobility; develop concept and technology assessment plan with methods, metrics and measures; conduct a technology assessment of the representative baseline; conduct a concept assessment of the best collection of soldier technologies identified in survey; identify impact to capabilities created by the concept and identify tradeoffs required to make a difference in Small Combat Unit Load.		-	-	10.000
Accomplishments/Planned Programs Subtotals		28.953	29.855	42.419
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603001A: <i>Warfighter Advanced Technology</i>				J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	15.320	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Warfighter Advanced Technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Multi-layer Coextrusion for High Performance Packaging</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Investigated sophisticated die technologies that processed high performance packaging structures for the Unitized Group Ration (UGR) polymeric tray.</p>	1.592	-	-
<p>Title: Precision Guided Airdropped Equipment</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed advances in the state-of-the-art Joint Precision Airdrop Systems guidance and navigation for small airdrop resupply payloads.</p>	1.194	-	-
<p>Title: Advanced Packaging Materials for Combat Rations</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Investigated potential alternative processing technologies for heat sensitive foods.</p>	0.796	-	-
<p>Title: Soldier Personal Cooling System</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a 1.0 liter, 3.5 pound, 120 watt (at 125°F) vapor compression, liquid circulating microclimate cooling system in accordance with Air Soldier</p>	0.954	-	-
<p>Title: Reducing First Responder Casualties with Physiological Monitoring</p>	1.193	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>		PROJECT J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a wearable physiological monitoring system for emergency responders that can assist in decision making regarding physical performance and heat stress during training and missions.</p>				
<p>Title: Deployment of Affordable Guided Airdrop System</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Evaluated performance of a precision guided airdrop unit with a 50% decrease in weight and a 75% decrease in volume of the airborne guidance unit.</p>		1.990	-	-
<p>Title: Compostable and Recyclable Fiberboard Material for Secondary Packaging</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed and demonstrated a new generation of lightweight recyclable fiberboard with added functionality to improve material / supply chain efficiencies and performance.</p>		1.990	-	-
<p>Title: Remote Environmental Monitoring and Diagnostics in the Perishables Supply Chain</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed the capability to determine the remaining shelf life of operational rations based on storage history.</p>		2.189	-	-
<p>Title: High Pressure Pasteurization & Pressure Assisted Thermal Sterilization</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed the capability to sustain near-fresh quality entrees without refrigeration.</p>		3.422	-	-
Accomplishments/Planned Programs Subtotals		15.320	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>	PROJECT J52: <i>WARFIGHTER ADVANCED TECHNOLOGY INITIATIVES (CA)</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>				PROJECT VT5: <i>EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
<i>VT5: EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION</i>	-	-	2.100	-	2.100	3.000	3.640	3.850	3.640	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates fully integrated holistic expeditionary base camp (EBC) capabilities with mission-specific plug and play components, subsystems and modules designed to optimize manpower requirements, improve situational awareness, increase survivability, improve habitation, reduce logistics footprint, enhance supportability and reduce cost. Expeditionary Base Camp (EBC) systems (or remote command outposts) provide an operational capability for Small Combat Units (battalion and below) and Soldiers which are rapidly deployable/re-locatable and require no Military Construction and limited materiel handling support. The need for this technologically enabled capability has arisen as a result of new tactics, techniques and procedures used in austere, remote, and challenging environments in which stability operations, counterinsurgency operations and peace keeping missions are conducted. This project integrates mature technologies to create mission specific lab demonstrators and evaluates the performance capabilities using metrics and methodologies developed under PE 0602786//Project VT4.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led, performed and/or managed by the US Army Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA and fully coordinated with PE 0602786A (Warfighter Technology), PE 0602784A and 0603734A (Military Engineering) PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603125A (Combating Terrorism Technology Development), and PE 0603772A (Advanced Tactical Computer Science and Sensor Technology).

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

	FY 2010	FY 2011	FY 2012
Title: Expeditionary Base Camp (EBC) Technology Demonstrations	-	-	2.100
Description: This effort assesses and integrates maturing technologies required to plan, establish, operate, protect, sustain and redeploy a holistic small unit base camp system and manage its power, waste and water resources.			
FY 2012 Plans: Will assess maturing power, waste and water technologies and define an operationally effective architecture for a basic base camp demonstrator; begin system integration of best performing components, and validate system effectiveness measures; begin to mature and demonstrate the architecture for a unit mission base camp planning tool identifying pertinent system aspects such as interoperability requirements and power demand.			
Accomplishments/Planned Programs Subtotals	-	-	2.100

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603001A: <i>Warfighter Advanced Technology</i>	PROJECT VT5: <i>EXPEDITIONARY MOBILE BASE CAMP DEMONSTRATION</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>							
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	336.741	71.510	68.171	-	68.171	65.647	69.795	72.971	72.302	Continuing	Continuing
810: <i>IND BASE ID VACC&DRUG</i>	19.748	18.185	18.646	-	18.646	18.820	20.674	19.910	18.342	Continuing	Continuing
840: <i>COMBAT INJURY MGMT</i>	42.272	44.004	38.659	-	38.659	34.079	35.463	36.729	37.141	Continuing	Continuing
945: <i>BREAST CANCER STAMP PROCEEDS</i>	1.005	-	-	-	-	-	-	-	-	Continuing	Continuing
97B: <i>BLOOD SAFETY</i>	2.388	-	-	-	-	-	-	-	-	Continuing	Continuing
97D: <i>CENTER FOR AGING EYE</i>	2.387	-	-	-	-	-	-	-	-	Continuing	Continuing
FH4: <i>FORCE HEALTH PROTECTION - ADV TECH DEV</i>	1.885	1.974	1.542	-	1.542	1.672	1.761	1.776	1.806	Continuing	Continuing
MB1: <i>ADV DIAGNOSTICS & THERAPEUTIC DIG TECH</i>	1.593	-	-	-	-	-	-	-	-	Continuing	Continuing
MB3: <i>CENTER FOR INTEGRATION OF MEDICINE & INNOV TECH</i>	8.953	-	-	-	-	-	-	-	-	Continuing	Continuing
MG5: <i>NATIONAL FUNCTIONAL GENOMICS CENTER (CA)</i>	5.968	-	-	-	-	-	-	-	-	Continuing	Continuing
MI4: <i>ALLIANCE FOR NANOHEALTH (CA)</i>	3.979	-	-	-	-	-	-	-	-	Continuing	Continuing
MJ2: <i>FIBRINOGEN BANDAGES FOR BATTLEFIELD WOUNDS (CA)</i>	2.388	-	-	-	-	-	-	-	-	Continuing	Continuing
MK8: <i>PLASMA STERILIZER (CA)</i>	2.387	-	-	-	-	-	-	-	-	Continuing	Continuing
ML3: <i>SOLDIER-MOUNTED EYE-TRACKING & CONTROL SYSTEM (CA)</i>	3.482	-	-	-	-	-	-	-	-	Continuing	Continuing
MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>	231.980	-	-	-	-	-	-	-	-	Continuing	Continuing

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>					R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>						
MM3: <i>WARFIGHTER MEDICAL PROTECTION & PERFORMANCE STDS</i>	6.326	7.347	9.324	-	9.324	11.076	11.897	14.556	15.013	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) supports maturation and demonstration of advanced medical technologies including drugs, vaccines, medical devices, and diagnostics and developing medical practices and procedures to effectively protect and improve the survivability of US Forces across the entire spectrum of military operations. Tri-Service coordination and cooperative efforts are focused in four principal medical areas: Combat Casualty Care, Military Operational Medicine, Militarily Relevant Infectious Diseases, and Clinical and Rehabilitative Medicine.

Promising medical technologies are refined and validated through extensive testing, which is closely monitored by the US Food and Drug Administration (FDA) and Environmental Protection Agency (EPA), as part of their processes for licensing new medical products. The FDA requires medical products to undergo extensive preclinical testing in animals and/or other models to obtain preliminary efficacy and toxicity information, before they can be tested in humans (clinical trials). Clinical trials are conducted in three phases, starting with Phase 1, to prove the safety of a drug, vaccine, or device for the targeted disease or medical condition in a small number of healthy volunteers. Each successive phase includes larger numbers of human subjects and requires FDA cognizance prior to proceeding. Work conducted in this PE primarily focuses on late stages of technology maturation activities required to conduct Phase 2 human expanded safety and efficacy clinical trials. Some high risk technologies may require additional maturation with FDA guidance prior to initiating these clinical trials. Such things as proof of product stability and purity are necessary to meet FDA standards before entering later stages of testing and prior to transitioning into a formal acquisition program and conducting Phase 3 pivotal trials for licensure. Activities in the PE may include completion of preclinical animal studies and Phase 2 clinical studies involving human volunteers according to the FDA and EPA requirements.

Blast research efforts in this PE are fully coordinated with the United States Army Natick Soldier Research, Development and Engineering Center. This coordination enables improved body armor design and rations for Soldiers. Additionally, the activities funded in this PE are externally peer reviewed and fully coordinated with all Services as well as other agencies through the Joint Technology Coordinating Groups of the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee. The ASBREM Committee serves to facilitate coordination and prevent unnecessary duplication of effort within DoD's biomedical research and development community, as well as their associated enabling research areas.

Work funded in this project PE is fully coordinated with efforts undertaken in PE 0602787A.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by Walter Reed Army Institute of Research, Silver Spring, MD; US Army Medical Research Institute of Infectious Diseases, Fort Detrick, MD; US Army Research Institute of Environmental Medicine, Natick, MA; US Army Institute of Surgical Research, Fort Sam Houston, TX; US Army Aeromedical

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>
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Research Laboratory, Fort Rucker, AL; the Naval Medical Research Center, Silver Spring, MD; US Army Dental Trauma Research Detachment, Fort Sam Houston, TX; US Army Center for Environmental Health Research and the Armed Forces Institute of Regenerative Medicine, Fort Detrick, MD.

B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	339.752	71.510	63.808	-	63.808
Current President's Budget	336.741	71.510	68.171	-	68.171
Total Adjustments	-3.011	-	4.363	-	4.363
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.685	-			
• SBIR/STTR Transfer	-2.326	-			
• Adjustments to Budget Years	-	-	4.363	-	4.363

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army								DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT 810: <i>IND BASE ID VACC&DRUG</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
810: <i>IND BASE ID VACC&DRUG</i>	19.748	18.185	18.646	-	18.646	18.820	20.674	19.910	18.342	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates US Food and Drug Administration (FDA) regulated medical countermeasures such as drugs, vaccines, and diagnostic systems to naturally occurring infectious diseases that are threats to US military deployed forces. The focus of the program is on prevention, diagnosis, and treatment of diseases that can adversely impact military mobilization, deployment, and operational effectiveness. Prior to licensure of a new drug or vaccine to treat or prevent disease, the FDA requires testing in human subjects. Studies are conducted stepwise: first to prove the product is safe in humans, second to demonstrate the desired effectiveness and optimal dosage in a small study, and third to demonstrate effectiveness in large, diverse human populations. All test results are submitted to the FDA for evaluation to ultimately obtain approval (licensure) for medical use. This project supports studies for safety and effectiveness testing on small study groups after which they transition to the next phase of development for completion of studies in larger populations. The project also supports testing of personal protective measures that can reduce disease transmission from biting insects and other vectors to include products such as repellents and insecticides which are regulated by the U. S. Environmental Protection Agency (EPA).

- Research conducted in this project focuses on the following five areas:
- (1) Drugs to Prevent/Treat Parasitic (symbiotic relationship between two organisms) Diseases
 - (2) Vaccines for Preventing Malaria
 - (3) Bacterial Threats
 - (4) Viral Threats
 - (5) Diagnostics and Disease Transmission Control

Research is conducted in compliance with FDA regulations for medical products for human use and EPA-regulations for insect control products that impact humans or the environment (e.g., repellents and insecticides).

Work is managed by the Walter Reed Institute of Research (WRAIR), US Army Medical Institute of Infectious Disease (USAMRIID), and coordinated with Naval Medical Research Center (NMRC). The Army is responsible for programming and funding all DoD naturally occurring infectious disease research requirements, thereby precluding duplication of effort within the Military Departments.

Promising medical countermeasures identified in this project are further matured under PE 0603807A, project 808.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 810: <i>IND BASE ID VACC&DRUG</i>
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Work in this project is performed by the Walter Reed Army Institute of Research, Silver Spring, MD, and its overseas laboratories; the US Army Medical Research Institute of Infectious Diseases, Fort Detrick, MD; and the Naval Medical Research Center, Silver Spring, MD, and its overseas laboratories.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Drugs to Prevent/Treat Parasitic Diseases</p> <p>Description: This effort selects promising malaria and leishmaniasis (a disease transmitted by sand flies) drug candidates for testing in human subjects, and prepares data packages required for FDA approval of testing in humans and conduct testing. Studies have shown that the malaria parasite can become resistant to existing drugs, which makes it necessary to continually research new and more effective treatments.</p> <p>FY 2010 Accomplishments: Expanded Malarone testing in an increased number of humans with positive results, and continued studies with a Chloroquine-tinidazole combination drug for prevention of malaria.</p> <p>FY 2011 Plans: Based on selection of promising candidates in previous year, expand testing in humans of treatment options for malaria and leishmaniasis. Work with commercial manufacturer to change the dosing and subsequent labeling of Malarone for other malaria treatment indications.</p> <p>FY 2012 Plans: Will initiate safety and effectiveness studies in human volunteers on the most promising candidate identified from preclinical studies.</p>	3.872	3.089	2.335
<p>Title: Vaccines for Prevention of Malaria</p> <p>Description: This effort selects candidate vaccines for various types of malaria including the severe form of malaria (<i>Plasmodium falciparum</i>) and the less severe but relapsing form (<i>Plasmodium vivax</i>) and prepares technical data packages required for FDA approval of testing in humans. Conduct testing of promising malaria vaccine candidates in human subjects. A malaria vaccine would minimize the progression and impact of drug resistance and poor Warfighter compliance with taking preventive anti-malarial drugs.</p> <p>FY 2010 Accomplishments: Partnered with industry to conduct initial safety and small-scale effectiveness testing in humans of a new <i>Plasmodium falciparum</i> malaria vaccine candidate; forwarded promising candidate vaccines for further testing in larger populations where malaria occurs naturally, such as Africa; initiated <i>Plasmodium vivax</i> malaria candidate vaccine testing in humans pending FDA approval.</p> <p>FY 2011 Plans:</p>	3.823	3.824	4.905

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>		PROJECT 810: <i>IND BASE ID VACC&DRUG</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Conduct studies to determine optimal dosing schedule of new Plasmodium falciparum malaria vaccine candidate, and plan for safety and effectiveness tests in larger populations in endemic areas; down-select best and most effective vaccine candidates, for further development; will assess effectiveness of Plasmodium vivax malaria candidate vaccines in humans.</p> <p>FY 2012 Plans: Will formulate new candidate vaccines against Plasmodium falciparum and Plasmodium vivax malaria as well as test them in uninfected adults for safety, immunogenicity (ability to produce an immune response), and effectiveness; will further test the most promising vaccine candidates in adults and children in larger test populations where malaria occurs naturally; will transfer vaccine candidate to the advanced development program.</p>				
<p>Title: Bacterial Threats</p> <p>Description: This effort selects promising candidate vaccines against each of the three main bacterial causes of diarrhea (E. coli, Campylobacter and Shigella; a significant threat during initial deployments) and meningococcal vaccine candidates (a threat to trainees, deployed troops and military families) for testing in human subjects. Prepare data packages required for FDA approval and conduct testing in human subjects.</p> <p>FY 2010 Accomplishments: Conducted testing of a Shigella component (Invaplex) candidate vaccine on an expanded population, began safety and effectiveness trial of a live attenuated Shigella vaccine; began E. coli vaccine candidate safety and effectiveness testing in humans; prepared the meningococcal Group B multicomponent vaccine for testing in humans in conjunction with partners.</p> <p>FY 2011 Plans: Continue safety and effectiveness trials of Invaplex and live attenuated Shigella vaccine; continue safety and effectiveness trial to establish most promising E. coli vaccine; undertake a safety study in humans of the meningococcal Group B multicomponent vaccine.</p> <p>FY 2012 Plans: Will conduct human trials of live attenuated Shigella vaccine and E. coli vaccine to determine their effectiveness. Will complete transfer of meningococcal vaccine technology to commercial partner.</p>		6.375	5.122	7.623
<p>Title: Viral Threats Research</p> <p>Description: This effort selects most promising vaccine candidates for evaluation in human subjects against dengue fever (a severe debilitating disease caused by a virus and transmitted by a mosquito) and hantavirus (severe viral infection that causes internal bleeding and is contracted from close contact with rodents). Conduct FDA-required nonclinical safety and protection</p>		3.492	3.086	1.825

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>		PROJECT 810: <i>IND BASE ID VACC&DRUG</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>testing (laboratory-based) in animals, prepare FDA investigational new drug technical data packages and conduct clinical testing of candidate vaccines in humans.</p> <p>FY 2010 Accomplishments: Conducted testing in humans of the hantavirus vaccine on an expanded population; down-select to most safe and effective dengue vaccine candidate based on expanded population studies (120 volunteers).</p> <p>FY 2011 Plans: Further develop the hantavirus vaccine with support of a commercial partner; conduct testing in humans for safety and effectiveness of the final dengue vaccine candidate.</p> <p>FY 2012 Plans: Will further develop the hantavirus vaccine with support of a commercial partner to include evaluation of vaccine delivery methods to improve effectiveness and safety; will transition to advanced development program.</p>				
<p>Title: Diagnostics and Disease Transmission Control</p> <p>Description: This effort conducts human subject testing of FDA-regulated field medical diagnostic devices and EPA-approved measures to control insect-borne pathogens and diseases such as Q Fever (sand fly fever), Japanese encephalitis, Rickettsial disease (carried by ticks, fleas, and lice) and other pathogens transmitted by arthropods (animals without a backbone with segmented bodies and jointed limbs, such as a scorpion, crab, or centipede).</p> <p>FY 2010 Accomplishments: Tested a new repellent and began evaluation of field-deployable tests to detect infectious organisms within insects that cause Q-fever and dengue fever. For diagnostics, validated results of testing for leishmaniasis, dengue fever and Rickettsial disease devices. Modified the leishmaniasis infection hospital-based diagnostic test technology to be compatible with Joint Biological Agent Identification Diagnostic System (JBAIDS) platform.</p> <p>FY 2011 Plans: Transition new repellent to advanced development; evaluate a field device to detect the dengue virus in mosquitoes in conjunction with commercial partner; assist commercial partners in fielding of FDA-approved point-of-care tests for dengue fever and leishmaniasis.</p> <p>FY 2012 Plans: Will complete the evaluation of repellent products; Will assist the commercial partners in fielding FDA-approved rapid human diagnostics (point-of-care tests) for Q-fever; will evaluate a field detection device to detect Japanese encephalitis and other</p>		2.186	3.064	1.958

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 810: <i>IND BASE ID VACC&DRUG</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
pathogens transmitted by arthropods (animals without a backbone with segmented bodies and jointed limbs, such as a scorpion, crab, or centipede) in collaboration with commercial partner.			
Accomplishments/Planned Programs Subtotals	19.748	18.185	18.646

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army								DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT 840: <i>COMBAT INJURY MGMT</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
840: <i>COMBAT INJURY MGMT</i>	42.272	44.004	38.659	-	38.659	34.079	35.463	36.729	37.141	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures, demonstrates, and validates promising medical technologies and methods to include control of severe bleeding, treatment for traumatic brain injury (TBI), revival and stabilization of trauma patients, and prognostics and diagnostics for life support systems. Post-evacuation medical research focuses on continued care and rehabilitative medicine for extremity (arms and legs), facial/maxillary (jaw bone), and ocular (eye) trauma and leveraging recent innovations in regenerative medicine and tissue engineering techniques.

Research conducted in this project focuses on the following five areas:

- (1) Damage Control Resuscitation
- (2) Combat Trauma Therapies
- (3) Combat Critical Care Engineering
- (4) Clinical and Rehabilitative Medicine
- (5) Traumatic Brain Injury

All research is conducted in compliance with US Food and Drug Administration (FDA) requirements for licensure of medical products for human use.

Promising efforts identified through applied research conducted under PE 0602787A, project 874, are further matured under this project. Promising results identified under this project 840 are further matured under PE 0603807A, project 836.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the US Army Institute of Surgical Research (USAISR), Fort Sam Houston, TX; the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD; and the Armed Forces Institute of Regenerative Medicine (AFIRM), Fort Detrick, MD.

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

	FY 2010	FY 2011	FY 2012
Title: Damage Control Resuscitation	13.089	14.776	11.527
Description: This effort supports work required to validate safety and effectiveness of drugs and medical procedures to maintain metabolism and minimize harmful inflammation after major trauma. Efforts focus on blocking complement activation (a series of			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 840: <i>COMBAT INJURY MGMT</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>disease fighting proteins and their reactions in the body) from damaging healthy cells of the body and preventing or minimizing secondary organ failure (including brain and spinal cord injury).</p> <p>FY 2010 Accomplishments: Began safety and effectiveness evaluation in humans of freeze-dried plasma and platelet products to control severe bleeding; conducted additional studies in larger animals to identify optimal timing, dose and mechanisms of action of plasma, clotting factors and complement inhibitors (CIs) (normal physiological responses to trauma) in combination.</p> <p>FY 2011 Plans: Begin human evaluation of blood substitutes and noninvasive interventions for internal bleeding; evaluate guidelines for combined use of plasma, clotting factors and CIs using a representative, large animal model to potentially change clinical resuscitation guidelines.</p> <p>FY 2012 Plans: Will initiate limited clinical studies of coagulation factor and platelet function in burn patients; will conduct studies of acute coagulopathy (clotting or bleeding disorder) of traumatic shock; will evaluate currently available blood products in a large animal (pig) model.</p>				
<p>Title: Combat Trauma Therapies</p> <p>Description: This effort focuses on work required to validate safety and effectiveness of drugs, biologics (products derived from living organisms), and medical procedures intended to minimize immediate and long-term effects from battlefield injuries. This effort includes neuroprotective research - funding in this area is transitioned to Traumatic Brain Injury in FY12.</p> <p>FY 2010 Accomplishments: Completed initial FDA safety studies in humans of a candidate neuroprotective drug and a diagnostic device for brain trauma; refocused dental disease research to facial restorative surgery; began research in eye trauma to evaluate current repair treatment for improvement and evaluated new alternatives as they were identified; expanded existing in-house capability for human safety and effectiveness testing on newly identified treatments and therapies for battlefield trauma.</p> <p>FY 2011 Plans: Begin the next study of the candidate neuroprotective drug for FDA approval (effectiveness); begin animal studies of an anti-seizure mixture of multiple drugs in combination and studies of silent brain seizures after traumatic brain injury (TBI); develop a mandibular (jaw) defect model; continue evaluation of pain management regimens to improve long-term outcomes; use a small</p>		12.592	16.750	3.558

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 840: <i>COMBAT INJURY MGMT</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>animal model to down-select therapeutics for blast-induced TBI; continue in-house human clinical trials of promising treatments and therapies for battlefield trauma.</p> <p>FY 2012 Plans: Will continue studies in wound healing, as well as skin, muscle, and bone repair. Will transition skin and muscle work to more relevant animal models and continue in-house human trials. Beginning in FY12, work in neuroprotection research is transitioned to Traumatic Brain Injury.</p>				
<p>Title: Traumatic Brain Injury</p> <p>Description: This effort supports work required to validate safety and effectiveness of drugs, biologics (products derived from living organisms), and medical procedures intended to minimize immediate and long-term effects from penetrating brain injuries. This research area starts in FY12.</p> <p>FY 2012 Plans: Will complete the FDA effectiveness study of the candidate neuroprotective drug for treatment of TBI and will complete the pivotal trial for a bench-top assay for use in hospitals using candidate biomarkers for the detection of TBI; will transition to advanced development; Will continue development of a smaller, deployable diagnostic device for brain trauma as well as a hand held version; will evaluate progesterone (steroid hormone) and nitrite as therapeutic interventions for blast injury.</p>		-	-	4.273
<p>Title: Combat Critical Care Engineering</p> <p>Description: This effort supports diagnostic and therapeutic medical devices, algorithms, software, and data-processing systems for resuscitation, stabilization, and life support; this research area started in FY10.</p> <p>FY 2010 Accomplishments: Completed FDA safety study of fluid resuscitation algorithms; submitted FDA technical data package for the fully-integrated and automated fluid resuscitation system; collaborated with manufacturers to integrate oxygen and ventilation systems; transitioned stroke volume algorithm to advanced development for integration with new monitors for triage decision support; conducted studies for development of a model (algorithm) for early indication of circulatory collapse from severe blood loss.</p> <p>FY 2011 Plans: Complete evidence-based decision support development for early indicators of reduction in blood volume, the need for intervention, and closed-loop care during casualty transport. Continue to support simulation development to reduce reliance on live tissues in training.</p> <p>FY 2012 Plans:</p>		5.807	3.287	3.056

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>		PROJECT 840: <i>COMBAT INJURY MGMT</i>	
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012	
Will begin collection of continuous waveform data (output from vital signs monitors) in burn and trauma patients with blood loss to refine algorithm; will evaluate commercially-viable measurement systems and novel remote triage devices (both wear-and-forget and stand-off devices) for effectiveness and specificity to blood loss.				
<p>Title: Clinical and Rehabilitative Medicine</p> <p>Description: This effort supports clinical studies of treatment of ocular and visual system traumatic injury, as well as restoration of function and appearance by regenerating skin, muscle, and bone tissue in battle-injured casualties. Areas of interest for regenerative medicine include healing without scarring, repair of compartment syndrome (muscle and nerve damage following reduced blood flow due to swelling), replacement skin, and facial reconstruction.</p> <p>FY 2010 Accomplishments: Conducted regenerative medicine studies using human subjects to demonstrate stable engraftment and restoration of sensory-motor function of transplanted limbs and facial skin, fat transfer therapy to manage burn scarring, implantation of engineered cartilage ear transplants, and use of a strain-reducing dressing to reduce wound scarring.</p> <p>FY 2011 Plans: Conduct studies using relevant large animals to evaluate the most promising treatments for repairing traumatic eye injuries; conclude FY10 clinical trials; begin studies of skin cells or tissue from patient engineered and transplanted back into the patient as a replacement for burned tissue.</p> <p>FY 2012 Plans: Will conduct preclinical studies on novel drug delivery, diagnostic and/or tissue repair strategies for eye injury, as well as initial clinical studies of vision rehabilitation strategies; will conduct preclinical and initial clinical studies of strategies for maxillofacial reconstruction, including wound healing control and tissue engineering/regeneration techniques, to restore facial features; will begin a pilot clinical trial of a drug that reduces the spread of burn damage; will finish preclinical research on engineered implants; will start a pilot clinical trial on bone regeneration using scaffold and stem cell technologies; and will continue an ongoing clinical trial in muscle regeneration.</p>	10.784	9.191	10.920	
<p>Title: Under Body Blast Injury Assessment</p> <p>Description: This effort supports research to enable the Live-Fire Test and Evaluation (LFT&E) community to conduct realistic survivability testing of ground-combat vehicles subjected to under-body blast (UBB) threats, with a primary emphasis on assessing potential occupant casualties, as well as to enable the development and testing of improved occupant protection systems. UBB creates injurious forces on occupants of ground-combat vehicles that are more violent and that act in directions not normally encountered in civilian automotive accidents. Injury prediction tools that were developed to assess occupant safety in</p>	-	-	5.325	

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>automobile crashes are not adequate for assessing occupant survivability in ground-combat vehicles exposed to UBB threats. Accurately predicting the spectrum of injuries caused by UBB forces in live-fire tests of ground-combat vehicles presents a unique challenge for the DoD. An UBB medical research program is being initiated to understand the human tolerance limits and injury mechanisms needed to accurately predict injuries to ground-combat vehicle occupants caused by UBB events.</p> <p><i>FY 2012 Plans:</i> Will initiate research to develop biomedically-valid UBB human tolerance limits and injury prediction tools for supporting the development of DoD blast injury prevention standards for survivability assessments and protection systems development; will accelerate development and integration of human tolerance limits and injury prediction tools to enhance the LFT&E community's ability to accurately assess ground-combat vehicle occupant survivability in UBB events.</p>				
	Accomplishments/Planned Programs Subtotals	42.272	44.004	38.659
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 945: <i>BREAST CANCER STAMP PROCEEDS</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
945: <i>BREAST CANCER STAMP PROCEEDS</i>	1.005	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project receives funds as proceeds from the sale of Breast Cancer Stamps.

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

	FY 2010	FY 2011	FY 2012
<i>Title:</i> Breast Cancer Stamp Proceeds	1.005	-	-
<i>Description:</i> This is a Congressional Interest Item.			
<i>FY 2010 Accomplishments:</i> Breast Cancer Stamp Proceeds			
Accomplishments/Planned Programs Subtotals	1.005	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 97B: <i>BLOOD SAFETY</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
97B: <i>BLOOD SAFETY</i>	2.388	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Blood Safety advanced technology development.

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

	FY 2010	FY 2011	FY 2012
Title: Blood Safety and Decontamination Technology	2.388	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Blood Safety and Decontamination Technology			
Accomplishments/Planned Programs Subtotals	2.388	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT 97D: <i>CENTER FOR AGING EYE</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
97D: <i>CENTER FOR AGING EYE</i>	2.387	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Low Vision research.

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

	FY 2010	FY 2011	FY 2012
Title: Military Low Vision Research	2.387	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Military Low Vision Research			
Accomplishments/Planned Programs Subtotals	2.387	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT FH4: <i>FORCE HEALTH PROTECTION - ADV TECH DEV</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
FH4: <i>FORCE HEALTH PROTECTION - ADV TECH DEV</i>	1.885	1.974	1.542	-	1.542	1.672	1.761	1.776	1.806	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures, demonstrates, and supports enhanced Force Health Protection of Soldiers against threats in military operations and training. Health-monitoring tools are matured to rapidly identify deployment stressors that affect the health of Joint Forces. These databases and systems enhance the Department of Defense's (DoD's) ability to monitor and protect against adverse changes in health, especially mental health effects caused by changes in brain function. Force Health Protection work is conducted in close coordination with the Department of Veterans Affairs. The program is maturing the development of global health monitoring (e.g., development of neuropsychological evaluation methodologies), validating clinical signs and symptoms correlating to medical records, diagnosed diseases, and mortality rates. The key databases supporting this program are the Millennium Cohort Study and the Total Army Injury and Health Outcomes Database. These databases allow for the examination of interactions of psychological stress and other deployment and occupational stressors that affect Warfighter health behaviors.

This project contains no duplication with any effort within the Military Departments and includes direct participation by other Services.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the US Army Center for Environmental Health Research (USACEHR), Fort Detrick, MD, the US Army Research Institute of Environmental Medicine (USARIEM), Natick, MA, and the Naval Health Research Center (NHRC), San Diego, CA.

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

	FY 2010	FY 2011	FY 2012
Title: Health Research	1.885	1.974	1.542
Description: This effort supports validation of interventions developed from the Millennium Cohort study (a prospective health project in military service members designed to evaluate the long-term health effects of military service, including deployments), validation of biomarkers of exposure, methods to detect environmental contamination and toxic exposure, and validation of thoracic injury prediction models of blast exposure.			
FY 2010 Accomplishments: Validated thoracic blunt trauma and performance decrement models by comparing with data obtained from large animal exercise studies; conducted data analysis to correlate relationships in Post-Traumatic Stress Disorder (PTSD), depression, and anxiety symptoms among Millennium Cohort participants in conjunction with increased mental and physical health problems; validated			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
prototype Environmental Sentinel Biomonitor (ESB) system for use with field drinking water production systems and transitioned to advanced development. <i>FY 2011 Plans:</i> Transition thoracic blast injury models and an integrated software version for combined blunt trauma and toxic gas inhalation to Army Research Laboratory Survivability, Lethality Assessment Division (Soldier Survivability Assessment Program) and to the Public Health Command (Health Hazard Assessment Program); conduct a systematic validation of prospective data to correlate relationships in PTSD and depression with suicide. <i>FY 2012 Plans:</i> Will validate potential intervention strategies for reduction of mental health symptoms and factors associated with suicide, with a goal to reduce the suicide rate; will validate sensor components to include whole-body acceleration (tertiary blast injury) and headform acceleration (traumatic brain injury).					
Accomplishments/Planned Programs Subtotals			1.885	1.974	1.542
C. Other Program Funding Summary (\$ in Millions)					
N/A					
D. Acquisition Strategy					
N/A					
E. Performance Metrics					
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MB1: <i>ADV DIAGNOSTICS & THERAPEUTIC DIG TECH</i>	1.593	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Advanced Diagnostic and Therapeutic Digital Technologies development.

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

	FY 2010	FY 2011	FY 2012
Title: Advanced Diagnostic and Therapeutic Digital Technologies	1.593	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Advanced Diagnostic and Therapeutic Digital Technologies			
Accomplishments/Planned Programs Subtotals	1.593	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT MB3: <i>CENTER FOR INTEGRATION OF MEDICINE & INNOV TECH</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MB3: <i>CENTER FOR INTEGRATION OF MEDICINE & INNOV TECH</i>	8.953	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for the Center for the Integration of Medicine and Innovative Technology.

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

	FY 2010	FY 2011	FY 2012
Title: Center for the Integration of Medicine and Innovative Technology (CIMIT) research	8.953	-	-
Description: This is a Congressional Interest item.			
FY 2010 Accomplishments: Center for the Integration of Medicine and Innovative Technology (CIMIT) research			
Accomplishments/Planned Programs Subtotals	8.953	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT MG5: <i>NATIONAL FUNCTIONAL GENOMICS CENTER (CA)</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MG5: <i>NATIONAL FUNCTIONAL GENOMICS CENTER (CA)</i>	5.968	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Functional Genomics.

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

	FY 2010	FY 2011	FY 2012
Title: National Functional Genomics Center	5.968	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: National Functional Genomics Center			
Accomplishments/Planned Programs Subtotals	5.968	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT MI4: <i>ALLIANCE FOR NANOHEALTH (CA)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MI4: <i>ALLIANCE FOR NANOHEALTH (CA)</i>	3.979	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification
Congressional Interest Item funding for the Alliance for NanoHealth.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Title: Alliance for NanoHealth	3.979	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Alliance for NanoHealth			
Accomplishments/Planned Programs Subtotals	3.979	-	-

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

D. Acquisition Strategy
N/A

E. Performance Metrics
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT MJ2: <i>FIBRINOGEN BANDAGES FOR BATTLEFIELD WOUNDS (CA)</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MJ2: <i>FIBRINOGEN BANDAGES FOR BATTLEFIELD WOUNDS (CA)</i>	2.388	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Fibrin Adhesive Stat (FAST) Dressing technology development.

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

	FY 2010	FY 2011	FY 2012
Title: Fibrin Adhesive Stat (FAST) Dressing	2.388	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Fibrin Adhesive Stat (FAST) Dressing			
Accomplishments/Planned Programs Subtotals	2.388	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT MK8: <i>PLASMA STERILIZER (CA)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MK8: <i>PLASMA STERILIZER (CA)</i>	2.387	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Plasma Sterilizer advanced technology development.

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

	FY 2010	FY 2011	FY 2012
Title: Plasma Sterilizer	2.387	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Plasma Sterilizer			
Accomplishments/Planned Programs Subtotals	2.387	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
ML3: <i>SOLDIER-MOUNTED EYE-TRACKING & CONTROL SYSTEM (CA)</i>	3.482	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Biosensor Communicator and Controller System advanced technology development.

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

	FY 2010	FY 2011	FY 2012
Title: Biosensor Communicator and Controller System	3.482	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Biosensor Communicator and Controller System			
Accomplishments/Planned Programs Subtotals	3.482	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>				PROJECT MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>	231.980	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Medical Advanced Technology Initiatives.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Cellular Therapy for Battlefield Medical Care.</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2010 Accomplishments: This is a Congressional Interest Item.</p>	2.785	-	-
<p>Title: Center for Genetic Origins of Cancer.</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2010 Accomplishments: This is a Congressional Interest Item.</p>	1.990	-	-
<p>Title: Combat Wound Initiative at Walter Reed Army Medical Center.</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2010 Accomplishments: This is a Congressional Interest Item.</p>	2.387	-	-
<p>Title: Human Genomics, Molecular Epidemiology and Clinical Diagnostics for Infectious Diseases.</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2010 Accomplishments: This is a Congressional Interest Item.</p>	1.194	-	-
<p>Title: Medical Surveillance Initiative-Clinical Looking Glass.</p> <p>Description: Funding is provided for the following effort</p>	1.194	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> National Oncogenomics and Molecular Imaging Center. <i>Description:</i> Funding is provided for the following effort	4.735	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Neuroimaging & Neuropsychiatric Trauma in US Warfighters. <i>Description:</i> Funding is provided for the following effort	6.217	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Telepharmacy Robotic Medicine Device Unit. <i>Description:</i> Funding is provided for the following effort	0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Institute for the Advancement of Bloodless Medicine. <i>Description:</i> Funding is provided for the following effort	1.485	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> National Biodefense Training. <i>Description:</i> Funding is provided for the following effort	4.974	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Rugged Electronic Textile Vital Signs Monitoring. <i>Description:</i> Funding is provided for the following effort	2.387	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Trauma Care, Research and Training. <i>Description:</i> Funding is provided for the following effort		2.387	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Maine Institute for Human Genetics. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Institute for Regenerative Medicine. <i>Description:</i> Funding is provided for the following effort		3.183	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> National Center of Ophthalmology Training and Education al Wills Eye Health System. <i>Description:</i> Funding is provided for the following effort		2.387	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Rural Health - CERMUSA. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Spinal Muscular Atrophy (SMA) Research Program. <i>Description:</i> Funding is provided for the following effort		2.984	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Advanced Lower Limb Prosthesis for Battlefield Amputees. <i>Description:</i> Funding is provided for the following effort	3.183	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Advanced Restoration Therapies in Spinal Cord Injuries. <i>Description:</i> Funding is provided for the following effort	1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Prader-Willi Syndrome (PWS) Research. <i>Description:</i> Funding is provided for the following effort	1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Remote Bio-Medical Detector. <i>Description:</i> Funding is provided for the following effort	2.785	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Advanced Regenerative Medicine Therapies for Combat Injuries. <i>Description:</i> Funding is provided for the following effort	3.183	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Chronic Tinnitus Treatment Program. <i>Description:</i> Funding is provided for the following effort	0.796	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: Bioelectrics Research for Casualty Care and Management. Description: Funding is provided for the following effort		1.194	-	-
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: Advanced Medical Multi-Missions and CASEVAC Roles. Description: Funding is provided for the following effort		0.796	-	-
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: Brain Interventional-Surgical Hybrid Initiative. Description: Funding is provided for the following effort		2.387	-	-
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: 101st Airborne Injury Prevention & Performance Enhancement Research Initiative. Description: Funding is provided for the following effort		2.984	-	-
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: Blood, Medical & Food Safety Via Eco-Friendly Wireless Sensing. Description: Funding is provided for the following effort		1.592	-	-
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: International Heart Institute/U.S. Army Vascular Graft Research Project. Description: Funding is provided for the following effort		1.592	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Military Burn Trauma Research Program. <i>Description:</i> Funding is provided for the following effort	4.477	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Military Nutrition Research: Personnel Readiness and Warfighter Performance. <i>Description:</i> Funding is provided for the following effort	0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Staph Vaccine. <i>Description:</i> Funding is provided for the following effort	6.367	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Linear Accelerator Cancer Research. <i>Description:</i> Funding is provided for the following effort	0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Midwest Traumatic Injury Rehabilitation Center. <i>Description:</i> Funding is provided for the following effort	1.162	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.			
<i>Title:</i> Oncology Group Pediatric Cancer Research (CH). <i>Description:</i> Funding is provided for the following effort	1.592	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Strattice Dermal Matrix Research. <i>Description:</i> Funding is provided for the following effort		1.990	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Battlefield Nursing Program. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Medical Errors Reduction Initiative. <i>Description:</i> Funding is provided for the following effort		1.990	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Personal Status Monitor (Nightengale). <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Advanced Cancer Genome Institute. <i>Description:</i> Funding is provided for the following effort		1.989	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Advanced Military Wound Healing Research and Treatment. <i>Description:</i> Funding is provided for the following effort		0.796	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> ALS Therapy Development for Gulf War Research. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Anti-Microbial Bone Graft Product. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Antioxidant Micronutrient Therapeutic Countermeasures. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Automated Portable Field System f/Rapid Detection & Diagnosis of Endemic Diseases & Other Pathogens. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Battlefield Related Injury Translational Research Strategies. <i>Description:</i> Funding is provided for the following effort		1.791	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Bio-Printing of Skin for Battlefield Burn Repairs. <i>Description:</i> Funding is provided for the following effort		1.990	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Bio-Surveillance in a Highly Mobile Population. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Blood and Bone Marrow Collection Fellowship. <i>Description:</i> Funding is provided for the following effort		1.990	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Brain Safety Net. <i>Description:</i> Funding is provided for the following effort		2.387	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Breast Cancer Medical Information Network Decision Support. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Center for Cancer Immunology Research. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Center of Excellence in Infectious Diseases and Human Microbiome. <i>Description:</i> Funding is provided for the following effort		2.387	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Clinical Development of a Norovirus Gastroenteritis Vaccine. <i>Description:</i> Funding is provided for the following effort		3.581	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Clinical Technology Integration for Military Health. <i>Description:</i> Funding is provided for the following effort		1.591	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Collagen-Based Wound Dressing. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Cooperative International Neuromuscular Research. <i>Description:</i> Funding is provided for the following effort		3.263	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Countermeasures to Hemorrhaging (Liquid Bandage and Tissue Rengeneration). <i>Description:</i> Funding is provided for the following effort		5.730	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Customized Nursing Programs for Fort Benning. <i>Description:</i> Funding is provided for the following effort		1.592	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.					
<i>Title:</i> Enhancing Wound Healing, Tissue Regeneration, and Biomarker Discovery. <i>Description:</i> Funding is provided for the following effort			1.990	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.					
<i>Title:</i> Exceptional Family Transition (EFTT) for Soldiers, Sailors, Marines, and Airmen. <i>Description:</i> Funding is provided for the following effort			0.637	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.					
<i>Title:</i> Health Disparaties in Troop Readiness. <i>Description:</i> Funding is provided for the following effort			7.958	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.					
<i>Title:</i> Highly Functional Neurally Controlled Skeletally Attached and Intelligent Prosthetic Devises. <i>Description:</i> Funding is provided for the following effort			3.024	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.					
<i>Title:</i> Identification of Pain Mechanisms and Therapeutic Targets. <i>Description:</i> Funding is provided for the following effort			0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.					
<i>Title:</i> Imaging and Cognitive Evaluation of Soldiers. <i>Description:</i> Funding is provided for the following effort			0.637	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Infection Prevention Program for Battlefield Wounds. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Infectious and Airborne Pathogen Reduction. <i>Description:</i> Funding is provided for the following effort		2.228	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> In-field Body Temperature Conditioner. <i>Description:</i> Funding is provided for the following effort		2.386	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Institute for Simulation and Interprofessional Studies. <i>Description:</i> Funding is provided for the following effort		4.615	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Integrated Patient Electronic Record System. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Intelligent Orthopedic Fracture Implant Program. <i>Description:</i> Funding is provided for the following effort		0.796	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Malaria Vaccine Development. <i>Description:</i> Funding is provided for the following effort		3.978	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Marty Driesler Lung Cancer Project. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Mass Casualty First Responders Disaster Surge Technology Program. <i>Description:</i> Funding is provided for the following effort		2.387	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Medical Biosurveillance and Efficiency Program. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Microencapsulation and Vaccine Delivery Research. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Military Drug Management System. <i>Description:</i> Funding is provided for the following effort		2.387	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Military Medical Decontamination System. <i>Description:</i> Funding is provided for the following effort		4.477	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Military Mental Health Initiative. <i>Description:</i> Funding is provided for the following effort		0.597	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Military Pediatric Training and Support. <i>Description:</i> Funding is provided for the following effort		3.979	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Mission Hospital Computerized Physician Order Entry. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Mobile Aerosol Monitoring for the Department of Defense. <i>Description:</i> Funding is provided for the following effort		1.194	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Mobile Integrated Diagnostic and Data Analysis System (MIDDAS). <i>Description:</i> Funding is provided for the following effort		1.592	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Multi-Dose Closed Loop pH Monitoring System for Platelets. <i>Description:</i> Funding is provided for the following effort		1.591	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Multiplexed Human Fungal Infection Diagnostic. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Musculoskeletal Interdisciplinary Research Initiative. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> NAU-TGen North Dangerous Pathogens DNA Forensics Center Upgrades. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Near Infrared Spectroscopy Military Personnel Assessment. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Neural Control of External Devices. <i>Description:</i> Funding is provided for the following effort		1.990	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Nicholson center for Surgical Advancement Medical Robotics and Simulation. <i>Description:</i> Funding is provided for the following effort		4.178	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Nurse Education Center of Excellence for Remote and Medically Underserved Populations (CERMUSA). <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Nursing Teaching and Leadership Program. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Operation Re-Entry NC. <i>Description:</i> Funding is provided for the following effort		2.387	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Parsons Institute for Information Mapping. <i>Description:</i> Funding is provided for the following effort		1.194	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Pride Center for America's Wounded Veterans. <i>Description:</i> Funding is provided for the following effort		1.592	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>		PROJECT MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Rapid Burn Wound Therapies. <i>Description:</i> Funding is provided for the following effort		1.989	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Regenerative Medicine to Address Acute Hearing Loss. <i>Description:</i> Funding is provided for the following effort		2.386	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Sensor Tape Physiological Monitoring. <i>Description:</i> Funding is provided for the following effort		1.990	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Silicon Nanomaterial for Battlefield Medical Devices. <i>Description:</i> Funding is provided for the following effort		2.787	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Smart Wound Dressing for MRSA-Infected Battle Wounds. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Stress Disorders Research Initiative at Fort Hood. <i>Description:</i> Funding is provided for the following effort		2.387	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Techniques to Manage Noncompressible Hemorrhage Following Combat Injury. <i>Description:</i> Funding is provided for the following effort		1.990	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Testing of Microneedle Device for Multiple Applications. <i>Description:</i> Funding is provided for the following effort		0.955	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Translational Research for Muscular Dystrophy. <i>Description:</i> Funding is provided for the following effort		1.592	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Transportable Renal Replacement Therapy for Battlefield Applications. <i>Description:</i> Funding is provided for the following effort		0.796	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Trauma Response Simulation Training. <i>Description:</i> Funding is provided for the following effort		1.194	-	-
<i>FY 2010 Accomplishments:</i> This is a Congressional Interest Item.				
<i>Title:</i> Treatment of Battlefield Spinal Cord and Burn Injuries. <i>Description:</i> Funding is provided for the following effort		0.359	-	-

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT MM2: <i>MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: Vanadium Safety Readiness. Description: Funding is provided for the following effort		3.342	-	-
FY 2010 Accomplishments: This is a Congressional Interest Item.				
Title: Human Organ and Tissue Preservation Technology Description: This is a Congressional Interest Item.		1.592	-	-
FY 2010 Accomplishments: Human Organ and Tissue Preservation Technology				
Title: Battlefield Exercise and Combat Related Spinal Cord Injury Research Description: This is a Congressional Interest Item.		2.387	-	-
FY 2010 Accomplishments: Battlefield Exercise and Combat Related Spinal Cord Injury Research				
Title: High Performance Computing in Biomedical Engineering and Health Sciences Description: This is a Congressional Interest Item.		1.194	-	-
FY 2010 Accomplishments: High Performance Computing in Biomedical Engineering and Health Sciences				
Title: Fighting Combat-related Fatigue Syndrome Description: This is a Congressional Interest Item.		0.796	-	-
FY 2010 Accomplishments: Fighting Combat-related Fatigue Syndrome				
Accomplishments/Planned Programs Subtotals		231.980	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>	PROJECT MM3: <i>WARFIGHTER MEDICAL PROTECTION & PERFORMANCE STDS</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
MM3: <i>WARFIGHTER MEDICAL PROTECTION & PERFORMANCE STDS</i>	6.326	7.347	9.324	-	9.324	11.076	11.897	14.556	15.013	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project supports the Medical and Survivability technology areas of the future force with laboratory validation studies and field demonstrations of biomedical products designed to protect, sustain, and enhance Soldier performance in the face of a myriad of environmental, physiological stressors, and materiel hazards encountered in training and operational environments. This effort focuses on demonstrating and transitioning technologies as well as validated tools associated with biomechanical-based health risks, injury assessment and prediction, Soldier survivability, and performance during continuous operations. The three main thrust areas are (1) Physiological Health and Environmental Protection, (2) Injury Prevention and Reduction, and (3) Psychological Health and Resilience.

This project contains no duplication with any effort within the Military Departments, and includes direct participation by other Services.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the US Army Research Institute of Environmental Medicine (USARIEM), Natick, MA, and the US Army Aeromedical Research Laboratory (USAARL), Fort Rucker, AL.

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

	FY 2010	FY 2011	FY 2012
Title: Physiological Health and Environmental Protection (Sleep Research/Environmental Monitoring)	2.109	2.608	1.603
Description: This effort supports development of laboratory products, interventions, and decision aids for the validation of physiological status and prediction of Soldier performance in extreme environments.			
FY 2010 Accomplishments: Transitioned heat strain decision aid to the United States Army Ranger School which will provide a more comprehensive risk assessment tool for heat-related injury in the training environment; refined sensor technologies for prediction of heat injuries; refined computational model for predicting performance affected by chronic sleep restriction in the operational environment.			
FY 2011 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>		PROJECT MM3: <i>WARFIGHTER MEDICAL PROTECTION & PERFORMANCE STDS</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<p>Validate the next generation of individual physiological sensors for the prediction of heat injuries in training environments; perform advanced evaluations of a computational model for predicting performance affected by chronic sleep restriction in the operational environment.</p> <p>FY 2012 Plans: Complete field studies of the heat strain decision-aid with the US Army Ranger School to reduce the risk of heat injuries during training; validate a computational model for predicting performance affected by chronic sleep restriction in the operational environment.</p>					
<p>Title: Environmental Health and Protection - Physiological Awareness Tools and Warrior Sustainment in Extreme Environments</p> <p>Description: This effort supports development of non-invasive technologies, decision-aid tools, and models to enhance Warrior protection and sustainment across the operational spectrum.</p> <p>FY 2012 Plans: Will validate and transition non-invasive hydration assessment sensors to the advanced development program.</p>			-	-	1.544
<p>Title: Injury Prevention and Reduction (Physical Performance Enhancement)</p> <p>Description: This effort supports validation of injury prediction tools for brain, spine, and thoracic injury from blast, blunt, and ballistic impact.</p> <p>FY 2010 Accomplishments: Field evaluated loading assessment system for the prediction of spinal injury; validated thoracic blunt trauma and performance decrement models by comparing with data obtained from large animal exercise studies; validated a battery of Soldier performance evaluations based on common Soldiering tasks.</p> <p>FY 2011 Plans: Validate safe, rapid assessment criteria for spinal injury risk prediction; complete validation of facial fracture dose-response models and injury risk functions using an instrumented headform; transition integrated software version for combined blunt trauma and toxic gas inhalation; refine analysis tools which can use non- or minimally-invasive techniques to detect bone injury.</p> <p>FY 2012 Plans: Will validate software that accounts for the effects of clothing and body armor on the body following blast; will validate software to estimate lung, heart, and rib injury from blunt trauma due to debris impact (secondary blast injury); will validate the effectiveness of selected elements of neurosensory performance assessment batteries.</p>			3.320	3.345	3.598
<p>Title: Psychological Health and Resilience</p>			0.897	1.394	2.579

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603002A: <i>MEDICAL ADVANCED TECHNOLOGY</i>		PROJECT MM3: <i>WARFIGHTER MEDICAL PROTECTION & PERFORMANCE STDS</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<p>Description: This effort supports validation of neurocognitive assessment and brain injury detection methods. Validate tools and preclinical methods to treat Post-Traumatic Stress Disorder in a military population.</p> <p>FY 2010 Accomplishments: Conducted field study to determine the extent to which baseline psychological and neurological functioning impacts resilience and sensitivity to concussion.</p> <p>FY 2011 Plans: Validate utility of neurocognitive measures for tracking and monitoring recovery rate after concussion; validate rodent Post-Traumatic Stress Disorder model using current treatment methods.</p> <p>FY 2012 Plans: Will determine effectiveness of various treatment modalities (e.g., occupational therapy, counseling, etc.); will validate screening/scoring guidelines for revisions to the Post-Deployment Health Assessment and the Post-Deployment Health Reassessment.</p>					
Accomplishments/Planned Programs Subtotals			6.326	7.347	9.324
C. Other Program Funding Summary (\$ in Millions)					
N/A					
D. Acquisition Strategy					
N/A					
E. Performance Metrics					
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>							
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	104.229	57.454	62.193	-	62.193	66.660	73.039	76.774	78.762	Continuing	Continuing
313: <i>ADV ROTARYWING VEH TECH</i>	37.993	42.149	44.939	-	44.939	46.777	50.279	56.515	58.170	Continuing	Continuing
435: <i>AIRCRAFT WEAPONS</i>	2.615	2.608	-	-	-	-	-	-	-	Continuing	Continuing
436: <i>ROTARYWING MEP INTEG</i>	-	1.754	7.619	-	7.619	10.070	12.762	10.092	10.252	Continuing	Continuing
447: <i>ACFT DEMO ENGINES</i>	17.264	10.943	9.635	-	9.635	9.813	9.998	10.167	10.340	Continuing	Continuing
BA7: <i>AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	46.357	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates manned and unmanned rotary wing vehicle (RWV) technologies to enable Army transformation. Within this PE, aviation technologies are developed and integrated into realistic and robust demonstrations. The PE supports enabling component and subsystems for rotorcraft in the following areas: rotors, drive trains, structures and survivability (project 313), weapons integration (project 435), mission equipment packages to enable control of unmanned systems (project 436) and affordable and efficient engines (project 447). Projects BA7 and BA8 fund congressional special interest items.

Work in this PE is related to and fully coordinated with PE 0602211A (Aviation Technology), PE 0603313A (Missile and Rocket Advanced Technology) and PE 0603270A (Electronic Warfare Technology). Efforts under this PE transition to programs supported by PE 0603801A (Aviation - Advanced Development), PE 0604801A (Aviation - Engineering Development), and PE 0604270A (Electronic Warfare Development).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC) with facilities located at Redstone Arsenal, AL; Fort Eustis, VA; and Moffett Field, CA.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	112.388	57.454	59.983	-	59.983
Current President's Budget	104.229	57.454	62.193	-	62.193
Total Adjustments	-8.159	-	2.210	-	2.210
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-6.242	-			
• SBIR/STTR Transfer	-1.917	-			
• Adjustments to Budget Years	-	-	2.210	-	2.210

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>	PROJECT 313: <i>ADV ROTARYWING VEH TECH</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
313: <i>ADV ROTARYWING VEH TECH</i>	37.993	42.149	44.939	-	44.939	46.777	50.279	56.515	58.170	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates systems/subsystems for manned/unmanned rotorcraft that provide, improved survivability, greater performance and reduced operational costs and required maintenance. Systems demonstrated include rotors, drivetrains, robust airframe structures and integrated threat protection systems.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Fort Eustis, VA., and the System Simulation Development Directorate, AMRDEC, Redstone Arsenal, AL. Work in this project is coordinated with Program Manager ? Aircraft Survivability Equipment (PM-ASE).

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

	FY 2010	FY 2011	FY 2012
<p>Title: Rotorcraft Survivability</p> <p>Description: These efforts increase rotorcraft survivability by reducing platform signatures and providing the means to more efficiently counter enemy detection and tracking systems. This effort also enhances situational awareness, allowing manned/unmanned aircraft to avoid enemy air threats.</p> <p>FY 2010 Accomplishments: Completed development of a lightweight, multi-function laser to counter man-portable air-defense systems, small arms, rocket propelled grenades, and laser designated threats through multi-band, infra-red and eye-safe visual laser energy.</p> <p>FY 2011 Plans: Integrate the lightweight, multi-function laser on an Apache platform and demonstrate improved countermeasures effectiveness through flight testing on a threat range; and demonstrate an aircraft survivability software adapter to allow plug & play capability for legacy and future aircraft survivability equipment (ASE) components and software products through hardware-in-the-loop (HITL) lab testing.</p> <p>FY 2012 Plans:</p>	9.378	12.306	6.763

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT 313: <i>ADV ROTARYWING VEH TECH</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will conduct follow-on HITL demonstration of survivability software adapter utilizing Integrated Aircraft Survivability Equipment (IASE) system, developed by PM-ASE, and additional aircraft survivability systems; and will finalize Super - Application Programming Interface (API) definition to allow plug & play capability for legacy and future aircraft ASE.				
<p>Title: Rotorcraft Drive Systems</p> <p>Description: This effort demonstrates advanced rotorcraft drive technologies that: increase the horsepower-to-weight ratio; reduce drive system noise; reduce production, operating and support costs; and provide automatic component impending failure detection.</p> <p>FY 2010 Accomplishments: Conducted over-torque fatigue demonstration of the tail rotor enhanced power density gears; completed endurance and over-torque demonstration of the helical face gears; and completed demonstration of the composite gearbox housings and composite shaft/coupling.</p> <p>FY 2011 Plans: .Investigate material technologies through bench testing to validate materials for lightweight housings, new bearings and ultra-highly loaded gears; initiate preliminary and detailed design of a demonstrator drive system; and evaluate these technologies relative to conventional single-speed transmissions as well as proposed multi-speed drive configurations.</p> <p>FY 2012 Plans: Will complete detailed design and begin fabrication of drive system component test hardware to validate key materials for ultra-highly loaded gears and bearings as well as lightweight gearbox housings with improved corrosion resistance and reduced operational maintenance.</p>		3.462	3.278	3.202
<p>Title: Rotor Design and Capabilities</p> <p>Description: This effort determines the performance benefits of advanced rotors and air vehicles through the evaluation of alternative designs aimed to satisfy future force capability needs for increased system durability, speed, range and payload.</p> <p>FY 2010 Accomplishments: Characterized acoustic properties of Optimum Speed Rotor through flight testing and demonstrated full flight envelope; conducted component demonstrations for rotor durability technologies; and conducted whirl stand and wind tunnel testing on full-scale rotor blades to demonstrate high performance rotor technologies that improve aeromechanical performance, reduce acoustic detection, and reduce vibration.</p> <p>FY 2011 Plans:</p>		14.016	12.017	15.306

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT 313: <i>ADV ROTARYWING VEH TECH</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Demonstrate enhanced integrated rotor durability to assess benefit to aircraft maintenance; demonstrate permanent erosion protection, reliable icing protection and battle damage assessment as well as repair technologies on full-scale rotor blades; and demonstrate improved hover performance.</p> <p>FY 2012 Plans: Will complete assessment of reconfigurable rotors technology; will design a high performance, low vibration, low noise rotor and integrated control system; will investigate advanced air vehicle concepts that address Army Aviation performance gaps; and will initiate trade studies that support the evaluation of candidate next generation air vehicle designs that will include performance, survivability, cost and sustainability attributes to be pursued for demonstration.</p>				
<p>Title: Capability-based Operations & Sustainment Technologies (COST)</p> <p>Description: Mature and demonstrate technologies that improve the operational availability of rotorcraft while reducing operating and support (maintenance) costs. Efforts include component sensing, diagnostics, prognostics, and control systems.</p> <p>FY 2010 Accomplishments: Integrated engine, flight control, electrical and rotor technologies to demonstrate the feasibility of implementing these technologies as a single solution, as well as applied system level data fusion techniques to increase accuracy and reduce false alarms; and conducted a system integration demonstration in an avionics systems integration laboratory.</p> <p>FY 2011 Plans: Develop prognostic technologies to predict failures and remaining useful life of engine accessories such as fuel controls, pumps and generators; and begin demonstration of on-board automatic adjustments for in-flight rotor smoothing/balance capability.</p> <p>FY 2012 Plans: Will demonstrate individual algorithms for prognostics of engine components, structural integrity, rotor components, and vehicle management systems for improved component time on wing and reduced maintenance; and will develop data fusion techniques to improve sensor coverage and account for system-to-system influences.</p>		6.655	5.852	6.669
<p>Title: Adaptive Vehicle Management System (AVMS)</p> <p>Description: The AVMS integrates advanced flight controls with real-time aircraft state information to enable safe, low-effort maneuvering and real-time adaptation to aircraft state changes (degradation, damage, mission, etc.). The AVMS demonstrates technology that enables Level 1 (most acceptable) handling qualities in the entire flight envelope, reduces flight control line replaceable unit counts by over 20%, and reduces flight control system weight.</p> <p>FY 2010 Accomplishments:</p>		1.176	1.402	3.842

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT 313: <i>ADV ROTARYWING VEH TECH</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Compiled and identified technologies, including emerging applied research, and analyzed the technology status as well as the risk assessment of each for inclusion in the AVMS flight demonstration; and generated a preliminary design of a baseline AVMS system for flight demonstration.</p> <p>FY 2011 Plans: Complete preliminary design of required AVMS hardware and software; prioritize technologies to be flight demonstrated and conduct a risk/reward assessment of each technology; and generate several candidate systems to analyze in simulation to support a planned flight demonstration.</p> <p>FY 2012 Plans: Will finish simulation evaluation of candidate systems to determine final candidates via flight demonstration. Will begin detailed analysis and design of the best candidate AVMS suites in preparation for flight demonstration.</p>				
<p>Title: Integrated Aircraft and Crew Protection</p> <p>Description: This effort demonstrates combined rotorcraft platform durability and survivability improvements through a fully optimized and integrated structure, Vehicle Management System (VMS), and rotors/subsystems technology integration program.</p> <p>FY 2010 Accomplishments: Conducted a series of platform system trade studies to identify the sensitivities of technology contributions to battlefield and operational survivability from structures, rotors, subsystems, and vehicle management systems areas.</p> <p>FY 2011 Plans: Finalize the platform system trade studies; and conduct hardware refinement and validation to mature system level solutions of structures, rotors, subsystems and VMS technologies.</p> <p>FY 2012 Plans: Will fabricate and demonstrate, at the full-scale component level, technology optimized concepts in structures, rotors, subsystems, and vehicle management systems areas, derived from the earlier trade studies; and will begin design of a combat tempered platform integrated technology demonstrator and will conduct system trade studies.</p>		1.882	3.392	5.286
<p>Title: Real-time Airspace Collision Avoidance and Teaming (REACT) and Joint Common Architecture (JCA)</p> <p>Description: This program evaluates, and integrates real-time airspace de-confliction and collision avoidance technologies. The JCA effort will develop standards and requirements for an aviation open systems, mission processing architecture that is scalable across joint rotorcraft missions. This effort will implement these standards into a prototype processing system and demonstrate through Software Integration Lab (SIL) testing.</p>		1.424	3.902	3.871

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>	PROJECT 313: <i>ADV ROTARYWING VEH TECH</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<p><i>FY 2010 Accomplishments:</i> Matured the Army tactical airspace model for systems engineering analysis of potential airspace de-confliction and collision avoidance methods, as well as demonstrated improved airborne and ground control station based real-time situational awareness displays.</p> <p><i>FY 2011 Plans:</i> Evaluate and demonstrate airspace/battlespace integration technologies, including real-time situational awareness display concepts and collision avoidance technology concepts, and evaluate effectiveness.</p> <p><i>FY 2012 Plans:</i> Will increase complexity of airspace/battlespace scenario and demonstrate effectiveness of real-time displays and collision avoidance technologies; and begin development of a software developer toolkit and integrator toolkit to verify software compliance with defined JCA standards and requirements.</p>			
Accomplishments/Planned Programs Subtotals	37.993	42.149	44.939

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>	PROJECT 435: <i>AIRCRAFT WEAPONS</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
435: <i>AIRCRAFT WEAPONS</i>	2.615	2.608	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project develops, demonstrates and integrates manned and unmanned sensor and weaponization technologies such as advanced missiles, guns, fire controls, advanced target acquisition and pilotage sensors into Army aviation platforms. Efforts are directed toward reducing the integrated weight of weapons, increasing engagement ranges, providing selectable effects on a variety of threats, and enabling cost-effective integration across multiple aviation platforms.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Redstone Arsenal, AL and Fort Eustis, VA.

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

	FY 2010	FY 2011	FY 2012
Title: Aviation Multi-Platform Munition (AMPM)	2.615	2.608	-
Description: Aircraft weapons efforts were consolidated in this project to focus technologies toward integrating a new lightweight weapon for use with both manned and unmanned rotorcraft systems.			
FY 2010 Accomplishments: Developed and published interface control documentation of weapons for multi-platform integration; began development of a weapon system engineering concept and developed key technologies; and completed flight demonstration of industry candidate missile systems (30 lb. class) in conjunction with Kiowa Warrior weapons pylon evaluation.			
FY 2011 Plans: Complete the system concept and system engineering plan for integration of smart weapons, to include initial definition of a universal weapon integration architecture; and demonstrate smart weapon (Shadow Hawk) integration implementing the Universal Armaments Interface (UAI) standard.			
Accomplishments/Planned Programs Subtotals	2.615	2.608	-

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

N/A

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>	PROJECT 435: <i>AIRCRAFT WEAPONS</i>

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>				PROJECT 436: <i>ROTARYWING MEP INTEG</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
436: <i>ROTARYWING MEP INTEG</i>	-	1.754	7.619	-	7.619	10.070	12.762	10.092	10.252	Continuing	Continuing

Note

The objective of this project is to mature and validate man-machine integration and mission equipment technologies, such as artificial intelligence, intelligent agents, cognitive decision aiding (CDA) sensors, avionics, communications, pilot vehicle interfaces, and autonomous assistants. This project improves the overall mission execution by demonstrating manned and unmanned system teaming, enhanced helicopter pilotage capability, improved crew workload distribution, and new capabilities for both manned and unmanned aircraft. This project supports Army transformation by providing mature technology to greatly expand the capabilities of unmanned aircraft, in current operating roles and future unmanned wingman roles. This project also develops, demonstrates and integrates manned and unmanned sensor and weaponization technologies such as advanced missiles, guns, fire controls, advanced target acquisition and pilotage sensors into Army aviation platforms. Efforts are directed toward reducing the integrated weight of weapons, increasing engagement ranges, providing selectable effects on a variety of threats, and enabling cost-effective integration across multiple aviation platforms.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan.

A. Mission Description and Budget Item Justification

Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development and Engineering Center (AMRDEC), Fort Eustis, VA.

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

	FY 2010	FY 2011	FY 2012
Title: Intelligent Autonomy for Unmanned Systems	-	1.754	2.719
Description: Mature and apply tactical behaviors and safe-flight technologies to enable unmanned aircraft to maintain safe, responsive, flexible and tactical formation flight with manned helicopters for unmanned wingman applications in re-supply, reconnaissance, surveillance and attack missions.			
FY 2011 Plans: Evaluate and down-select flight-following algorithms. Assess architectures for integrating flight-following algorithms and tactical behaviors with flight controls.			
FY 2012 Plans: Will migrate autonomy functions from ground control station to the unmanned aircraft to enable precise adjustment of delivery location in re-supply mission and autonomous onboard real time mission re-planning.			
Title: Aviation Weapons System Integration	-	-	4.900

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>	PROJECT 436: <i>ROTARYWING MEP INTEG</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<p>Description: Develop an integrated, networked sensor and weapons management system that enables manned-unmanned teams to conduct cooperative precision engagements of short dwell targets with distributed Mission Equipment Packages (MEPs) .</p> <p>FY 2012 Plans: Will develop a lightweight, integrated weapon system for manned and unmanned engagements of ground and airborne targets, to include advanced munitions for platform self-defense from threat unmanned aircraft.</p>			
Accomplishments/Planned Programs Subtotals	-	1.754	7.619

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army								DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>				PROJECT 447: <i>ACFT DEMO ENGINES</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
447: <i>ACFT DEMO ENGINES</i>	17.264	10.943	9.635	-	9.635	9.813	9.998	10.167	10.340	Continuing	Continuing

Note

This project matures and demonstrates power system technologies through design, fabrication, and evaluation of advanced engine components in order to improve the performance of turbine engines. This project supports Army transformation by demonstrating mature technologies for lighter turbine engines that provide increased power, increased fuel efficiency, improved sustainability and reduced maintenance. These advanced engine designs will significantly improve the overall aircraft performance characteristics and reduce the logistical footprint of rotary wing aircraft.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

A. Mission Description and Budget Item Justification

Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), at Fort Eustis, VA.

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

Title: Advanced Affordable Turbine Engine (AATE) Technology	FY 2010	FY 2011	FY 2012
Description: Demonstrate a 3000 horsepower gas turbine engine for improved operational capability for Blackhawk, Apache, and other future rotorcraft. AATE includes two competitive engine demonstrator efforts (1 - General Electric and 2 - Advanced Turbine Engine Company (ATEC) (Honeywell and Pratt & Whitney Joint Venture)). Work in this project is complementary with efforts in PE 0602211A, project 47A.	17.264	10.943	-
FY 2010 Accomplishments: Integrated core engine components into gas generator configurations, completed initial evaluation, and demonstrated mechanical integrity of the integrated core engine designs; integrated power turbines and conducted first full engine evaluations, establishing initial engine performance capability; determined design modifications required to fully achieve performance goals; and designed and fabricated component modifications to meet performance goals.			
FY 2011 Plans: Complete optimized component evaluations and analyze results in support of engine demonstration; integrate optimized components into goal engine demonstrator hardware; complete full engine demonstration to include final engine performance and weight assessment; complete additional engine evaluations to gain insight into engine durability characteristics; and upon			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT 447: <i>ACFT DEMO ENGINES</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
completion of this effort, this program transitions to the PEO Aviation Improved Turbine Engine Program (ITEP) for Engineering Manufacturing Development (EMD).					
Title: Future Affordable Turbine Engine (FATE)			-	-	9.635
Description: Demonstrate an advanced, innovative gas turbine engine that provides significant improvement in operational capability for current and future rotorcraft. FATE uses sequential design and fabrication iterations to mature a design to demonstrate the following performance and cost goals: 35% reduction in specific fuel consumption (SFC); 80% improvement in horsepower-to-weight ratio; and a 45% reduction in production and maintenance cost compared to year 2000 state-of-the-art engine technology. Work in this project is coordinated with efforts in PE 0602211A, project 47A.					
FY 2012 Plans: Will complete preliminary design, detailed design, and component fabrication efforts for initial build of advanced engine system demonstrator, building on knowledge gained under other DoD Versatile Affordable Advanced Turbine Engine (VAATE) efforts; and design activities will include 2-D and 3-D mechanical and aero-thermal efforts to evaluate the merits of individual components.					
Accomplishments/Planned Programs Subtotals			17.264	10.943	9.635
C. Other Program Funding Summary (\$ in Millions) N/A					
D. Acquisition Strategy N/A					
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>				PROJECT BA7: <i>AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
<i>BA7: AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	46.357	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Aviation advanced technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: UAV-Resupply (BURRO)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported the development of an unmanned aerial logistics resupply delivery system designed to overcome effects of threat, weather, elevation and chem-bio-radiation; Effort focused on unmanned aerial system concept to increase reliability, reduce susceptibility and reduce vulnerability.</p>	3.184	-	-
<p>Title: Universal Control Full Authority Digital Engine Control (FADEC)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a universal control architecture that incorporates model-based schemes to improve operational performance and reduce ownership cost for turboshaft engine control systems; Effort was re-scoped for future ITEP 3000hp engine application.</p>	7.162	-	-
<p>Title: Drive System Composite Structural Component Risk - Reduction Program</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Evaluated the results of the earlier material testing and implemented necessary changes; Other materials were also evaluated and tested; A final geometry and material system was down-selected for advancement.</p>	2.387	-	-
<p>Title: Autonomous Cargo Acquisition for Rotorcraft Unmanned Aerial Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments:</p>	1.273	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT BA7: <i>AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Investigated rotorcraft unmanned aerial systems (UAS) to provide logistics supply and precise load emplacement and extraction.				
Title: Inter Turbine Burner for Turbo Shaft Engines Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Validated the final design selection of an inter turbine burner flame-holder and combustion chamber geometry.		2.387	-	-
Title: Enhanced Rapid Tactical Integration and Fielding of Systems Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Supported development of systems that provide network-centric capabilities to the future force.		3.104	-	-
Title: Parts-on-Demand for CONUS Operations Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed a process for Parts-on-Demand for CONUS Operations.		4.477	-	-
Title: Next Generation Green, Economical and Automated Production of Composite Structures for Aerospace Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed tooling system processes to reduce labor costs, improve efficiency, and improve capabilities; Included semi-automated/automated processes: batching, mixing, forming, drying, and sealing for soluble tooling; Rapid prototyping methods were evaluated to make small production runs more cost effective for soluble and insoluble tooling.		0.995	-	-
Title: UH-60 Transmission/Gearbox Galvanic Corrosion Reduction Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Researched ways to reduce corrosion and thus increase mission readiness.		1.492	-	-
Title: Robust Composite Structural Core for Army Helicopters		1.592	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT BA7: <i>AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This Congressional Interest Item matured a more robust structural core product through material characterization, product development and technology transition.</p> <p>FY 2010 Accomplishments: In FY10, this Congressional Interest Item matured a more robust structural core product through material characterization, product development and technology transition.</p>				
<p>Title: Crewmember Alert Display Development Program</p> <p>Description: This Congressional Interest Item developed and combined already installed crewmember displays to alert the door gunners with immediate and accurate detections of hostile fire from enemy weapon systems.</p> <p>FY 2010 Accomplishments: In FY10, this Congressional Interest Item developed and combined already installed crewmember displays to alert the door gunners with immediate and accurate detections of hostile fire from enemy weapon systems.</p>		1.592	-	-
<p>Title: Wireless HUMS for Condition Based Maintenance of Army Helicopters</p> <p>Description: This Congressional Interest Item evaluated ways to improve operational safety of Army helicopters in both training and combat operations, while concurrently supporting cost reduction through condition based maintenance.</p> <p>FY 2010 Accomplishments: In FY10, this Congressional Interest Item evaluated ways to improve operational safety of Army helicopters in both training and combat operations, while concurrently supporting cost reduction through condition based maintenance.</p>		1.592	-	-
<p>Title: Heavy Fuel Engine Family for Unmanned Systems</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed and tested a fuel efficient heavy fuel engine to meet the DoD requirement that UAS engines operate on JP-8 fuel.</p>		3.183	-	-
<p>Title: Transitioning Stretch Broken Carbon Fiber to Production Programs</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Researched methods to develop and qualify carbon fiber composite material forms for use on military aircraft.</p>		3.183	-	-
<p>Title: Advanced Affordable Turbine Engine Program</p>		3.979	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603003A: <i>AVIATION ADVANCED TECHNOLOGY</i>		PROJECT BA7: <i>AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)</i>
B. Accomplishments/Planned Programs (\$ in Millions)				
				FY 2010
				FY 2011
				FY 2012
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Developed and tested components of the next generation engine for attack and utility helicopters in support of the Army Advanced Affordable Turbine Engine (AATE) program.				
Title: New Hi Temp Dom PES Foam Fab/Cert DoD Aerospace Applications				2.387
Description: This is a Congressional Interest Item.				-
FY 2010 Accomplishments: Qualified a low density polyethersulphone (PES) foam for high performance core materials as an alternative source for defense and aerospace structural core applications.				-
Title: Technologies for Military Equipment Replenishment				1.592
Description: This is a Congressional Interest Item.				-
FY 2010 Accomplishments: Developed solutions to facilitate the return of equipment to service; Re-engineered essential parts to reduce costs and give equipment a longer useful life.				-
Title: Foil Bearing Supported UAV Engine				0.796
Description: This is a Congressional Interest Item.				-
FY 2010 Accomplishments: Developed proof-of-concept air cushion foil bearings that provide extended part life relative to conventional engine bearings.				-
Accomplishments/Planned Programs Subtotals				46.357
				-
				-
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	92.638	64.438	77.077	-	77.077	82.110	89.766	94.727	97.861	Continuing	Continuing
232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>	29.511	43.573	54.210	-	54.210	54.941	62.281	65.856	68.452	Continuing	Continuing
43A: <i>ADV WEAPONRY TECH DEMO</i>	33.687	-	-	-	-	-	-	-	-	Continuing	Continuing
L94: <i>ELECTRIC GUN SYS DEMO</i>	6.053	-	-	-	-	-	-	-	-	Continuing	Continuing
L96: <i>HIGH ENERGY LASER TECHNOLOGY DEMO</i>	22.414	19.868	18.408	-	18.408	23.201	23.214	24.103	24.641	Continuing	Continuing
L97: <i>SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY</i>	0.973	0.997	4.459	-	4.459	3.968	4.271	4.768	4.768	Continuing	Continuing

Note

FY12 funding increase for Advanced Lethality and Survivability Demos.

A. Mission Description and Budget Item Justification

The objective of this program element (PE) is to mature and demonstrate advanced lethal and non-lethal weapons and munitions technologies to increase battlefield lethality. This PE supports the maturation and demonstration of enabling components and subsystems which provide: scalable lethal and non-lethal effects (project 232); key subsystems that enable an electromagnetic (EM) gun weapon system demonstrator (project L94); a tactical high energy laser weapon system demonstrator (project L96); and smoke and obscurant technologies to enhance platform and personnel survivability (project L97). Project 43A funds congressional special interest items.

Work in this PE is related to, and fully coordinated with, PE 0602624A (Weapons and Munitions Technology), PE 0602618A (Ballistics Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0602307A (Advanced Weapons Technology), PE 0602120A (Sensors and Electronic Survivability), PE 0602622A (Chemical, Smoke, and Equipment Defeating Technology), and PE 0603313A (Missile and Rocket Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ, in cooperation with the Army Research Laboratory (ARL), Aberdeen Proving Ground, MD; the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI; the Aviation and Missile Research, Development, Engineering Center (AMRDEC), Huntsville, AL; Edgewood Chemical Biological Center (ECBC), Edgewood, MD; and the U.S. Army Space and Missile Defense Center (SMDC), Huntsville, AL.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	89.861	64.438	67.325	-	67.325
Current President's Budget	92.638	64.438	77.077	-	77.077
Total Adjustments	2.777	-	9.752	-	9.752
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	4.419	-			
• SBIR/STTR Transfer	-1.642	-			
• Adjustments to Budget Years	-	-	9.752	-	9.752

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603004A: <i>Weapons and Munitions Advanced Technology</i>				232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>	29.511	43.573	54.210	-	54.210	54.941	62.281	65.856	68.452	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates lethal and non-lethal enabling technologies for weapons and munitions such as advanced energetic materials, insensitive munitions, novel fuze designs, scalable warhead designs, pulsed laser sources, and high power microwave (HPM) systems. This project focuses on technologies that enable precision delivery of effects and increased affordability.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ, in cooperation with the Army Research Laboratory (ARL), Aberdeen Proving Ground, MD; the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI; and the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Ground Based Networked Munitions Technologies</p> <p>Description: This effort provides follow-on technology advancement to ground based munitions systems currently being developed with improved capabilities. This includes an autonomous non-lethal response system. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H19.</p> <p>FY 2010 Accomplishments: Matured non-lethal (NL) layered response concept, focusing on a delivery methodology for self-destructing/self-deactivating anti-vehicle anti-personnel munitions; demonstrated initial shaped-charge prototype capability for low collateral damage self destruct mechanism in a laboratory environment; and demonstrated a passive communications repeater approach to increase in the laboratory; and matured a 40mm flare-based non-lethal deployment concept.</p> <p>FY 2011 Plans: Demonstrate a non-lethal layered response concept, focusing on ability to deploy munitions that can be fired in succession to intended ranges; continue to mature low-collateral self destruct concept by demonstrating a system with a representative explosively formed penetrator warhead.</p> <p>FY 2012 Plans:</p>	2.885	3.101	3.237

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>		PROJECT 232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will integrate imagery and image processor, in a translucent protective container with Spider Munition Control Unit (MCU), for TRL 6 demonstration; will incorporate the low collateral SD technology into a representative Scorpion System and conclude it with a final TRL 6 test/demonstration; will demonstrate the disposable radio repeater technology to maintain and regain signal from the Spider to the hand held device during the TRL 6 testing.				
<p>Title: Scalable Effect Weapons and Munitions System</p> <p>Description: This effort matures scalable warhead technology and materials as well as demonstrates them in weapon and munition concepts that can be gun or missile launched to deliver a broad spectrum of effects. This ranges from non-lethal to lethal, against threat personnel and other targets. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H18, H28, and PE 0602303A/Project 214.</p> <p>FY 2010 Accomplishments: Modeled detailed designs and simulated performance of components and system assemblies; integrated technologies developed under PE 060624A/Project H28 into a demonstrator to test advanced technology functions for medium and large caliber scalable and adaptive lethality munitions; conducted static demonstrations of medium and large caliber munitions, in a laboratory environment to verify component level performance against selectable and scalable lethality requirements, using a combination of empirical data and modeling and simulation (M&S) analyses.</p> <p>FY 2011 Plans: Fabricate and integrate hardware as well as conduct fully integrated gun-launched firing demonstrations against varied targets and scenarios in a relevant environment to demonstrate scalable and adaptive effects with medium caliber cartridges, artillery shells, and unitary warheads for rocket applications; and verify system scalable lethality performance using technical data and M&S analysis.</p>		12.567	11.363	-
<p>Title: Soldier and Small Unit Lethality Integration</p> <p>Description: This effort leverages the soldier radio waveform (SRW) to enable network lethality at the small combat unit (SCU) level. Efforts described here are coordinated and complimentary to related efforts in PE 0603001A/Project J50.</p> <p>FY 2010 Accomplishments: Integrated mission tasking, target geo-location and hand-off from a small unmanned aerial vehicle (UAV) platform to a small unit effects network; and participated and demonstrated small unit effects network at command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) On-The-Move (OTM) test bed.</p> <p>FY 2011 Plans:</p>		2.904	2.959	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>		PROJECT 232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Refine and evaluate coordinated target hand-off, attack capability, as well as de-confliction with a small UGV/small UAV; and demonstrate network fire capabilities and fire control decision aides.				
<p>Title: Tunable Pyrotechnics</p> <p>Description: This effort demonstrates reactive energetic technologies that enable the Warfighter to have pyrotechnic munitions for countermeasure missions.</p> <p>FY 2010 Accomplishments: Tested enhanced primer and tracer compositions; matured countermeasure formulation; integrated formulation into developmental test configuration decoys to demonstrate effectiveness against specific threat systems; demonstrated battlefield effects by testing developmental test configuration battlefield effects simulators; and demonstrated feasibility of tunable compositions in battlefield effects.</p> <p>FY 2011 Plans: Conduct a comprehensive evaluation on the performance of the compositions in a countermeasure mission using computer models of the decoy, evaluate effectiveness against simulation threat systems and captive IR seeker threat systems; and mature formulation characterization of IR and visible illumination compositions.</p> <p>FY 2012 Plans: Will validate performance of advanced countermeasure flares through captive seeker flight testing and demonstrate performance of the pyrotechnic portion of the pocket hand-held signal with respect to the color given off and its illumination intensity.</p>		2.910	2.928	2.997
<p>Title: Extended Area Protection and Survivability (EAPS)</p> <p>Description: This effort demonstrates the use of command-guided medium caliber projectiles for the interception and destruction of incoming rockets, artillery, and mortar rounds. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H28 and PE 0603313A/Project 263</p> <p>FY 2010 Accomplishments: Fabricated an integrated system including a course correction round and respective warhead subsystems; investigated command of a projectile maneuver and a warhead detonation simultaneously through an RF link from the ATS radar ground station; and modeled as well as simulated the fire of a group of rounds, tracked them through the radar, and implemented a course correction in flight, to increase the intercept probability.</p> <p>FY 2011 Plans:</p>		3.888	4.358	9.901

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT 232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Demonstrate with a fully loaded round with the capability to track, perform command maneuver and detonate warheads through an RF link.</p> <p>FY 2012 Plans: Will integrate developed gun system with optimized ammunition to provide salvo firing capability; perform validation of fire control software and integration into gun system; verify optimized warhead performance; assess software and firmware improvements to track, divert and initiate the warhead of multiple targets simultaneously.</p>				
<p>Title: Military Operations in Urban Terrain (MOUT)/Urban Lethal Technologies</p> <p>Description: This effort demonstrates the next generation of explosive wall breaching and shoulder launched weapon warhead technologies.</p> <p>FY 2010 Accomplishments: Optimized precursor and bash-through warhead for reduced weight; demonstrated warhead performance against target set (i.e., triple brick walls, double reinforced concrete walls, earth and timber bunker, as well as stationary and moving vehicles with a minimum of 30 mm of rolled homogenous armor) for shoulder launched munitions; and demonstrated remote emplacement of a single step breaching system.</p> <p>FY 2011 Plans: Mature fuzing technologies and build a lab demonstrator for shoulder launched weapons; mature standoff breaching warhead design and build a lab demonstrator; evaluate the enhanced shoulder launched weapon and breaching warhead in a military relevant environment.</p> <p>FY 2012 Plans: Will integrate optimized flight projectile, fire from enclosure (from cover) propulsion and light weight composite launcher; will optimize system against requirements; will demonstrate integrated system capability; and validate system capability against target set.</p>		4.357	6.606	4.894
<p>Title: Advanced Lethality Demonstration</p> <p>Description: This effort matures and demonstrates novel penetrator designs as well as alternative lethal mechanisms to maintain or exceed tank main gun performance against multiple target types into the future. A goal of this effort is to mature and demonstrate new tank main gun rounds, made with conventional materials, of equal or better performance to our currently fielded depleted uranium based rounds. Efforts described here are coordinated and complementary to the FY10 Advanced Lethality Demonstration in PE0603004A/Project L94.</p> <p>FY 2011 Plans:</p>		-	3.685	2.318

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT 232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Initiate performance assessment of three novel penetrator configurations at both ordnance and hypervelocity; conduct system trade studies; fabricate and bench test full scale surrogates to evaluate tactical deployment concepts; and revise baseline tank main gun kinetic energy cartridge system designs, to incorporate these novel penetrator configurations. FY 2012 Plans: Will optimize and validate tactical size KE penetrator against actual range targets; will provide lethality maps for modeling and simulation.				
Title: Dual-Use Improved Conventional Munitions (DPICM) Replacement Acceleration Description: This effort matures and demonstrates ultra high reliability fuzing, advanced kill mechanisms, and alternative dispense technologies to provide increased battlefield lethality with reduced unexploded ordnance (UXO) compliant with current DoD cluster munitions policy. Efforts described here are coordinated and complimentary to related efforts in PE 0602624/Project H18 and the FY10 Advanced Lethality Demonstration in PE 0603004A/Project L94. FY 2011 Plans: Mature and demonstrate enabling components as well as subsystems that provide: ultra high reliability through exploitation of novel power sources and redundant fuze architecture; enhance lethal effects against armored targets via optimization of high velocity penetrators and explosives; increase area coverage through demonstration of innovative munitions dispense systems; and provide UXO compliance via improved self-destruct/self-neutralization features. FY 2012 Plans: Will demonstrate fuze reliability through static and ballistic testing; will optimize warhead design based on feedback and will use input to validate systems effectiveness modeling.		-	3.487	5.205
Title: Medium Caliber Weapon Systems Description: This effort matures and demonstrates advanced medium caliber rounds, weapon and ammunition systems optimized for remote applications. This effort addresses multiple warfighter capability gaps including super high elevation engagement, high performance stabilization, remote ammunition loading, weapon safety and reliability, improved lethality, accuracy, and the ability to fire a suite of ammunition from non-lethal to highly lethal, to provide escalation of force capability in one system. Efforts described here are coordinated and complementary to the FY10 Advanced Lethality Demonstration in PE0603004A/Project L94. FY 2011 Plans:		-	5.086	10.932

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>		PROJECT 232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<p>Mature and demonstrate initial model designs and components for alternative lethality mechanisms; develop demonstration system mature controls and software; initiate system engineering analyses and testing; explore remote armament designs and build demonstrators.</p> <p>FY 2012 Plans: Will build advanced prototypes using mature system dynamic models to optimize system precision, accuracy, reliability and lethality against new and existing target sets, with new munitions and weapon enhancements; will mature remaining system dynamics models; will utilize systems engineering to optimize components maturation efforts for maximum return on investments and performance; will demonstrate scalable lethality effects leveraging non-lethal munition technologies; will conduct live fire demonstrations in Mann barrels (test barrels designed to isolate munitions characteristics); and advanced medium and remote small caliber rounds, weapons, as well as ammunitions system prototypes.</p>					
<p>Title: Advanced Power and Energy Management for Munitions</p> <p>Description: This effort demonstrates the technology options available to provide the next generation of gun fired smart munitions, with advanced power components for improved performance.</p> <p>FY 2012 Plans: Demonstrate technologies for reserve batteries that use methods to integrate energy storage with new architectures that have superior characteristics for energy management; mature electrochemical architectures which can be miniaturized for integration into semiconductor devices capable to scale up into standard reserve cell to power munitions systems; demonstrate novel methods and techniques designed to reduce the power consumption of advanced gun fired smart munitions, as well as advances in technology will develop future generation of energy harvesters.</p>			-	-	1.747
<p>Title: Scale-up of Energetic Materials</p> <p>Description: This effort matures and demonstrates the performance and insensitivity of energetic materials in medium cal (direct fire) and large cal (indirect fire) weapons.</p> <p>FY 2012 Plans: Will assess propulsion system as well as explosive warhead performance improvements against most critical current and projected threat targets; will fabricate and bench test improved energetic materials in tactical quantities and configurations to evaluate performance improvements.</p>			-	-	2.500
<p>Title: Counter Countermeasure (CCM) Technology Demonstrations</p>			-	-	1.345

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT 232: <i>ADVANCED LETHALITY & SURVIVABILITY DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort demonstrates the continued effectiveness of US weapon systems and ammunition against current and projected enemy countermeasures, including conventional and classified threats and unexploded ordnance. Efforts are coordinated and complimentary to related efforts in PE 060624A/Project H19.</p> <p>FY 2012 Plans: Will conduct performance assessment of counter countermeasure technologies for application to weapon systems with the most critical need; will conduct system trade studies; will fabricate and bench test surrogates to evaluate improvements; and will assess technologies for application to Army unique needs for mitigation of unexploded ordnance.</p>				
<p>Title: Lethality Efforts</p> <p>Description: This effort demonstrates several advanced lethality efforts.</p> <p>FY 2012 Plans: Will mature and demonstrate enabling technologies, tactically relevant to the Kinetic Energy Active Protection System, and its subsystems to increase the battlefield lethality/survivability; will demonstrate technologies for longer range artillery systems by optimizing alternative launch mechanisms for indirect fire extended range; will demonstrate technologies for sensor-fused munitions for anti-armor and area defense capability; will demonstrate technologies for improving precision that will extend beyond existing ranges.</p>		-	-	9.134
Accomplishments/Planned Programs Subtotals		29.511	43.573	54.210
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>				PROJECT 43A: <i>ADV WEAPONRY TECH DEMO</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
43A: <i>ADV WEAPONRY TECH DEMO</i>	33.687	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Advanced Weaponry Technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Rapid Insertion of Developmental Technology</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported accelerated development of these technologies: insensitive munitions thermal coatings for ammunition containers; micro/nano-Electrical Mechanical Systems; and self assembled writable ordnance for rapid detonation.</p>	1.593	-	-
<p>Title: Lightweight Munitions and Surveillance System (LMSS) for Unmanned Air & Ground Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported the maturation and demonstration of prototypes of a low cost extended range guided munition.</p>	3.819	-	-
<p>Title: Nanotechnology Fuze-on-a-Chip</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported integration of all fuze components into a single chip, providing more than an order-of-magnitude of reduction in size and manufacturing cost</p>	1.591	-	-
<p>Title: Lens-Less Micro Seeker System for Small Steerable Projectiles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Continued the development of advanced sensor technology to be outfitted on a small steerable projectile utilized against incoming rockets, artillery and mortars.</p>	1.990	-	-
<p>Title: Advanced Lightweight Gunner Protection Kit</p>	0.796	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT 43A: <i>ADV WEAPONRY TECH DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported development and qualification of affordable lightweight ballistic armor gunner protection kits for tactical vehicle gunners.</p>				
<p>Title: Titanium Powder Advanced Forged Parts Program</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported development of a manufacturing process for lightweight titanium forged parts for critical DoD applications.</p>		3.024	-	-
<p>Title: Micro Inertial Navigation Unit Technology</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported integration of GPS and inertial navigation functions to enable navigation where GPS is jammed or otherwise unavailable.</p>		1.194	-	-
<p>Title: Soldier Protection through Unmanned Ground Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported creation of a specialized gun that can be mounted on a UGV robot to be used as a point leader in infantry missions.</p>		1.194	-	-
<p>Title: Advanced Robot and Sensor Technology for Surveillance and Energy Efficiency Applications</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported maturation and demonstration of specialized robots for monitoring HVAC systems and other surveillance.</p>		1.194	-	-
<p>Title: Next Generation Machining Technology and Equipment</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments:</p>		1.592	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>		PROJECT 43A: <i>ADV WEAPONRY TECH DEMO</i>
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Supported development of next generation machining technology and equipment to produce cannon tubes and other armament components and assemblies..				
Title: Lightweight Reliable Materials for Military Systems Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Supported increasing the durability and reliability of the lightweight materials that the Army needs for the next generation of weapons and equipment.		2.785	-	-
Title: Technology Development at the Quad Cities Manufacturing Laboratory Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Matured techniques for manufacturing of titanium and advanced ceramic structures, to reduce need for machining.		5.014	-	-
Title: Recovery, Recycle, and Reuse of DOE Metals for DoD Applications Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed an efficient low cost method of obtaining lightweight specialty metals for use by the Department of Defense.		1.920	-	-
Title: LW25 Gun System and Demonstration Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed a light weight machine gun for small helicopters.		2.400	-	-
Title: Zumwalt National Program for Countermeasures to Biological and Chemical Threats Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Furthered the understanding and ability of operational military forces to identify, prevent, and mitigate threats from biological and chemical weapon agents.		1.194	-	-
Title: Integrated Family of Test Equipment V6 Product Improvement Program		2.387	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT 43A: <i>ADV WEAPONRY TECH DEMO</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Developed enhancements for automatic testing equipment of weapons systems.			
Accomplishments/Planned Programs Subtotals	33.687	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT L94: <i>ELECTRIC GUN SYS DEMO</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
L94: <i>ELECTRIC GUN SYS DEMO</i>	6.053	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates electromagnetic (EM) armament subsystems and the enabling technologies for tactically relevant EM gun systems. This work complements and is fully coordinated with efforts in PE 0602618A/Project H75 and PE 0601104A/Project H56.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Armament Research, Development, and Engineering Center (ARDEC), Picatinny, NJ, in cooperation with the Army Research Laboratory (ARL), Adelphi, MD, and The Institute for Advanced Technology (IAT), Austin, TX (a University Affiliated Research Center).

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

	FY 2010	FY 2011	FY 2012
<p>Title: EM Gun System Demonstration</p> <p>Description: The primary objective of this effort is to reduce technical risk associated with EM Gun technology by demonstrating meaningful technical progress at the subsystem level. (Due to the identification of significant technical challenges during FY09, the Army decided to end its Advanced Technology Development investment in EM Gun technology and will collect and archive materials and reports for future use as required.)</p> <p>FY 2010 Accomplishments: Executed scope reduction and contract completion activities to terminate the program to develop a vehicle-mounted EM gun; provided Army stewardship of the pulsed power technology for future work; conducted the inventory and disposition of hardware, documented and preserved the intellectual property, and disassembled, packaged, and shipped EM gun launcher and mount from Yuma Proving Ground to ARDEC.</p>	0.216	-	-
<p>Title: Advanced Lethality Demonstration</p> <p>Description: This effort matures and demonstrates novel penetrator designs and alternative lethal mechanisms to maintain or exceed gun performance against multiple target types into the future. Beginning in FY11, this effort will be documented in PE0603004/Project 232.</p> <p>FY 2010 Accomplishments:</p>	5.837	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT L94: <i>ELECTRIC GUN SYS DEMO</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Evaluated alternative penetrator designs at conventional to hypervelocity for tank main guns; evaluated components for alternative lethal mechanisms against advanced armor and area targets; and matured and evaluated conventional and advanced weapon propulsion alternatives for their potential to attain increased velocities and performance.			
Accomplishments/Planned Programs Subtotals	6.053	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>				PROJECT L96: <i>HIGH ENERGY LASER TECHNOLOGY</i> <i>DEMO</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
L96: <i>HIGH ENERGY LASER TECHNOLOGY DEMO</i>	22.414	19.868	18.408	-	18.408	23.201	23.214	24.103	24.641	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced technologies for future force High Energy Laser (HEL) weapons technology. The major effort under this project is the development of a mobile 100 kilowatt (kW) class Solid State High Energy Laser Technology Demonstrator (HEL TD) that is traceable to the form, fit, and function requirements of the future force. At weapon system power levels of around 100 kW, Solid State Laser (SSL) technology has the potential to engage and defeat rockets, artillery and mortars (RAM), surface mines, anti-tank guided missiles (ATGMs), sensors, and optics. HELs are expected to complement conventional offensive and defensive weapons at a lower cost-per-shot than current systems and without the need to strategically, operationally, or tactically stockpile ordnance. The HEL TD effort utilizes a modular building block approach with open systems architecture to ensure growth and interoperability. This modular approach ensures opportunity for technology insertions for maturation of laser, beam control, sensor/radar, integration of power and thermal management subsystems, as well as Battle Management Command, Control, and Computers (BMC3).

Work in this project is related to, and fully coordinated with, efforts in PE 0602307A (Advanced Weapons Technology), PE 0602890F (High Energy Laser Research), PE 0603924F (HEL Advanced Technology Program), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603924D8Z (High Energy Laser Advanced Technology Program), PE 0602120A (Sensors and Electronic Survivability), and PE 0605605A (DOD High Energy Laser Systems Test Facility),

The cited work is consistent with the Department of Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is performed by the US Army Space and Missile Defense Command Technical Center, Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
Title: High Energy Laser Technology Demonstrator (HEL TD)	22.414	19.868	18.408
Description: This effort matures and integrates SSL components and subsystems on a mobile platform to demonstrate a mobile high power solid state HEL TD.			
FY 2010 Accomplishments: Continued the fabrication and assembly of the Beam Control System (BCS) components; began coating process for primary mirror; conducted software verification and validation and conducted BCS alignment assessments as preparation for low power laser range demonstrations; and continued the system-level preliminary design of the integrated HEL mobile demonstrator.			
FY 2011 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT L96: <i>HIGH ENERGY LASER TECHNOLOGY</i> <i>DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Complete the fabrication, assembly, and functional testing of the BCS; complete coating process for primary mirror; explore integration issues of subsystems onto a tactical vehicle platform; conduct low power HEL testing to demonstrate target acquisition, tracking, and aim point selection; evaluate performance from low power testing and will make necessary changes; purchase test targets; and design and fabricate hardware and develop software interfaces to integrate the BCS and the 100 kW solid state laser (SSL) located at the High Energy Laser Systems Test Facility (HELSTF).</p> <p><i>FY 2012 Plans:</i> Will conduct high power HEL demonstrations of target acquisition, tracking, aim point selection and lethality against rockets, mortar, and other selected targets. Pre-demonstration activities will include BCS and 100 kW SSL hardware integration with check out activities. Will integrate High Energy Laser Joint Technology Office (HEL JTO) provided Adaptive Optics (AO) technologies into the BCS and will prepare for AO demonstrations at HELSTF.</p>				
Accomplishments/Planned Programs Subtotals		22.414	19.868	18.408
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE				PROJECT				
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>				L97: <i>SMOKE AND OBSCURANTS</i> <i>ADVANCED TECHNOLOGY</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
L97: <i>SMOKE AND OBSCURANTS</i> <i>ADVANCED TECHNOLOGY</i>	0.973	0.997	4.459	-	4.459	3.968	4.271	4.768	4.768	Continuing	Continuing

A. Mission Description and Budget Item Justification

The project matures and demonstrates obscurant technologies with potential to enhance personnel/platform survivability by degrading threat force surveillance sensors and defeating the enemy's target acquisition devices, missile guidance, and directed energy weapons. Dissemination systems for new and improved obscurants are developed with the goal of providing efficient and safe screening of deployed forces.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed and managed by the Army Research, Development, and Engineering Command (RDECOM), Edgewood Chemical Biological Center (ECBC), Edgewood, MD.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Obscurant Enabling Technologies</p> <p>Description: This effort demonstrates the dissemination of advanced infra-red (IR) obscurants.</p> <p>FY 2010 Accomplishments: Designed bi-spectral obscurant prototypes for initial dissemination evaluations.</p> <p>FY 2011 Plans: Mature, fabricate, and test grenade concept for bi-spectral obscuration and effective dissemination patterns.</p> <p>FY 2012 Plans: Will optimize and demonstrate bispectral obscurant grenade and will mature, fabricate and test grenade concepts for new low hazard visual obscurant/smoke.</p>	0.973	0.997	1.013
<p>Title: Forensic Analysis of Explosives</p> <p>Description: This effort demonstrates improved point and stand-off detection of explosives and HME precursors.</p> <p>FY 2012 Plans:</p>	-	-	1.446

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603004A: <i>Weapons and Munitions</i> <i>Advanced Technology</i>	PROJECT L97: <i>SMOKE AND OBSCURANTS</i> <i>ADVANCED TECHNOLOGY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will mature and evaluate colorimetric homemade explosives kit and integrate improved signature information for explosives and precursor materials into chemical point and stand-off detection systems.				
Title: Detection Mechanisms for Contaminants		-	-	2.000
Description: This effort demonstrates improved point and standoff detection of a wide range of hazardous materials.				
FY 2012 Plans: Will mature innovative technologies based on multiple spectroscopic sensing techniques for the detection and identification of hazardous material; algorithms will be integrated for improved probability of detection (Pd) and low false alarm rate (FAR) and based on the use of complementary spectroscopic techniques.				
Accomplishments/Planned Programs Subtotals		0.973	0.997	4.459
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	261.689	89.499	106.145	-	106.145	107.544	112.151	111.884	111.114	Continuing	Continuing
221: <i>COMBAT VEH SURVIVABLTY</i>	42.008	24.897	44.275	-	44.275	49.905	51.817	51.589	52.227	Continuing	Continuing
441: <i>COMBAT VEHICLE MOBILTY</i>	45.272	42.154	42.508	-	42.508	38.048	37.909	38.990	39.610	Continuing	Continuing
497: <i>COMBAT VEHICLE ELECTRO</i>	7.246	7.507	8.659	-	8.659	8.789	11.433	10.143	7.925	Continuing	Continuing
515: <i>ROBOTIC GROUND SYSTEMS</i>	9.753	10.637	10.703	-	10.703	10.802	10.992	11.162	11.352	Continuing	Continuing
533: <i>Ground Vehicle Demonstrations</i>	124.342	-	-	-	-	-	-	-	-	Continuing	Continuing
53D: <i>NAC Demonstration Initiatives (CA)</i>	30.720	-	-	-	-	-	-	-	-	Continuing	Continuing
C66: <i>DC66</i>	2.348	4.304	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this program element (PE) is to mature and demonstrate combat and tactical vehicle automotive technologies that enable Army transformation to a lighter, more mobile and more survivable force. This PE supports maturation and demonstration of enabling component and subsystems for ground combat/tactical vehicles in the areas of survivability (project 221), mobility (project 441), combat vehicle electronics (project 497), and robotic ground systems (project 515). . Projects 533 and 53D fund congressional special interest items. Project C66 supports classified activities. Properly accessed individuals can obtain further information from the ASA(ALT) Special Programs Office.

Work in this PE is coordinated with, PEs 0602601A (Combat Vehicle and Automotive Technology), 0602618A (Ballistics Technology), 0602120A (Sensors and Electronic Survivability, Robotics Technology), 0602105A (Materials), 0602624A (Weapons and Munitions Technology), 0602705A (Battery/Ind Power Technology), 0603004A (Weapons and Munitions Advanced Technology), and 0708045A (Manufacturing Technology). Work in this PE is coordinated with the US Marine Corps, the Naval Surface Warfare Center, the Naval Research Laboratory, Air Force Armaments Command, and other ground vehicle developers within the Departments of Energy, Commerce, and Transportation as well as DARPA.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, Michigan.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	240.190	89.499	105.848	-	105.848
Current President's Budget	261.689	89.499	106.145	-	106.145
Total Adjustments	21.499	-	0.297	-	0.297
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.493	-			
• Other Adjustments 1	23.992	-	0.297	-	0.297

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 221: <i>COMBAT VEH SURVIVABLTY</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
221: <i>COMBAT VEH SURVIVABLTY</i>	42.008	24.897	44.275	-	44.275	49.905	51.817	51.589	52.227	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates survivability technologies such as active protection systems (APS), advanced vehicle armors, and safety devices. This project focuses on integrating and demonstrating active protection technologies and vision protection to defeat optical attacks. This project looks at the integration of survivability technologies that enable entire protection suites to provide greater survivability than armor alone.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, Michigan; Army Research Laboratory (ARL), Aberdeen Proving Ground, Maryland; Armaments Research, Development, and Engineering Center (ARDEC), Picatinny, New Jersey; and the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Active Protection Systems (APS) against Kinetic Energy (KE) threats:</p> <p>Description: This effort conducts essential trade studies, technical evaluations, and demonstrations of APS components/subsystems designed for protection against KE penetrators. Coordinated work is also being conducted under Program Elements (PE) 0602624A, 0603004A, and 0603313A.</p> <p>FY 2010 Accomplishments: Supported KE APS demonstrations with interceptor/system evaluation, demonstration, and analysis; completed component and system design specifications and finalized all system interfaces.</p> <p>FY 2011 Plans: Support final end-to-end KE APS demonstration, including vertical launch and use of warhead to defeat a KE threat, with interceptor/system testing, demonstration, and analysis; complete integration of all components into interceptor; facilitate final transition to PEO Ground Combat Systems.</p>	3.925	1.534	-
<p>Title: Tactical Wheeled Vehicle (TWW) Survivability:</p> <p>Description: This effort focuses on maturing and demonstrating viable integrated survivability suites that can be tailored to meet current and future threats for light, medium, and heavy tactical wheeled vehicles. Coordinated work is also being performed under Program Elements (PE) 0602601A, 0602618A, and 0602105A</p>	10.525	11.035	13.442

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 221: <i>COMBAT VEH SURVIVABLTY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p><i>FY 2010 Accomplishments:</i> Completed tactical platform active protection prototype system integration; conducted live fire blast and ballistic evaluation; conducted mobility/durability tests on demonstration vehicles; assessed emerging technologies against current and emerging threats to optimize suites of integrated survivability technologies including high performance ballistic materials, active protection systems, and common displays; integrated suite options and delivered test report, lessons learned, and recommendations to ground combat and tactical vehicle developers.</p> <p><i>FY 2011 Plans:</i> Utilize requirements analysis, technology assessments, concept integration studies based upon emerging technology, and lessons learned to apply a systems engineering evaluation approach to provide a holistic, platform-level process for the maturation of the integrated survivability suites; mature advanced armor to include: opaque, transparent, and underbody kits; integrate advanced tactical vehicle active protection; and establish a concept for an optimized convoy mission focused survivability suite based upon a down selection process.</p> <p><i>FY 2012 Plans:</i> Will apply the lessons learned from the systems engineering evaluation and survivability suite; begin work on an optimized suite of survivability systems that focus on convoy protection; will define, fabricate, integrate and evaluate an advanced active protection system for tactical vehicles.</p>				
<p><i>Title:</i> Vision Protection:</p> <p><i>Description:</i> This effort matures and demonstrates treatments to optical systems that provide protection from frequency-agile laser weapons. Coordinated work is also being performed in Program Elements (PE) 0602120A, 0602705A, 0602786A and 0602712A.</p> <p><i>FY 2010 Accomplishments:</i> Demonstrated eye protection concepts in optical sight testbed and completed new laser-protected optical design for M1A2 Abrams Tank gunner's primary sight</p> <p><i>FY 2011 Plans:</i> Evaluate and refine an architecture that enables a large focal plane optical switch to be implemented; conduct lab testing of laser protected fire control and driver's cameras; and design and implement a liquid optical limiter handling system.</p> <p><i>FY 2012 Plans:</i></p>		2.450	5.339	5.163

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>		PROJECT 221: <i>COMBAT VEH SURVIVABLTY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
Will demonstrate vision protection technologies at TRL 6 and deliver design to PM Abrams; will explore application of protection techniques to other Heavy Brigade platforms and perform laboratory assessments to address evolving threats.					
<p>Title: Armor/Mine Protection:</p> <p>Description: This effort integrates and demonstrates advanced ballistic protection for combat and tactical vehicle including smart and ceramic armors, advanced composite and laminate structures, and advanced transparent armor formulations.</p> <p>FY 2012 Plans: Will fabricate and evaluate combat and tactical wheeled vehicle armor recipes and improved mine kit designs against objective threats while reducing armor weights; integrate armors on demonstrator vehicles and begin performance evaluations; will validate platform-level mine-blast response modeling and simulation tools to include crew/occupant response to support system level analysis</p>			-	-	8.323
<p>Title: High Performance Lightweight Track (Blast Mitigation):</p> <p>Description: This effort improves lightweight track durability and survivability. This effort is done in coordination with PE 0603005A projects 441 and 497.</p> <p>FY 2010 Accomplishments: Used Modeling and Simulation (M&S) to perform blast event analysis on the double pin lightweight track prototype and exploited analysis results to optimize track design for mine blast/IED survivability.</p> <p>FY 2011 Plans: Integrate track solutions, fabricate prototypes and demonstrate blast protection.</p> <p>FY 2012 Plans: Will complete validation of track performance in an operational environment and transition design to PM Bradley Block II modernization program.</p>			1.973	2.498	2.975
<p>Title: Vehicle Integration Laboratory:</p> <p>Description: This effort provides for continuous improvements to ground vehicles to include technology trades, integration, concepts and configuration management designs. A ground system vertical test rig to enable in-house Occupant Centric Survivability evaluations. The system vertical test rig will simulate the vertical forces that occur from an underbelly explosive event (initial vertical and drop-down forces). This test device evaluates the occupant and restraint system (seat, seat belt, floor kits) response to the vertical forces</p>			2.166	4.491	9.047

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 221: <i>COMBAT VEH SURVIVABLTY</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011
<p><i>FY 2010 Accomplishments:</i> Developed M&S framework to assess system integration impacts for emerging technologies (i.e. , advanced engines, suspensions, survivability technologies) for ground combat and tactical vehicle platforms; began life cycle environmental and stability studies of laser protection systems for tactical and ground combat vehicles.</p> <p><i>FY 2011 Plans:</i> Integrate prototype tactical wheeled vehicle active protection systems onto a surrogate platform and conduct performance testing; evaluate integration techniques and concepts for advanced armor kits that defeat objective and emerging threats for ground and tactical vehicle fleets; and conduct system-level testing of combined fire protection technologies on representative ground vehicle platforms.</p> <p><i>FY 2012 Plans:</i> Initial occupant protection suites will be analyzed, for tradeoff studies, balancing protection against performance and payload; will conduct an In Progress Review to present analysis results and make recommendations for a program selection of demonstrator platform and occupant protection technologies; will design, build, and integrate the selected technologies onto the demonstrator vehicle and optimization of the ideal occupant cab will begin.</p>			
<p><i>Title:</i> Armor Integration</p> <p><i>Description:</i> This effort integrates and demonstrates passive, reactive, and electromagnetic technologies for use in active protection armor applications to defeat objective and emerging kinetic energy and chemical energy threats.</p> <p><i>FY 2010 Accomplishments:</i> Matured and validated passive and reactive armor solutions from PE 0602601A/Project C05 and PE 0602618A that defeat objective and emerging threats.</p>		1.281	-
<p><i>Title:</i> Underbody Blast Methodolgy</p> <p><i>Description:</i> Advancement of modeling and simulation to improve the survivability of ground vehicle occupants to underbody blast threats</p> <p><i>FY 2012 Plans:</i> Evaluate vehicle and underbody Soldier blast protection and modeling to address information knowledge gaps that include sensitivity of the elements of the blast kill chain, human effects and injury modeling, blast insult to injury mechanisms and optimization of form, fit and performance</p>		-	5.325
<p><i>Title:</i> Lighter Weight Armor Solutions</p>		19.688	-

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 221: <i>COMBAT VEH SURVIVABLTY</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<p>Description: This effort explored new "out-of-the-box" and "out-of-the-mainstream" armor solutions. The goal was to design, develop and build a concept vehicle within twelve months to meet four overarching objectives (payload, performance, protection and price) while emphasizing occupant-centric survivability.</p> <p>FY 2010 Accomplishments: designed, analyzed (through analytical and physical M&S), fabricated, integrated and conducted limited sub-system evaluations (live fire test and evaluation (LFT&E) and automotive performance evaluation). Data (M&S, LFT&E, CAD, etc.) and lessons learned are helping shape/inform Army programs such as MRAP, JLTV and HMMWV RECAP.</p>			
Accomplishments/Planned Programs Subtotals	42.008	24.897	44.275

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>				441: <i>COMBAT VEHICLE MOBILITY</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
441: <i>COMBAT VEHICLE MOBILITY</i>	45.272	42.154	42.508	-	42.508	38.048	37.909	38.990	39.610	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced mobility and electric technologies for propulsion, power, and electrical components and subsystems. Mobility technologies are being developed to meet program thresholds and move towards ground combat/tactical vehicle objectives. Additionally this program looks at the integration of mobility technologies to enable lightweight, agile, deployable, fuel efficient, and survivable ground vehicles.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI, in conjunction with Army Research Laboratory (ARL), Adelphi, MD.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Hybrid Electric Vehicle (HEV) Propulsion and Power & Energy (P&E) System Integration Lab (SIL):</p> <p>Description: This effort matures and demonstrates power and energy component technologies and assesses HEV performance benefits and burdens. Transition to PEO Combat Support and Combat Service Support.</p> <p>FY 2010 Accomplishments: Supported demonstration of HEV components and hybrid electric system for combat platforms; performed thermal management evaluation of components that increase heat transfer capabilities of onboard power electronics, and performed evaluation of high temperature power electronics.</p> <p>FY 2011 Plans: Mature and demonstrate HEV components and system integration capabilities in simulated field conditions to solve user identified-technical issues and evaluate high temperature/high power electronic devices.</p>	4.259	1.974	-
<p>Title: Ground Systems Power Evaluation:</p> <p>Description: This effort matures and demonstrates power and energy components for propulsion, control systems, communications, life support, electric weapons, and protection systems.</p> <p>FY 2010 Accomplishments:</p>	2.734	2.402	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 441: <i>COMBAT VEHICLE MOBILITY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Demonstrated high temperature power electronics, advanced motors and generator systems; matured advanced diesel engines for JP-8 compatibility and increased thermal efficiency; and matured and demonstrated components, including traction motor inverters, energy converters and motor generator concepts in integrated hybrid electric (HE) systems for wheeled vehicles.</p> <p>FY 2011 Plans: Continue optimization of higher temperature power electronics for use in wheeled vehicle platforms; and continue the optimization of HE systems for wheeled vehicle system upgrades, as well as advanced motors and generators that offer onboard and export power generation.</p>				
<p>Title: Demonstration and Evaluation of Power Electronics:</p> <p>Description: This effort demonstrates Silicon Carbide power conversion components.</p> <p>FY 2012 Plans: Will demonstrate SiC power conversion components, such as SiC DC-DC converter, DC/AC motor inverter and AC/DC generator inverter, to evaluate their performance at higher inlet coolant temperatures, to assess their impact on the total system efficiency and cooling burden, and the effect on total system reliability; will mature thermal systems to increase HVAC efficiency; and will demonstrate electronics cooling technologies for increased performance.</p>		-	-	5.994
<p>Title: Track and Suspension:</p> <p>Description: This effort matures track and suspension system technologies and conducts system and vehicle level evaluations. This effort is done in coordination with PE 0603005A, projects 221 and 497</p> <p>FY 2010 Accomplishments: Matured, fabricated and conducted preliminary laboratory evaluation of advanced lightweight track systems; designed improvements included track durability, survivability, and flame resistance while decreasing system weight.</p> <p>FY 2011 Plans: Refine, fabricate, and conduct vehicle performance and durability testing of the advanced lightweight track systems.</p> <p>FY 2012 Plans: Will evaluate reformulated track elastomer improvements through on-vehicle evaluation to determine effectiveness in increasing track system durability and survivability. Will construct and complete demonstration of material improvements to the T-161 track system with the goal to reduce the track system weight by over 1,000 lbs. Will mature advanced suspension systems such as</p>		1.806	4.331	6.730

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 441: <i>COMBAT VEHICLE MOBILITY</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011
energy regenerative suspensions, for integration on-vehicle platforms. Will establish components necessary to increase vehicle stability in conjunction with on-board vehicle braking systems.			
<p>Title: Power Management:</p> <p>Description: This effort demonstrates power management components to meet objective tactical and combat vehicle power requirements.</p> <p>FY 2012 Plans: Will validate and integrate advanced intelligent (learning and adaptive) control architecture to control multiple vehicular power sources and loads and will validate the modeling and simulation toolset.</p>		-	-
<p>Title: Energy Storage:</p> <p>Description: This effort will investigate advances in chemistry and materials for energy storage devices.</p> <p>FY 2012 Plans: Will improve battery energy density resulting in reduced battery size and weight thereby minimizing component footprint on vehicle platform for pulse power electromagnetic armor applications.</p>		-	-
<p>Title: Pulse Power:</p> <p>Description: This effort matures and demonstrates compact components and subsystems that enable significantly improved survivability and lethality applications.</p> <p>FY 2010 Accomplishments: Demonstrated second generation SiC switch reliability technology at threshold metrics defined by Future Force concepts; refined the programmable pulse power supply for field demonstrations at threshold metrics; and refined designs for active cooling programmable pulse power supply for High Energy Laser Technology Demonstrator (HEL TD)</p> <p>FY 2011 Plans: Demonstrate Advanced Pulse forming card for the programmable pulse power supply at objective metrics for ground combat systems; and demonstrate SiC switch at objective metrics defined by ground combat systems.</p> <p>FY 2012 Plans:</p>		4.902	10.889
			2.300
			3.054
			3.679

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 441: <i>COMBAT VEHICLE MOBILITY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will start integration of power brick based electro-magnetic armor components for ground combat systems schedule, and start build of generation 2 Programmable Pulse Power supply for the HEL Technology Demonstrator at Space and Missile Defense Center (SMDC).				
Title: Fuel Cell Power: Description: This effort develops fuel cell technology as an auxiliary power unit for providing electrical power to ground combat vehicles. This effort is done in coordination with efforts in PE 0602601A , Project H91. FY 2010 Accomplishments: Identified ground vehicle system power requirements and space available for fuel cell applications; created system layout map and performed modeling and simulation; and matured and demonstrated fuel cell system components.		4.412	-	-
Title: JP-8 Fuel Cell Reformer System: Description: This effort identifies and demonstrates fuel cell technology, that when integrated with a JP-8 reformer, creates an Auxiliary Power Unit (APU). This effort is done in coordination with efforts in PE 0602601A. FY 2010 Accomplishments: Improved the JP-8 reformer system model to optimize the layout design and mature system process models; identified all JP-8 reformer components and technologies to be used; and began reformer component characterization to ensure operational parameters are met. FY 2011 Plans: Begin integration demonstration of essential reformer components; characterize performance of components when integrated in complete reformer system; and begin physical assembly of a JP-8 reformation system.		4.112	3.920	-
Title: Non-Primary Power: Description: This effort matures and demonstrates small engines based auxiliary power units, fuel cell based auxiliary power units for military ground vehicles. FY 2012 Plans: Will begin integrating JP-8 reformer/fuel cell system into a relevant Abrams space claim; will finalize JP-8 reformer/fuel cell system design; will begin testing engine based auxiliary power units in a relevant environment; will integrate small engine technologies for use on small unmanned ground vehicles.		-	-	3.531
Title: Fuel Efficiency ground vehicle Demonstrator (FED):		4.721	4.839	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 441: <i>COMBAT VEHICLE MOBILITY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort focuses on demonstrating the viability of achieving significant decreases in fuel consumption without sacrificing tactical vehicle performance or capability.</p> <p>FY 2010 Accomplishments: Completed design of demonstrator(s); and began fabrication/integration of the demonstrator(s); conducted subsystem evaluation.</p> <p>FY 2011 Plans: Complete fabrication of demonstrator and begin validation of the findings of the FED system modeling and simulation.</p>				
<p>Title: Propulsion-Prime Power:</p> <p>Description: This effort provides powertrain and power technologies for military wheeled and tracked vehicles.</p> <p>FY 2010 Accomplishments: Completed performance and durability demonstration of modified commercial diesel engines; integrated and evaluated compact advanced high power density, high operating temperature, components on vehicle platforms; ruggedized Stryker Magneto-Rheological (MR) suspension hardware and software.</p> <p>FY 2011 Plans: Complete testing of the MR suspension on a Stryker vehicle; perform advanced development and integration of sensors and control algorithms for closed-loop control of diesel engines; perform vehicle noise analysis; improve control strategy for powertrain; evaluate and select power generation components.</p> <p>FY 2012 Plans: Will advance powertrain technologies by increasing thermal efficiency and reducing heat rejection of diesel engines; will improve the development and integration of sensors and control algorithms for closed-loop control of diesel engines; will validate advanced high efficiency transmissions; will evaluate and mature control strategies for powertrain systems; will adapt power generation components through powertrain analysis; will improve and mature components to reduce engine cooling burden.</p>		7.818	7.660	10.189
<p>Title: Power and Thermal Management:</p> <p>Description: This effort demonstrates power and thermal management components and control strategies to meet objective tactical and combat vehicle power requirements. This effort is done in coordination with efforts in PE 0602601A.</p> <p>FY 2010 Accomplishments:</p>		4.860	1.293	-

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 441: <i>COMBAT VEHICLE MOBILITY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Matured and demonstrated intelligent power management utilizing Artificial Intelligence (AI) to optimize vehicle control strategies and provide data for Condition Based Maintenance (CBM); and tested, evaluated and demonstrated power and thermal management systems in a relevant laboratory environment.</p> <p>FY 2011 Plans: Investigate optimal strategy for combining power and thermal management components into a system architecture.</p> <p>Title: Non-primary Power Sources (NPS):</p> <p>Description: This effort demonstrates component technologies for energy storage and generation. This effort is done in coordination with efforts in PE 0602601A.</p> <p>FY 2010 Accomplishments: Integrated power generation and energy storage system into advanced power and energy vehicle architecture system; and demonstrated improved engine-off vehicle performance on system demonstrator for silent watch.</p> <p>FY 2011 Plans: Complete maturation of electrochemical cells, modules, and batteries; demonstrate and refine hybrid battery systems.</p>		5.648	0.921	-
<p>Title: Force Projection:</p> <p>Description: This effort focuses on reducing the logistics footprint by maturing water generation, common powertrain lubricant and alternative fuel technologies. This effort is done in coordination with efforts in PE 0602601A.</p> <p>FY 2011 Plans: Conduct field evaluation and military utility assessment of water from air demonstrators; integrate basic in-line water quality monitoring demonstration technology into purification systems and design and fabricate advanced hand held monitoring technology for water treatment process monitoring; develop water reuse technology; complete laboratory and engine testing and initiate field evaluation of the single powertrain lubricant.</p> <p>FY 2012 Plans: Will complete field evaluation and military utility assessment and refurbish water from air demonstrators, will fabricate hand held and in-line monitoring technology for water treatment process monitoring, will develop wastewater treatment and recycle technology, will develop nanofluid technology that suspends nanoparticles in coolants and lubricants to improve thermal, friction, and wear properties and will evaluate alternative fuels for use in ground systems.</p>		-	3.925	7.031
Accomplishments/Planned Programs Subtotals		45.272	42.154	42.508

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>				497: <i>COMBAT VEHICLE ELECTRO</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
497: <i>COMBAT VEHICLE ELECTRO</i>	7.246	7.507	8.659	-	8.659	8.789	11.433	10.143	7.925	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures, integrates, and demonstrates vehicle electronics hardware (displays, sensors, communications systems, and vehicle command/control/driving mechanisms) and software that result in increased crew efficiencies, performance, and/or reduced crew size, and reductions in vehicle maintenance costs. The project advances open system architectures for ground combat vehicles that allow more efficient crew stations to be adapted for a variety of ground platforms. Technical challenges include: increased levels of automation for both manned and unmanned systems, advanced user interfaces that support improved/increased span of control for robotic operations and collaborative vehicle operations, workload management, reliability of driving aids and commander's decision aids, and embedded simulation for battlefield visualization and fully integrated virtual test/evaluation. Additionally this project matures and demonstrates mobility technologies that reduce the weight as well as the operation and sustainment of ground vehicles, including advanced track and vehicle electronics and power. .

The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP).

Work in this project is performed by the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI, in conjunction with Army Research Laboratory - Human Resources Engineering Directorate (ARL-HRED), Aberdeen, MD.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Improved Mobility and Operations Performance through Autonomous Technologies:</p> <p>Description: This effort matures indirect vision technologies to provide the Soldier with full hemispherical situational awareness in closed hatched vehicle operations.</p> <p>FY 2010 Accomplishments: Refined enhanced crewstations and software based on mobility and local situational awareness tasks and workload; matured local situational awareness warfighter machine interfaces for dismounting Soldiers and conducted an experiment to assess impact of dismount information tools on local situational awareness; integrated enhanced crew station 360/90 (day/night) local situational awareness, assisted mobility, and Soldier monitoring/state classification technologies with surrogate platform; and analyzed results of the experiments to capture physiological and physical data from mounted Soldiers in operational environments.</p> <p>FY 2011 Plans: Integrate driver assist technologies and mounted Soldier monitoring, along with the local situational awareness system for dismounting Soldiers; integrate motion based cueing, video capture with closed hatch 360/90 Electro-Optic Indirect Vision (EOIV)</p>	6.344	6.534	2.930

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 497: <i>COMBAT VEHICLE ELECTRO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>system; and conduct warfighter assessment and engineering evaluations to collect enhanced quantitative performance level understanding of future EOIV operations.</p> <p>FY 2012 Plans: Will integrate advanced crew stations with state of the art EOIV (high resolution threat interrogation and driving sensors, digital video recording and displays), assisted mobility aids, mounted Soldier assessment and dismounting Soldier local situational awareness technologies; will conduct the final experiment to quantify system performance.</p>				
<p>Title: Enhanced Vehicle Technologies to Improve Lightweight Track Reliability:</p> <p>Description: This effort will improve/optimize lightweight segmented band track technology through utilization of high performance elastomers and design with the goal of improving track durability. This effort is done in coordination with related efforts in PE 0603005A projects 221 and 441.</p> <p>FY 2010 Accomplishments: Investigated wear gauges and developed measurement systems for bushing deformation in track shoes and wear, cracking, and chunking of track pad and road wheel rubber</p> <p>FY 2011 Plans: In FY11, identify and demonstrate health monitoring systems for track applications. Develop diagnostic and prognostic algorithms to report health predictions and future failures on track system components.</p> <p>FY 2012 Plans: Will integrate and evaluate the optimized track health monitoring system design performance including wear gauges, damage algorithms, and diagnostic/prognostics algorithms.</p>		0.902	0.973	1.942
<p>Title: Vehicle Electronics Integration and Power Architecture:</p> <p>Description: This effort matures and demonstrates military ground vehicle electrical/power architecture strategies. This effort done in coordination with efforts in PE 0603005 project 441.</p> <p>FY 2012 Plans: Will support technical standards development or modification to existing standards for military ground vehicle electrical systems. Will perform trade analysis of existing and future combat and tactical vehicle electrical systems and develop architectural design concepts for intra-vehicle data and video networks, general purpose computing resources, input/output devices, and associated</p>		-	-	3.787

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
software architectures. Also, will support technical standards development or modification to existing standards for low, medium, and high voltage power systems for military ground vehicles.					
Accomplishments/Planned Programs Subtotals			7.246	7.507	8.659
C. Other Program Funding Summary (\$ in Millions) N/A					
D. Acquisition Strategy N/A					
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE				PROJECT				
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>				515: <i>ROBOTIC GROUND SYSTEMS</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
515: <i>ROBOTIC GROUND SYSTEMS</i>	9.753	10.637	10.703	-	10.703	10.802	10.992	11.162	11.352	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates Unmanned Ground Vehicle (UGV) technologies. The main focus is on integrating and demonstrating in relevant environments sensor technologies, perception hardware and software, and robotic control technologies that enable UGV systems to maneuver on- and off-road at militarily significant speeds with minimal human intervention, thereby enabling the Soldier to perform other mission tasks. Challenges addressed include: obstacle avoidance, overcoming perception limitations, intelligent situational behaviors, command and control by Soldier operators, frequency of human intervention, operations in adverse weather, and robots protecting themselves and their surroundings from intruders. Mature technologies are incorporated in UGV technology demonstrators so that performance can be evaluated for tactical maneuver and sustainment applications.

The approach builds upon, complements, and does not duplicate previous and ongoing investments conducted under the Joint Robotics Program Office, in program element (PE) 0602601A, project H91 (Ground Vehicle Technology) and by the Army Research Laboratory (ARL) PE 0602120A (Sensors and Electronic Survivability).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI, in collaboration with the Army Research Laboratory (ARL), Adelphi and Aberdeen Proving Ground, MD.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Safe Operations of Unmanned systems for Reconnaissance:</p> <p>Description: This effort demonstrates perception, control and tactical behavior technologies to safely conduct unmanned urban operations.</p> <p>FY 2010 Accomplishments: Provided quantitative performance data based on demonstrations that enabled development of Techniques, Tactics and Procedures; developed mission-focused tactical behaviors; and developed and conducted initial warfighter assessment and engineering evaluations including the evaluation of combined mobility/mission workload for UGVs and Unmanned Air Vehicles (UAVs).</p> <p>FY 2011 Plans:</p>	5.066	10.637	10.703

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>		PROJECT 515: <i>ROBOTIC GROUND SYSTEMS</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>In FY11, integrate and evaluate behaviors that enable UGVs to navigate safely around people and other vehicles in a realistic military testing environment; integrate situational awareness and operational procedures to assure safe UGV employment across anticipated missions; demonstrate tactical behaviors focused on mission execution; integrate specialized classification algorithms for sensor and algorithm fusion; increase capabilities of M&S tools to evaluate perception/control algorithms and human-robot interaction; and evaluate sensors and tactical behaviors that enable the use of UGVs to assist in the security of maneuver elements (i.e., Convoy Operations).</p> <p>FY 2012 Plans: Will perform integration of all developed technologies on relevant testbed platforms and conduct a final Warfighter evaluation designed to examine resultant capabilities for a group of heterogeneous unmanned systems to conduct urban reconnaissance; will collect and provide performance data that will be validated through M&S and live experimentation to support transition into future systems; will perform systems engineering process, ensure interoperability and begin integration of subsystems, assess system design through modeling and simulation; and will mature relevant technologies for systems integration, gain safety approval for testing, and mature robotic control station.</p>				
<p>Title: Robotic Vehicle Control Architecture (RVCA) Technology:</p> <p>Description: This effort develops an Unmanned Ground Vehicle (UGV) end-to-end control architecture to reduce future technology integration risk and demonstrates the viability of autonomous operations in a relevant environment.</p> <p>FY 2010 Accomplishments: Integrated a prototype Autonomous Navigation System and new Reconnaissance, Surveillance and Target Acquisition system onto the Autonomous Platform Demonstrator; vehicle. Conducted a series of field engineering evaluations to measure system performance and effectiveness, Conducted a Soldier operational exercise at Ft. Hood, TX to gain user feedback on the system performance in its final configuration in a relevant environment. Analyzed data from all field assessments and developed final test reports.</p>		4.687	-	-
Accomplishments/Planned Programs Subtotals		9.753	10.637	10.703
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 515: <i>ROBOTIC GROUND SYSTEMS</i>

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE				PROJECT				
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>				533: <i>Ground Vehicle Demonstrations</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
533: <i>Ground Vehicle Demonstrations</i>	124.342	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

These are Congressional Interest Items

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

	FY 2010	FY 2011	FY 2012
<p>Title: Antiballistic Windshield Armor (AWA):</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Researched Antiballistic Windshield Armor.</p>	2.387	-	-
<p>Title: Unmanned Ground Vehicle Initiative (UGVI):</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Assessed the capability to expeditiously develop and field robotic systems through (1) modeling and simulation, (2) robotic experimentation and (3) robotic knowledge management.</p>	10.943	-	-
<p>Title: Protective 3-D Armor Structure to Safeguard Military Vehicles and Troops</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Assessed currently available capabilities in the area of Flammability, Smoke, and Toxicity (FST) and performed a gap assessment.</p>	1.592	-	-
<p>Title: Logistical Fuel Processors Development</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed smaller and more efficient reforming systems for fuel cell power systems; built a steam reformer prototype utilizing microfibrinous entrapped materials for more compact, more efficient, and better process control.</p>	1.194	-	-
<p>Title: Ground Forces Readiness Enabler for Advanced Tactical Vehicles (GREAT-V)</p>	0.796	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)				
				FY 2010
				FY 2011
				FY 2012
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Converted raster to CAD data for retention of data related to legacy vehicle.				
Title: Advanced Lithium Ion Phosphate Battery System				2.387
Description: This is a Congressional Interest Item.				-
FY 2010 Accomplishments: Continued development of cells and battery packs for hybrid HMMWVs and developed lithium battery packs.				-
Title: Hybrid Electric Heavy Truck Vehicle				1.592
Description: This is a Congressional Interest Item				-
FY 2010 Accomplishments: Developed and demonstrated a fuel efficient, low heat rejecting prototype engine from an on-road commercial off the shelf (COTS) engine that has been modified and is compatible with military heavy hydrocarbon fuels (JP-8 and DF-2).				-
Title: Pre-Discharge Threat Cues				1.592
Description: This is a Congressional Interest Item.				-
FY 2010 Accomplishments: Developed supporting technology for a mobile sensor and processor for use by mobile ground force (vehicle and dismount) protection in dense urban environments against urban weapons threats.				-
Title: Fire Shield				3.183
Description: This is a Congressional Interest Item.				-
FY 2010 Accomplishments: Upgraded and updated the Full Spectrum Active Protection Close-In Shield (FCLAS) technology and applied and integrated it into the Fire Shield (FS) close-in active protection concept; Developed & demonstrated Fire Shield for vehicle application; Developed and updated the Safe & Arm, CM materials, deployment design, and obtained Fire Shield (FS) component hardware for GOV testing.				-
Title: Silent Watch , 1B NPS 1160 Lithium-Ion Advanced Battery				0.796
				-

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>		PROJECT 533: <i>Ground Vehicle Demonstrations</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Continued the development of IB's 160-Ah large-format, prismatic Lithium-Iron Phosphate cells for use in ground vehicle silent watch and starting applications.</p>				
<p>Title: Advanced Suspension Systems for Heavy Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed and manufactured a compressible magneto rheological vehicle suspension system for vehicle proof of principal testing on a Bradley Fighting Vehicle.</p>		2.149	-	-
<p>Title: Advanced Corrosion Protection for Military Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Demonstrated technologies for Army vehicle corrosion prevention and control through development of new materials and application processes.</p>		2.387	-	-
<p>Title: Ceramic and Metal Matrix Composite (MMC) Armor Development Using Ring Extruder Technology</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed potential applications for a 12-screw ring extruder to extrude mixtures that can be formed or cast into armor tiles or panels.</p>		0.796	-	-
<p>Title: Advanced Carbon Hybrid Battery for Hybrid Electric Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Researched, designed, developed, and tested improvements to Absorbed Glass Mat (AGM) Lead acid batteries for 24V military batteries.</p>		0.796	-	-
<p>Title: Advanced Technology for Energy Storage</p>		1.592	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Investigated materials in the following areas: Ionic Liquid Electrolytes, Li-air Battery Cathode Catalysts, Graphene-based Electrodes, Battery Interface Characterization, Improved Solid Polymer Electrolytes, and Solid State Electrolytes.</p>				
<p>Title: Electric All Terrain Ultra Light Vehicle for the Minnesota National Guard</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed range extending technology for the all electric all terrain ultra light vehicles.</p>		1.592	-	-
<p>Title: Fuel System Component Technology Research</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed efficient and effective production of fuel system components made from titanium and other lightweight, high performance materials.</p>		1.592	-	-
<p>Title: Integrated Defense Technical Information</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed Windchill Product Data Management (PDM) capabilities.</p>		1.592	-	-
<p>Title: All Composite Lightweight Military Vehicle</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Designed and developed a low cost all-composite military vehicle.</p>		1.592	-	-
<p>Title: 30-kW Auxiliary Power for Armored Combat Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments:</p>		1.592	-	-

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>		PROJECT 533: <i>Ground Vehicle Demonstrations</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Developed an auxiliary power unit for silent watch onboard various military ground vehicles. Title: Compact 10 Kilowatt Generator Set for Army and Marine Combat Vehicles Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed and tested a highly compact 10 kW Generator for combat vehicles.		1.592	-	-
Networked Reliability and Safety Early Evaluation System (NRSEES) Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Designed a Multi Axis Simulation Table for the vibration testing of vehicle components and subsystems.		1.592	-	-
Unmanned Robotic System Utilizing Hydrocarbon Fueled Solid Oxide Fuel Cell Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed a solid oxide fuel cell for a selected UGV.		2.387	-	-
Friction Stir Welding Program Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed friction spin welding technology to attached fixed appurtenances with a friction weld head.		2.387	-	-
On-board Vehicle Power Systems Development Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed a prototype kit of a Transmission Integral Generator (TIG) On-Board Vehicle Power (OBVP), based on the Allison 3200SP.		2.467	-	-
VePro - Vehicle Health Usage Monitoring and Prognostics Description: Funding is provided for the following effort.		2.866	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 533: <i>Ground Vehicle Demonstrations</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> This Congressional Interest Item provided tools, methodology and technology/knowledge to develop, configure and implement conditional based maintenance (diagnostics and prognostic) algorithms for onboard vehicle platforms.				
<i>Title:</i> VSIL: Armored Vehicle Components and Systems Simulated in Cost-Effective Virtual Design and Test Environment <i>Description:</i> This is a Congressional Interest Item.		3.183	-	-
<i>FY 2010 Accomplishments:</i> Developed and demonstrated a standalone version of the Virtual Systems Integration Laboratory (VSIL).				
<i>Title:</i> Hybrid Engine Development Program <i>Description:</i> This is a Congressional Interest Item.		3.183	-	-
<i>FY 2010 Accomplishments:</i> Developed hybrid engine technologies with the goal of improving the efficiency, reliability, power density and cost of hybrid electric configurations for military applications.				
<i>Title:</i> Zouline Armor <i>Description:</i> This is a Congressional Interest Item.		3.342	-	-
<i>FY 2010 Accomplishments:</i> Reduced the areal density of the Zouline Armor system while providing ballistic protection for Tactical Vehicles.				
<i>Title:</i> Program Increase <i>Description:</i> This is a Congressional Interest Item.		3.730	-	-
<i>FY 2010 Accomplishments:</i> Investigated improving the current capabilities by (a) consolidating baseline 3D CAD geometry, creating a scanned data set repository, and creating links between the scanned, OEM, SE, Concepts, and other data sets. (b) implemented an Enterprise Program Data Repository and defined the concept of operation and Standard Operating Procedures (SOPs) for use of available commercial tools (MS Project, Sharepoint, Windchill). (c) developed M&S capabilities for a Simulation Data Management capability.				
<i>Title:</i> Advanced Battery Materials and Manufacturing <i>Description:</i> This is a Congressional Interest Item.		3.979	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>		PROJECT 533: <i>Ground Vehicle Demonstrations</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> Installed data loggers on Stryker vehicles to collect vehicle data and validate and verify CBM Solutions; identified opportunities for enhanced diagnostic development.				
<i>Title:</i> Army Vehicle Condition Based Maintenance <i>Description:</i> This is a Congressional Interest Item.		3.979	-	-
<i>FY 2010 Accomplishments:</i> Collected data on power train and power management systems.				
<i>Title:</i> Simulation Based Reliability and Safety (SimBRS) Program <i>Description:</i> This is a Congressional Interest Item.		4.874	-	-
<i>FY 2010 Accomplishments:</i> Provided models, simulation methods and software tools to addressed Modeling, Analysis, and Simulation capabilities.				
<i>Title:</i> Advanced Battery Development Program <i>Description:</i> This is a Congressional Interest Item.		8.953	-	-
<i>FY 2010 Accomplishments:</i> Developed a battery management system (battery electronics) developed Hardware-in-loop capability for the design, development & assessment of battery management system technologies; developed electrical subsystem modeling to support system level modeling.				
<i>Title:</i> Advanced Composites for Light Weight, Low Cost Transportation Systems Using 3+ Extruder <i>Description:</i> This is a Congressional Interest Item.		2.387	-	-
<i>FY 2010 Accomplishments:</i> Developed extrusion technology for powder-to-parts continuous manufacturing process near net shapes.				
<i>Title:</i> Enhanced Military Vehicle Maintenance System Demo Project <i>Description:</i> This is a Congressional Interest Item.		2.785	-	-
<i>FY 2010 Accomplishments:</i>				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 533: <i>Ground Vehicle Demonstrations</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Applied prognostic health monitoring modeling techniques to determine root cause of failure upon entering the depot maintenance process				
Title: Advanced Reactive Armor Systems Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed and tested Magmacore Reactive Armor.		1.592	-	-
Title: Superlattice Semiconductors for Mobile SS Lighting and Solar Power Applications Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Examined efficient, cost-effective alternative energy for mobile applications using superlattice silicon carbide.		2.785	-	-
Title: Water Purification System for Natural Disasters Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed a mobile, reverse osmosis water purification system.		0.800	-	-
Title: Tire to Track Transformer System for Light Vehicles Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Designed and developed a tire to track transformer system.		1.600	-	-
Title: All Composite Bus Program Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Designed and developed a lightweight composite transit bus.		1.990	-	-
Title: Hybrid Electric Drive All Terrain Vehicle Description: This is a Congressional Interest Item.		1.592	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 533: <i>Ground Vehicle Demonstrations</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<p><i>FY 2010 Accomplishments:</i> Developed hybrid automotive technologies for defense applications integrating the next iteration of electric drive technology.</p> <p><i>Title:</i> Alternative Energy Research</p> <p><i>Description:</i> This is a Congressional Interest Item.</p> <p><i>FY 2010 Accomplishments:</i> Demonstrated a mobile advanced power management architecture that incorporates source and demand management, plug-and-play capability, and interoperability with legacy equipment; Developed tools to assess the business case for future investments in micro-grid research or demonstration; Generated the technical data to assess the performance, durability, and operability of tactical ground systems operating on synthetic (FT SPK) and renewable (HRJ) fuel blends. Three tactical vehicle engines were operated on a renewable fuel blend according to the NATO 400-hr protocol and the data generated was compared to baseline operation on JP-8; Demonstrated mixed renewable generation sources and energy storage.</p>	18.155	-	-
Accomplishments/Planned Programs Subtotals	124.342	-	-

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

D. Acquisition Strategy
N/A

E. Performance Metrics
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE					PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>					53D: <i>NAC Demonstration Initiatives (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
53D: <i>NAC Demonstration Initiatives (CA)</i>	30.720	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

These are Congressional Interest Items

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

	FY 2010	FY 2011	FY 2012
<p>Title: Advanced Thermal Management System</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed electrical engine/vehicle thermal management accessories and oil management systems.</p>	2.388	-	-
<p>Title: Hydraulic Hybrid Vehicles (HHV) for the Tactical Wheeled Fleet</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed series hydraulic hybrid drivetrain technology for military tactical vehicle applications.</p>	2.785	-	-
<p>Title: JAMMA Family of Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Took feedback on vehicle performance from the user and incorporated lessons learned improvements back into the vehicle.</p>	0.795	-	-
<p>Title: Advanced Digital Hydraulic Hybrid Drive System</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed series hydraulic hybrid drivetrain technology for military tactical vehicle applications.</p>	1.990	-	-
<p>Title: Field Deployable Fleet Hydrogen Fueling</p> <p>Description: This is a Congressional Interest Item.</p>	2.388	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 53D: <i>NAC Demonstration Initiatives (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> Developed and tested Proton Exchange Membrane Electrolyzer components.			
<i>Title:</i> Defense Advanced Transportation Technology Program Hybrid Truck Users Forum <i>Description:</i> This is a Congressional Interest Item.	4.775	-	-
<i>FY 2010 Accomplishments:</i> Explored opportunities for hybrids and advanced vehicle technologies for trucks and commercial construction equipment.			
<i>Title:</i> Smart Plug-in Hybrid Vehicle Program <i>Description:</i> This is a Congressional Interest Item.	3.263	-	-
<i>FY 2010 Accomplishments:</i> Developed, demonstrated, and validated new technologies for grid to vehicle and vehicle to grid (V2G) power flow and communications.			
<i>Title:</i> Advanced Lightweight Multi-Functional Multi-Threat Composite Armor Material Technology <i>Description:</i> This is a Congressional Interest Item.	2.388	-	-
<i>FY 2010 Accomplishments:</i> Developed lightweight armor for the U.S. Army that will protect a variety of military vehicles from multiple threats.			
<i>Title:</i> Plug-in Hybrid Electric Vehicle <i>Description:</i> This is a Congressional Interest Item.	3.979	-	-
<i>FY 2010 Accomplishments:</i> Designed and developed a lightweight, plug-in hybrid electric vehicle (PHEV) specifically suited to military transportation needs and requirements.			
<i>Title:</i> Fully Burdened Cost of Fuel and Alternative Energy Methodology and Conceptual Model <i>Description:</i> This is a Congressional Interest Item.	2.785	-	-
<i>FY 2010 Accomplishments:</i>			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>	PROJECT 53D: <i>NAC Demonstration Initiatives (CA)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Developed a standard methodology and conceptual model for Department of Defense ground vehicle systems and posts, camps and stations to determine the fully burdened cost of fuel.			
Title: Future Tactical Truck Carbon Composite Shelter & Retrofit of Current Vehicle Shelters Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Developed a carbon composite shelter for military vehicles.	3.184	-	-
Accomplishments/Planned Programs Subtotals	30.720	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army									DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603005A: <i>Combat Vehicle and Automotive Advanced Technology</i>				PROJECT C66: DC66			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
C66: DC66	2.348	4.304	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

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

	FY 2010	FY 2011	FY 2012
Title: Classified Efforts	2.348	4.304	-
Description: Funding is provided for the following effort			
FY 2010 Accomplishments: Classified Efforts			
FY 2011 Plans: Classified Efforts			
Accomplishments/Planned Programs Subtotals	2.348	4.304	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603006A: <i>Command, Control, Communications Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	12.074	8.102	5.312	-	5.312	4.118	5.813	5.830	6.038	Continuing	Continuing
257: <i>DIGITAL BATTLEFLD COMM</i>	3.730	-	-	-	-	-	-	-	-	Continuing	Continuing
592: <i>SPACE APPLICATION TECH</i>	3.463	4.442	5.312	-	5.312	4.118	5.813	5.830	6.038	Continuing	Continuing
DF7: <i>DF7</i>	4.881	3.660	-	-	-	-	-	-	-	Continuing	Continuing

Note

FY 12 funding realigned to higher priority efforts

A. Mission Description and Budget Item Justification

Efforts in this program element (PE) mature and demonstrate advanced space technology applications that support the Army's ability to control and exploit space assets that contribute to current and future military operations as defined in the national, DoD, and Army space policies. This PE provides applications for enhanced intelligence, reconnaissance, surveillance, target acquisition, position/navigation, missile warning, ground-to-space surveillance, and command and control capabilities. Project 592 supports the maturation and demonstration of Space Applications Technology efforts that provide technology options for networked and integrated surveillance and command and control capabilities to enable information superiority, enhanced situational awareness, and support for distributed operations. Project 257 funds congressional special interest items. Project 592 also matures and demonstrates high altitude and space sensor and communications payloads for Army applications and provides technology risk reduction capability for ground-to-space surveillance system development. Project DF7 supports classified activities. Properly accessed individuals can obtain further information from the Assistant Secretary of the Army for Acquisition Logistics & Technology (ASAALT) Special Programs Office.

Work in this PE is coordinated with PE 0602120A (Sensors and Electronic Survivability) and PE 0603008A (Electronic Warfare Advanced Technology).

The cited work is consistent with the Department of Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the US Army Space and Missile Defense Technical Center in Huntsville, AL.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603006A: <i>Command, Control, Communications Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	12.352	8.102	7.073	-	7.073
Current President's Budget	12.074	8.102	5.312	-	5.312
Total Adjustments	-0.278	-	-1.761	-	-1.761
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.278	-			
• Other Adjustments 1	-	-	-1.761	-	-1.761

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603006A: <i>Command, Control, Communications Advanced Technology</i>	PROJECT 257: <i>DIGITAL BATTLEFLD COMM</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
257: <i>DIGITAL BATTLEFLD COMM</i>	3.730	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for digital battlefield advanced technology development.

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

	FY 2010	FY 2011	FY 2012
Title: Program Increase	3.730	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Developed increased situational awareness capability in training environment by providing relevant geospatial, human terrain, and combat event information fused with other entity information to support mission planning, command and control, and capture lessons learned. Implemented a Space-Battlefield Integration Laboratory to explore, develop, and validate space capabilities/ concepts for integration within the Exportable Combat Training Center (E-CTC).			
Accomplishments/Planned Programs Subtotals	3.730	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603006A: <i>Command, Control, Communications Advanced Technology</i>	PROJECT 592: <i>SPACE APPLICATION TECH</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
592: <i>SPACE APPLICATION TECH</i>	3.463	4.442	5.312	-	5.312	4.118	5.813	5.830	6.038	Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature and demonstrate advanced space technology applications that support the Army's ability to control and exploit space assets that contribute to current and future military operations as defined in the national, DoD, and Army space policies. This project matures and demonstrates advanced technologies in the areas of light weight materials, miniaturization, reduced power consumption, and advanced data collection, processing, and dissemination. This project also develops algorithms that process space and near space sensor data in real and near real time for integration into battlefield operating systems. It matures and demonstrates payloads, sensors and data down link systems for tactically responsive space and high altitude platforms. This project provides space advanced technology risk reduction capability for ground-to-space surveillance and systems development.

Work in this Project is coordinated with PE 0602120A (Sensors and Electronic Survivability) and PE 0603008A (Electronic Warfare Advanced Technology).

The cited work is consistent with the Department of Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the US Army Space and Missile Defense Technical Center in Huntsville, AL. This program is designated as a DoD Space Program.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Payload Technology Development</p> <p>Description: This effort matures technologies for smaller, Warfighter-responsive sensor and communication payloads for use in both space and high altitude environments.</p> <p>FY 2010 Accomplishments: Matured Electro-Optical/Infrared (EO/IR) imaging space sensor; using prior year demonstration data, matured the tactical radio relay payload to improve bandwidth and support more users; demonstrated improved tactical radio relay payload performance at high altitude.</p> <p>FY 2011 Plans: Mature high speed data relays for use in data links of high altitude and space-based assets; complete the development of a flight-ready EO/IR imaging space sensor; prepare a small satellite with data exfiltration capability for launch integration.</p> <p>FY 2012 Plans: Will begin development and building of data exfiltration mission small satellite using a software defined radio for increased communications bands to receive data from Unattended Ground Sensors; will conduct systems engineering analysis and</p>	1.013	2.206	5.312

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603006A: <i>Command, Control, Communications Advanced Technology</i>		PROJECT 592: <i>SPACE APPLICATION TECH</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
assessments of enhanced EO/IR imaging satellite technologies and will select and mature technologies to support constellation architectures; will support launch integration and operational demonstration of EO/IR imaging space sensor and data exfiltration small satellites.				
<p>Title: Vertical/Horizontal Integration of Space Technology and Applications (VISTA)</p> <p>Description: This effort matures and demonstrates algorithms and intelligent agent based software applications to provide missile threat warning for Warfighters on-the-move.</p> <p>FY 2010 Accomplishments: Matured the intelligent agent software technology, including automated and seamless distribution of relevant space and strategic system-developed situational awareness information to specific Brigade and below tactical units in a format that can be directly integrated into their applicable Battle Command System, including Force XXI Battle Command Brigade and Below (FBCB2) and Command and Control Personal Computer (C2PC); demonstrated the automated network-centric VISTA capability in the Army Training and Doctrine Command (TRADOC) Battle Laboratory Collaborative Simulation Environment.</p> <p>FY 2011 Plans: Further mature the intelligent agent technology in cooperation with complementary network-centric intelligent agent technology being developed by US Army Communications Electronics Research, Development, and Engineering Center (CERDEC); demonstrate seamless missile warning and situational awareness automated information dissemination for tactical On-the-Move (OTM) forces at the Brigade and below level.</p>		2.450	2.236	-
Accomplishments/Planned Programs Subtotals		3.463	4.442	5.312
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army									DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603006A: <i>Command, Control, Communications Advanced Technology</i>				PROJECT DF7: <i>DF7</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
DF7: <i>DF7</i>	4.881	3.660	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The purpose of the project is to conduct classified research efforts. The details of the efforts may be provided upon request to appropriately cleared individuals.

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

	FY 2010	FY 2011	FY 2012
Title: Classified efforts	4.881	3.660	-
Description: Classified efforts			
FY 2010 Accomplishments: Classified efforts			
FY 2011 Plans: Classified efforts			
Accomplishments/Planned Programs Subtotals	4.881	3.660	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603007A: <i>Manpower, Personnel and Training Advanced Technology</i>							
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	7.220	7.921	10.298	-	10.298	11.516	12.774	11.918	11.160	Continuing	Continuing
792: <i>Personnel Performance & Training</i>	7.220	7.921	10.298	-	10.298	11.516	12.774	11.918	11.160	Continuing	Continuing

Note

FY12 funding increase for Personnel and Training Systems.

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced behavioral and social science technologies that enhance performance to ensure that the Warfighter keeps pace with the transformations in systems, weapons, equipment, and mission requirements to meet the goals of the future force. These technologies provide key capabilities through training methods and techniques that prepare Soldiers and leaders to effectively operate in complex digitized, networked environments; enable the use of embedded training technologies envisioned for future command and control (C2) systems; as well as foster cognitive, behavioral, and psychological flexibility, adaptability, and mission readiness. Efforts include the evaluation of new selection measures, the refinement of performance metrics, the assessment of innovative training techniques, and the analysis of methods and tools to better adapt training to meet goals and requirements. Increased funding in FY12 for this PE is based on work shifted from PE 0602785A due to need for increased focus on maturation and demonstration of selection techniques and tools as well as training methods.

This PE leverages efforts and coordinates research with a number of other Laboratories and Research, Development, and Engineering Centers including, the Simulation and Training Technology Center (STTC), Army Research Laboratory - Human Research and Engineering Directorate (ARL-HRED) (PEs 0603015A, 0602308A, and 0602716A), and the Communications-Electronics Research, Development, and Engineering Center (CERDEC). Research in this PE is complementary to and fully coordinated with efforts funded in PE 0602785A (Project 790).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is performed and managed by the US Army Research Institute (ARI) for the Behavioral and Social Sciences in Arlington, VA.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603007A: <i>Manpower, Personnel and Training Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	7.371	7.921	8.023	-	8.023
Current President's Budget	7.220	7.921	10.298	-	10.298
Total Adjustments	-0.151	-	2.275	-	2.275
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.151	-			
• Adjustments to Budget Years	-	-	2.275	-	2.275

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603007A: <i>Manpower, Personnel and Training Advanced Technology</i>				792: <i>Personnel Performance & Training</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
792: <i>Personnel Performance & Training</i>	7.220	7.921	10.298	-	10.298	11.516	12.774	11.918	11.160	Continuing	Continuing

Note

Not applicable for this item.

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced behavioral and social science technologies that enhance performance to ensure that the Warfighter keeps pace with the transformations in systems, weapons, equipment, and mission requirements to meet the goals of the future force. These technologies provide key capabilities through training methods and techniques that prepare Soldiers and leaders to effectively operate in complex digitized, networked environments; enable the use of embedded training technologies envisioned for future command and control (C2) systems; as well as foster cognitive, behavioral, and psychological flexibility, adaptability, and mission readiness. Efforts include the evaluation of selection measures, the refinement of survey methodologies and performance metrics, the assessment of innovative training techniques, and the analysis of methods and tools to better adapt training to meet goals and requirements. Increased funding in FY12 for this project is based on work shifted from PE 0602785A due to need for increased focus on maturation and demonstration of selection techniques and tools as well as training methods.

This program leverages efforts and coordinates research with a number of other Laboratories and Research, Development, and Engineering Centers including, the Simulation and Training Technology Center (STTC), Army Research Laboratory - Human Research and Engineering Directorate (ARL-HRED), and the Communications-Electronics Research, Development, and Engineering Center (CERDEC). Research in this PE is complementary to and fully coordinated with efforts funded in PE 0602785A (Project 790).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is performed and managed by the US Army Research Institute (ARI) for the Behavioral and Social Sciences in Arlington, VA.

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

	FY 2010	FY 2011	FY 2012
Title: Personnel Technology	1.357	1.500	3.288
Description: This effort develops Soldier selection measures as well as techniques and tools to better predict behavior and performance. The Army's current selection measures primarily focus on a candidate's cognitive (e.g., technical and analytical) ability which does not predict attrition, discipline, and motivation.			
FY 2010 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603007A: <i>Manpower, Personnel and Training Advanced Technology</i>	PROJECT 792: <i>Personnel Performance & Training</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Investigated various methods and technologies to more rapidly assess attitudes and opinions across the Army to be more responsive to the fast-paced operational demands of overseas contingency operations; enhanced assessment methods for improved understanding of Soldiers' attitudes and opinions to quantify factors influencing Soldiers' career plans.</p> <p>FY 2011 Plans: Demonstrating and validating FY10 methods and technologies to streamline data collections and more rapidly assessing attitudes and opinions across the Army; and evaluating trends of Soldier satisfaction, especially in regard to deployment length and dwell time (i.e., back home), and the Army's care and concern for Soldiers and their families.</p> <p>FY 2012 Plans: Will evaluate capability of non-cognitive measures such as motivation, cooperation, and achievement to predict performance of enlisted personnel while in initial training environments; will evaluate the capability of non-cognitive measures to augment existing measures to better predict an individual's potential; will analyze the use of non-cognitive measures to provide flexibility for selection methods that can accommodate changes in force size.</p>				
<p>Title: Training and Leader Development</p> <p>Description: This effort provides training techniques and tools that will enable Soldiers to take full advantage of advances in technology and systems and helps the Army attain its training goals for future missions and operations.</p> <p>FY 2010 Accomplishments: Established guidelines for optimizing the use of blended learning environments for Army training (e.g., US Army Training and Doctrine Command (TRADOC) schools); evaluated the level of preparedness and performance through behavioral evaluation tools following graduation from training programs to develop improved training strategies; demonstrated two Web-based training tools (one to predict skill retention and one to develop techniques, tactics, and procedures to improve training outcomes); exploited and improved emerging development and measurement methods that can facilitate the Army's capability to produce leaders who can more easily adapt to change and complexity.</p> <p>FY 2011 Plans: Refine guidelines for training effectiveness based on operational relevance of training outcomes in TRADOC courses; demonstrate effectiveness of training tools/methods in simulated learning environments; demonstrate adaptive leadership and negotiation skills and techniques as well as measurement methods for leader development; and develop and refine methods and models for maintaining training relevance to operational units.</p> <p>FY 2012 Plans: Will develop methods to more readily assess whether training can be adapted to account for individual differences and experience levels; will develop strategies to tailor training based on Soldiers' learning progress for basic Soldier skills and for Advanced</p>		5.863	6.421	7.010

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603007A: <i>Manpower, Personnel and Training Advanced Technology</i>	PROJECT 792: <i>Personnel Performance & Training</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Individual Training; will analyze the use of prototype training tools to refine training strategies in institutional and unit-based training environments.			
Accomplishments/Planned Programs Subtotals	7.220	7.921	10.298

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	55.903	50.359	57.963	-	57.963	54.882	55.429	55.962	56.623	Continuing	Continuing
TR1: <i>TAC C4 TECHNOLOGY INT</i>	36.346	37.862	36.673	-	36.673	34.328	34.455	34.404	34.740	Continuing	Continuing
TR2: <i>Secure Tactical Information Integration</i>	12.554	12.497	21.290	-	21.290	20.554	20.974	21.558	21.883	Continuing	Continuing
TR8: <i>C3 DEMONSTRATIONS (CA)</i>	7.003	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies to address the seamless integrated communications challenge with distributed, secure, mobile, wireless, and self-organizing communications networks that will operate reliably in diverse and complex terrains, in all environments. Efforts demonstrate seamlessly integrated communications and information security technologies across all network tiers, ranging from unattended networks and sensors through maneuver elements and airborne and space assets. Project TR1 investigates and leverages external communication technologies and combines technology options in a series of Command, Control, Communications, and Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) On-The-Move (OTM) demonstrations to measure the potential battlefield effectiveness. Project TR2 provides information security technologies for tactical wireless networks against modern network attacks; and supports collaborative technologies for information sharing between battlefield functional communities. Project TR8 funds congressional special interest items.

Work in this PE is complimentary of PE 0602782A (Command, Control, Communications Technology), and fully coordinated with PE 0602783 (Computer and Software Technology), PE 0603772A (Advanced Tactical Computer Science and Sensor Technology), PE 0602120A (Sensors and Electronic Survivability), and PE 0602270A (EW Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Monmouth, NJ and Aberdeen Proving Ground, MD.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	57.199	50.359	53.896	-	53.896
Current President's Budget	55.903	50.359	57.963	-	57.963
Total Adjustments	-1.296	-	4.067	-	4.067
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	0.153	-			
• SBIR/STTR Transfer	-1.449	-			
• Adjustments to Budget Years	-	-	4.067	-	4.067

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>				PROJECT TR1: <i>TAC C4 TECHNOLOGY INT</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
TR1: <i>TAC C4 TECHNOLOGY INT</i>	36.346	37.862	36.673	-	36.673	34.328	34.455	34.404	34.740	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates key communications, mobile networking technologies, including antennas, radio components, and networking software to enable commanders and individual Soldiers to survive and fight by providing secure, reliable, mobile communications network solutions that function in complex and diverse terrains. Efforts here concentrate on three major goals: to provide a series of technology demonstrations of new and emerging Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) technology enabled capabilities to significantly reduce risk associated with the network-of-networks concept; to provide critical links in the ability to communicate and move large amounts of information across the force structure in a seamless, integrated manner conducive to a highly mobile manned and unmanned force structure; and to assess the Technology Readiness Level (TRL) of emerging network technologies in an operationally relevant environment. Several tasks are conducted in conjunction with the Defense Advanced Research Projects Agency (DARPA) and the other Services.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Monmouth, NJ and Aberdeen Proving Ground, MD.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Antenna Technologies</p> <p>Description: This effort matures and demonstrates low cost, power efficient, antenna technologies for terrestrial and tactical satellite ground terminals. Work accomplished under PE 0602782A/project H92 compliments this effort.</p> <p>FY 2010 Accomplishments: Completed development of low profile Ka/Ku single beam satellite communications (SATCOM) on the move (OTM) antenna and conducted field demonstration; integrated Ka/Q band power amplifiers into a single demonstrator and conducted lab experiments; matured and assessed single beam low profile hybrid Ka/Q band SATCOM OTM antenna; improved small aperture blue force tracking (BFT) SATCOM terminal to enable accurate position location dissemination using military satellite to replace costly commercial satellite services.</p> <p>FY 2011 Plans: Mature and demonstrate K/Ka/Q band low profile electronically steered SATCOM antenna components and aperture with integrated drive and tracking system; demonstrate BFT SATCOM antenna, modem architecture and preliminary network design;</p>	5.969	8.967	11.276

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>		PROJECT TR1: <i>TAC C4 TECHNOLOGY INT</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
mature conformal and embedded antenna design; conduct sub-system compatibility testing for a selected platform using electromagnetic modeling and simulation (M&S); and develop mockup brassboard for validation. FY 2012 Plans: Will investigate and refine embedded armor antennas; will fabricate internet protocol based antenna feed demonstrators; will integrate antenna apertures and feed systems into vehicle armor; will support the Tank and Automotive Research Development and Engineering Center during ballistic assessments of embedded armor antennas; will demonstrate integrated K/Ka/Q band low profile electronically steered SATCOM antenna; will integrate single package Ka/Q band integrated power amplifier into the K/Ka/Q band SATCOM antenna; will refine BFT SATCOM antenna network concepts and demonstrate medium scale performance.				
Title: Applied Communications and Information Networking (ACIN) Description: This effort adapts and matures emerging commercial wireless, networked communications technologies for military use. FY 2010 Accomplishments: Adapted emerging commercial (802.16e, 802.22 and 802.11n) wireless networking technologies for use in military frequency bands and assessed security vulnerabilities; modified radio frequency propagation M&S and planning tools for use in urban environments and complex terrain; assessed and adapted commercial software defined radios with cognitive radio technology. FY 2011 Plans: Adapt and assess emerging cognitive and commercial networking technologies for wireless networks including cognitive radios and cross layer network protocols; investigate associated communications architectures and hardware components; develop digitized SATCOM technologies to reduce size, weight, power and cost (SWAP-C) for strategic ground terminals. FY 2012 Plans: Will assess emerging commercial wireless communications technologies for suitability in military wireless communications networks; will adapt, mature and demonstrate commercial wireless network operations control and visualization solutions in Army tactical environments; will assess emerging 4G commercial cellular technologies (e.g., long term evolution) for future adaptation to military networks.		0.905	1.642	2.001
Title: C4ISR On-The-Move (OTM) Description: This effort provides a venue for technology demonstrations of new and emerging C4ISR technology-enabled capabilities. FY 2010 Accomplishments:		9.069	8.131	9.552

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>	PROJECT TR1: <i>TAC C4 TECHNOLOGY INT</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<p>Assessed increments of Joint Tactical Radio System (JTRS) Handheld/Manpack/Small Form Factor (HMS) and Ground Mobile Radio (GMR) for mounted & dismounted Soldiers, unmanned ground and aerial sensors, non-line of sight launch systems and intelligent munitions systems; assessed Warfighter Information Network ? Tactical (WIN-T) functionality including quality of service architecture, information assurance solutions to enable network security with minimal data loss, selected network operations management functions, and associated networks; assessed the maturity of technology efforts in an operationally relevant environment; supported technical evaluations to explore programmed increments of Battle Command and Unified Battle Command.</p> <p>FY 2011 Plans: Assess the capability, functionality, and performance of network integrated architectures and emerging capabilities that support the Army Brigade Combat Team Modernization Plan; assess the FY11 programmed increments of JTRS for mounted and dismounted Soldiers and platforms, unmanned ground and aerial sensors, and intelligent munitions systems in support of the Army Brigade Combat Team Modernization Plan; assess WIN-T functionality, including enhanced quality of service architecture, information assurance solutions to enable network security across a wide area network using multiple encryption devices with minimal loss of data, and selected network operations management functions; assess the TRL of Army S&T efforts maturing in the FY11 timeframe in an operationally relevant environment to facilitate technology transition; continue to support research and development (R&D) of capability sets and accelerate such capabilities to enhance the current force.</p> <p>FY 2012 Plans: Will assess the capability, functionality, and performance of network integrated architectures and emerging capabilities that support the Army Brigade Combat Team Modernization Plan and Network Modernization Strategy; will assess the FY12 programmed increments of JTRS for mounted and dismounted Soldiers and platforms, unmanned ground and aerial sensors, and intelligent munitions systems in support of the Army Brigade Combat Team Modernization Plan; will assess WIN-T increment 2 and 3 functionality including enhanced quality of service architecture, information assurance solutions to enable network security across a wide area network using multiple encryption devices with minimal loss of data, and selected network operations management functions; will assess the TRL of Army S&T efforts maturing in the FY12 timeframe in a operationally relevant environment to facilitate technology transition.</p>			
<p>Title: C4ISR Network Mining</p> <p>Description: This effort matures data mining that provides the link between the transactions to be analyzed and analytical systems on large-scale information technology. Data mining consists of five major elements: 1. extract, transform, and load transaction data onto the data warehouse system; 2. storing, and managing the data in a multidimensional database system; 3. providing data access; 4. analyzing the data by application software; and 5. presenting the data in a useful format.</p>	5.211	5.345	3.517

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>	PROJECT TR1: <i>TAC C4 TECHNOLOGY INT</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p><i>FY 2010 Accomplishments:</i> Conducted analysis and performed M&S of intelligence, surveillance, and reconnaissance (ISR) performance over restricted bandwidth networks; examined and represented in M&S of varying fidelity, carrier to noise radio and voice over Internet protocol (IP) solutions for future force networks.</p> <p><i>FY 2011 Plans:</i> Apply network mining software to analyze emerging protocols and standards for use over military networks; assess commercial technologies for potential transition into systems and develop architecture to decrease stovepipe and proprietary network implementations.</p> <p><i>FY 2012 Plans:</i> Will apply network mining software to determine how a military "apps store" can be efficiently deployed on the network; will code and assess advanced spectrum management software tools to facilitate network operations where various types of networks converge using multiple transmission media.</p>				
<p><i>Title:</i> Cognitive Networking</p> <p><i>Description:</i> This effort matures and demonstrates technologies enabling wireless networks to sense network and spectrum conditions, and automatically adapt for more efficient use. Work accomplished under PE 0602782A/project H92 compliments this effort.</p> <p><i>FY 2010 Accomplishments:</i> Improved cognitive radio policy software by standardizing dynamic spectrum access (DSA) policy language to allow interoperability of disparate next generation (XG) radio communications platforms; improved interoperability between spectrum sensors and cognitive antennas to more efficiently use current spectral resources; identified and assessed superconductor and non-superconductor technology to demonstrate preliminary all-digital receiver; developed digital signal processing components and requirements providing increased SATCOM capacity; improved cooperative SATCOM network routing technology to provide signal blockage mitigation.</p> <p><i>FY 2011 Plans:</i> Mature the cognitive network tools developed under PE 0602782A/project H92 to be able to assess and analyze networks with and without cognitive capabilities; adapt and mature commercial RF cellular based technologies.</p> <p><i>FY 2012 Plans:</i> Will mature all-digital strategic ground terminal architecture to enable improved tactical responsiveness to changing network needs and enable SATCOM to be responsive to cognitive ground networks; will mature digital transmitter and receiver interfaces and subsystem integration; will mature and demonstrate all-digital receiver; will demonstrate configurable baseband processor for</p>		3.984	4.481	5.976

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>		PROJECT TR1: <i>TAC C4 TECHNOLOGY INT</i>
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
increased SATCOM throughput and integrate with digital receiver for proof of concept; will define requirements and architecture for digital transmitter; will demonstrate government off-the-shelf (GOTS) applique to enable operation of commercial wireless 3G technology in Army tactical environments with the addition of WiFi mesh, multicast routing and automated frequency, sensing and control.				
<p>Title: Network Operations (NetOps)</p> <p>Description: This effort matures network operations technologies (network management, information dissemination management and cyber security) to simplify the planning, management and troubleshooting of complex tactical communications networks.</p> <p>FY 2012 Plans: Will demonstrate interoperability among disparate NetOps tools and technologies, leveraging existing GOTS/Commercial-off-the-shelf (COTS) tools being used in the field; will take advantage of NetOps tools that make sense while reducing the overall number of tools to significantly improve the network planning, management, configuring and monitoring of tactical networks; will research and improve tactical NetOps visualization capabilities and techniques based on how the Warfighter can best interpret the information; will consolidate and demonstrate NetOps tools (network management, information assurance, information dissemination management and signals management) into an intuitive multi-touch (touch screen) user environment to produce a more collaborative and centralized NetOps management capability.</p>		-	-	4.351
<p>Title: Wireless Information Assurance (IA)</p> <p>Description: This effort matures and demonstrates technologies to protect wireless tactical networks against computer network attacks with an emphasis on defending against attack methods not previously seen. Work accomplished under PE 0602782A/project H92 and PE 0603008A/project TR2 compliments this effort.</p> <p>FY 2010 Accomplishments: Wrote and demonstrated a mobile ad hoc networking (MANET) malicious code detection service to thwart zero-day attacks; demonstrated a response capability that receives the root cause analysis from the correlation engine then develops and recommends a response plan to address the security problem; matured autonomous adaptive middleware and assessed it in a laboratory environment.</p> <p>FY 2011 Plans: Develop and mature the mission generation engine to allow for dynamic reconfiguration of a subset of network parameters (e.g., topology) based on mission specifications; demonstrate computer network protection using mission to policy translation engine and adaptive middleware, tactical public key infrastructure, and cross domain solutions in a relevant environment.</p>		9.249	9.296	-
Title: Dismounted Communications in Urban Terrain		1.959	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>	PROJECT TR1: <i>TAC C4 TECHNOLOGY INT</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
<p>Description: This effort matures and demonstrates technologies that enable wireless networked communications for dismounted soldiers in complex terrain such as urban environments and inside buildings.</p> <p>FY 2010 Accomplishments: Coded space time adaptive processing for use on dismounted Soldiers' radio equipments; developed a tactical one-way certifiable (NSA security certification) cross domain (security levels) information sharing device.</p>			
Accomplishments/Planned Programs Subtotals	36.346	37.862	36.673

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>				PROJECT TR2: <i>Secure Tactical Information Integration</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
TR2: <i>Secure Tactical Information Integration</i>	12.554	12.497	21.290	-	21.290	20.554	20.974	21.558	21.883	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies with enhanced capabilities to analyze, plan, execute, and assess operations, at tactical and strategic levels, by integrating decision support and intelligence based software to provide a more comprehensive understanding of adversaries and environments. Efforts mature and demonstrate technologies to improve mission execution success by providing software to more tightly couple operations and intelligence, and to better facilitate collaboration between individuals and teams. Efforts in tactical cross domain solutions demonstrate software based technologies enabling information sharing across operations and intelligence security domains that replace current application-specific hardware solutions.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command, Communications (RDECOM)-Electronics Research Development and Engineering Center (CERDEC), Fort Monmouth, NJ and Aberdeen Proving Ground, MD, and the Army Research Laboratory (ARL), Adelphi, MD.

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

	FY 2010	FY 2011	FY 2012
Title: Collaborative Battle Management	6.654	6.947	7.007
Description: This effort matures and demonstrates technologies to improve sharing and understanding of data between the intelligence and operations communities.			
FY 2010 Accomplishments: Extended existing net-centric data strategies by adding concept-based data meta-tagging; matured portability framework and developed implementations for Force XXI Battle Command, Brigade and Below (FBCB2) and Distributed Common Ground Station-Army (DCGS-A); developed a universal collaboration bridge (UCB) permitting interoperability between mIRC (internet relay chat), Jabber (extensible messaging and presence protocol), Command Post of the Future and FBCB2; developed a digital mission model to enable collaboration between communities of interest (Intelligence (Intel)/Operations (Ops)/Geospatial (Geo)); coded software (SW) to associate Intel requirements, Geo data needs, and collection opportunities with operational mission tasks for Intel and Battle Command (BC) communities; integrated Intel and Ops decision support tools to include SW for managing planning and execution, priority information request, and collectors/sensors.			
FY 2011 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>		PROJECT TR2: <i>Secure Tactical Information Integration</i>
B. Accomplishments/Planned Programs (\$ in Millions)				
				FY 2010
				FY 2011
				FY 2012
<p>Support limited distribution of the UCB; mature and demonstrate SW to associate Intel requirements, Geo data needs and collection opportunities with mission tasks for Intel and BC and allow Warfighter modification of system information to adapt to dynamic enemy tactics; mature Integrated Intel/Ops services for collaboration/visualization across SW environments; demonstrate integrated Intel/Ops decision support tools for planning and execution, priority information requests management, and collection/sensor management; mature and demonstrate multi-touch (MT) based mission collaboration.</p> <p>FY 2012 Plans: Will develop collaboration services to include browser-based components for visualization of strategic battle command data feeds and communications status; will develop SW environment permitting applications to execute on different operating systems (e.g., Windows, LINUX); will complete MT-based mission collaboration SW including information link analysis tools and Tactical Ground Reporting System (TiGR)-compatible MT display; will develop and mature general device-independent MT application framework; will complete Geo terrain analytical tools. These efforts will transition to PM Battle Command and PM Commercial Joint Mapping Toolkit.</p>				
<p>Title: Tactical Cross Domain Solutions</p> <p>Description: This effort matures and demonstrates service oriented architecture (SOA) cross domain solutions (CDS) to enable assured sharing of information across multiple security domains.</p> <p>FY 2010 Accomplishments: Improved and demonstrated cross domain web services on high assurance operating systems (e.g., Green Hills Integrity, Lynx Works LynxOS) that provided trusted labeling service (applied security labeling classification and releasability labels to data), data regarding service (used to sanitize security labeled messages before they cross security domain boundaries), and domain boundary service (ensured that cross security domain requirements were fulfilled before information was released from one security domain to another).</p> <p>FY 2011 Plans: Demonstrate one-way position location information (PLI) transfer from unclassified to classified networks, and further mature guard to process two-way digital data flow; mature and demonstrate a general tool to be used by any program to identify malicious code in a developed application or on the network.</p> <p>FY 2012 Plans: Will improve the one-way PLI data transfer and two-way digital data flow cross-domain software, integrate it with a military-hardened, tactical (small size, weight, and power) hardware platform complete with the necessary embedded security features to undergo NSA security certification and accreditation and demonstrate it on Ground Soldier equipment in a field environment.</p>				5.900
				5.550
				5.824
Title: Information Assurance				-
				-
				8.459

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011				
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>		PROJECT TR2: <i>Secure Tactical Information Integration</i>		
B. Accomplishments/Planned Programs (\$ in Millions)						
<p>Description: This effort matures and demonstrates cyber security technologies that create new methods for defending wireless networks using nontraditional methodologies. Work being performed under PE /project 0602782/H92 and PE/project 0603008 TR1 complement this effort.</p> <p>FY 2012 Plans: Will integrate improved detection and automated response capabilities into Intrusion Detection System (IDS) technologies that resides on tactical host platforms, providing maximum protection to the host system with minimal resource usage; will develop IDS response component that collaborate with an Information Operations (IO) response component to take into account intelligence threat information and ascertain exactly who or what is causing the cyber threat; will integrate the IDS agents traversing the hosts and network into a common architecture; will evaluate the IDS components in a lab environment to ascertain the maturity of the functionality of each component of the architecture; will analyze and assess models of cyber attack behaviors to determine adversary objectives, attack vectors, and classes of attack to effect computer network defense (CND); will code and integrate a cyber tool kit for CND including dynamic protocols, a dynamic decentralized network remapping framework, and obfuscation (confusion) software for masking network role, system's identity, and cyber security protection from potential attackers.</p>				FY 2010	FY 2011	FY 2012
Accomplishments/Planned Programs Subtotals				12.554	12.497	21.290
C. Other Program Funding Summary (\$ in Millions)						
N/A						
D. Acquisition Strategy						
N/A						
E. Performance Metrics						
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.						

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>				PROJECT TR8: <i>C3 DEMONSTRATIONS (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
TR8: <i>C3 DEMONSTRATIONS (CA)</i>	7.003	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for C3 Demonstrations.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Portable Mobile Emergency Broadband Systems (PMEBS)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a rapidly deployable wireless ad-hoc portable communications system, that is self-configuring, self-healing and multi-hopping (Advanced Encryption Standard (AES)-256 mesh capable) as a low cost, near-term, off-the shelf solution that can supplement existing technology gaps for the last-mile tactical communications.</p>	3.183	-	-
<p>Title: Applied Communications and Information Networking (ACIN)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Matured and demonstrated commercial networking and communications technology in intelligent agents and mobile networking; provided rapid adaptation of commercial communications equipment for military use through the development of new architectures combining commercial and military unique technologies; provided modeling and simulation and planning tools for communications/network planning.</p>	3.024	-	-
<p>Title: Cybersecurity in Tactical Environments</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported research in the area of Malware and focused on the current and emerging threats that impact software baselines today and also researched solutions that could effectively mitigate these threats.</p>	0.796	-	-
Accomplishments/Planned Programs Subtotals	7.003	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603008A: <i>Electronic Warfare Advanced Technology</i>	PROJECT TR8: <i>C3 DEMONSTRATIONS (CA)</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603009A: <i>TRACTOR HIKE</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	10.945	8.015	8.155	-	8.155	9.049	9.108	8.995	9.143	Continuing	Continuing
B18: <i>DB18</i>	6.918	4.225	4.146	-	4.146	4.223	4.302	4.373	4.444	Continuing	Continuing
B31: <i>DB31</i>	4.027	3.790	4.009	-	4.009	4.826	4.806	4.622	4.699	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary (\$ in Millions)

	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	10.945	8.015	8.155	-	8.155
Total Adjustments	10.945	8.015	8.155	-	8.155
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-
• Adjustments to Budget Years	10.945	8.015	8.155	-	8.155

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army									DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603009A: <i>TRACTOR HIKE</i>				PROJECT B18: <i>DB18</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
B18: <i>DB18</i>	6.918	4.225	4.146	-	4.146	4.223	4.302	4.373	4.444	Continuing	Continuing

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program (SAP) annual report to Congress

A. Mission Description and Budget Item Justification

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

Title: DB18	FY 2010	FY 2011	FY 2012
Description: SAP	6.918	4.225	4.146
FY 2010 Accomplishments: SAP			
FY 2011 Plans: SAP			
FY 2012 Plans: .			
Accomplishments/Planned Programs Subtotals	6.918	4.225	4.146

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603009A: <i>TRACTOR HIKE</i>	PROJECT B31: <i>DB31</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
B31: <i>DB31</i>	4.027	3.790	4.009	-	4.009	4.826	4.806	4.622	4.699	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

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

	FY 2010	FY 2011	FY 2012
Title: DB31	4.027	3.790	4.009
Description: SAP			
FY 2010 Accomplishments: SAP			
FY 2011 Plans: SAP			
FY 2012 Plans: .			
Accomplishments/Planned Programs Subtotals	4.027	3.790	4.009

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603015A: <i>Next Generation Training & Simulation Systems</i>							
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	25.895	15.334	17.936	-	17.936	20.120	23.265	20.940	25.543	Continuing	Continuing
HB5: <i>IMMERSIVE ENVIRONMENTS DEMONSTRATIONS (CA)</i>	1.990	-	-	-	-	-	-	-	-	Continuing	Continuing
S28: <i>Immersive Learning Environments</i>	2.898	3.054	3.154	-	3.154	3.257	3.353	3.442	3.501	Continuing	Continuing
S29: <i>MODELING & SIMULATION - Adv Tech Dev</i>	5.651	7.380	6.052	-	6.052	6.380	9.397	6.861	11.224	Continuing	Continuing
S31: <i>Modeling and Simulation Infrastructure Technology</i>	10.103	4.900	8.730	-	8.730	10.483	10.515	10.637	10.818	Continuing	Continuing
S33: <i>TRAINING AND SIMULATION SYSTEMS INITIATIVES (CA)</i>	5.253	-	-	-	-	-	-	-	-	Continuing	Continuing

Note
FY12 funding increase to support Underbody Blast Armor and Training Modeling and Simulation.

A. Mission Description and Budget Item Justification

Efforts in this program element (PE) mature and demonstrate tools to enable effective training capability for the Warfighter. The PE matures and demonstrates simulation technologies developed by the Institute for Creative Technology (project S28); incorporates advanced modeling and simulation (M&S), training, and leader development technology into immersive training demonstrations as well as demonstrates a framework for future embedded training and simulation systems for future force combat and tactical vehicles, and dismounted Soldier systems (project S29); develops, integrates and demonstrates an overarching M&S architecture that incorporates multi-resolution entity-based models, simulations, and tools to enable Network-Centric Warfare M&S capability (project S31).

Work in this PE complements and is fully coordinated with efforts in PE 0602308A (Advanced Concepts and Simulation), PE 0602785 (Manpower/Personnel/Training Technology), PE 0602787A (Medical Technology), and PE 0603007A (Manpower, Personnel and Training Advanced Technology).

Immersive Environments Demonstrations (project HB5) and Training and Simulation Initiatives (project S33) fund congressional special interest items.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>
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Work in this PE is performed by the Army Research Laboratory, Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, FL.

B. Program Change Summary (\$ in Millions)	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	25.362	15.334	13.317	-	13.317
Current President's Budget	25.895	15.334	17.936	-	17.936
Total Adjustments	0.533	-	4.619	-	4.619
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	1.194	-			
• SBIR/STTR Transfer	-0.661	-			
• Adjustments to Budget Years	-	-	4.619	-	4.619

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE				PROJECT				
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603015A: <i>Next Generation Training & Simulation Systems</i>				HB5: <i>IMMERSIVE ENVIRONMENTS DEMONSTRATIONS (CA)</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
HB5: <i>IMMERSIVE ENVIRONMENTS DEMONSTRATIONS (CA)</i>	1.990	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Immersive Environments advanced technology development.

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

	FY 2010	FY 2011	FY 2012
Title: Joint Fires and Effects Training System (JFETS)	1.990	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Investigated technology options for immersive capabilities for institutional training and enhancements to the field.			
Accomplishments/Planned Programs Subtotals	1.990	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>				PROJECT S28: <i>Immersive Learning Environments</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
<i>S28: Immersive Learning Environments</i>	2.898	3.054	3.154	-	3.154	3.257	3.353	3.442	3.501	Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature and demonstrate immersive technologies that include the application of photorealistic synthetic environments, multi-sensory interfaces, virtual humans, and training applications on low-cost game platforms. This project uses advanced modeling, simulation, and leadership development techniques to leverage the emerging immersive technologies that are created at the Institute of Creative Technologies (ICT) University Affiliated Research Center (UARC) at the University of Southern California to formulate training demonstrations with an emphasis on urban operations and asymmetric warfare. The ICT's collaboration with its entertainment partners creates a true synthesis of creativity and technology that harnesses the capabilities of industry, and the research and development community to advance the Army's ability to train and practice military skills across the full spectrum of conflict.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy and the Army Science and Technology Master Plan.

Work in this project is performed by the Research, Development, and Engineering Command (RDECOM), Army Research Laboratory, Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, FL.

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

	FY 2010	FY 2011	FY 2012
Title: Immersive Techniques	2.898	3.054	3.154
Description: This effort demonstrates and matures technological advancements from PE 0602308A/project D02 into complex state-of-the-art simulation environments in support of multi-student and team training.			
FY 2010 Accomplishments: Demonstrated and refined methods and technologies that expand immersive environments to support multi-student and team training; demonstrated and matured methods to support computer generated after-action reviews, virtual human-based mentoring, and computer-directed scenario adaptation based on multi-player distributed training techniques; and matured and assessed environment for leaders to practice decision making skills in complex, cultural environments.			
FY 2011 Plans: Mature and refine software tools that rapidly author automated tutoring systems for specific training applications; and mature methods to implement training applications on portable and mobile devices.			
FY 2012 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>	PROJECT S28: <i>Immersive Learning Environments</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will develop virtual mission rehearsal trainers encompassing complex team, interpersonal actions as well as conflicts and is supported by interactive learning technologies; will complete study that examines the measurement and impact of the sense of presence on learning in virtual environments.				
Accomplishments/Planned Programs Subtotals		2.898	3.054	3.154
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>				PROJECT S29: <i>MODELING & SIMULATION - Adv Tech Dev</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
S29: <i>MODELING & SIMULATION - Adv Tech Dev</i>	5.651	7.380	6.052	-	6.052	6.380	9.397	6.861	11.224	Continuing	Continuing

A. Mission Description and Budget Item Justification

Efforts in this project mature and demonstrate next generation training and simulation systems that focus on integrating virtual threats, asymmetric warfare, network-centric operations, and embedding training capabilities as well as technologies into operational go-to-war future force systems to include dismounted warrior systems. The synergy between these embedded training capabilities and the immersive training advanced technology development in project S28 provides Army units with a set of complementary embedded as well as deploy-on-demand systems that provide just-in-time, dynamic, realistic training, and mission rehearsal capabilities. Demonstrations include technologies that form a framework for future training applications for the range of future force operations such as robotic control and other sensor operations; mission planning and rehearsal; command, control, and maneuver; Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) network analysis to support distributed simulations; and vehicle system interface requirements. This project creates a joint environment by synchronizing virtual and constructive simulated forces with the next generation and current training systems from the Army, Navy, Air Force, and Marine forces.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Research, Development, and Engineering Command (RDECOM), Army Research Laboratory (ARL), Weapons and Materials Research Directorate, Aberdeen Proving Ground, Maryland and Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, Florida.

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

	FY 2010	FY 2011	FY 2012
Title: Embedded Techniques	5.651	5.880	3.762
Description: This effort matures and demonstrates capabilities (most provided from PE 0602308A/project C90) built into or added onto operational systems, subsystems, or equipment, to enhance as well as maintain the skill proficiency of Soldiers, and maximizes component commonality among combat vehicles and Soldier computer systems.			
FY 2010 Accomplishments:			
Teamed with U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC) to exploit employing modeling and simulation technologies (i.e., Force Battle Command, Real-time Adversarial Intelligence Decision aid) in embedded training for current and future Command and Control (C2) systems used to train for asymmetric urban warfare environments; exploited technology development of computer-generated behaviors to simulate terrorist/insurgency urban warfare for future embedding into C2 systems; continued technology maturity for dismounted Soldier embedded training prototypes to			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>	PROJECT S29: <i>MODELING & SIMULATION - Adv Tech Dev</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>support next generation Soldier systems in collaboration with U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) and CERDEC.</p> <p>FY 2011 Plans: Demonstrate immersive training on portable and mobile devices such as mobile hand-held devices as well as militarized personal computers; assess and demonstrate software authoring tools for real-time creation and delivery of automated tutoring systems to distributed multi-student teams.</p> <p>FY 2012 Plans: Will continue advance technology demonstrator maturity improvements from PE 0602308A/project C90 Live, Virtual, Constructive (LVC) technologies such as real-time physics-based rendering of asymmetric forces in urban environments and will prepare future experiments for FY13.</p>				
<p>Title: Advanced simulation to treat Post Traumatic Stress Disorder (PTSD)</p> <p>Description: This effort matures and demonstrates advanced simulation technologies developed at the Institute for Creative Technology (ICT) to treat the effects of PTSD.</p> <p>FY 2011 Plans: Will evaluate, demonstrate and quantify the immersive simulation treatment effects and the long term results of the treatment.</p> <p>FY 2012 Plans: Will continue to evaluate, demonstrate and quantify the immersive simulation treatment effects and the long term results of treatment, and transition results as well as lessons learned to Army/DoD medical community.</p>		-	1.500	1.500
<p>Title: Underbody blast modeling and simulation (UBB M&S)</p> <p>Description: Advanced M&S to improve the survivability of ground vehicle occupants to underbody blast threats.</p> <p>Current UBB M&S is limited to replicating finite blast-soil loading conditions, vehicle structure responses to the blast load, and the resulting injury to the crew. To significantly improve designs, engineering, and assessment of existing and future blast protection technology, UBB M&S needs to be more dynamic, predictive, verified, validated and accredited (VV&A).</p> <p>FY 2012 Plans: Will verify and validate UBB M&S loading conditions to account for model variability due to soil conditions (type/composition, moisture content, overburden, soil bed preparation); will quantify UBB M&S sub-vehicle system models for deviations in vehicle</p>		-	-	0.790

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>	PROJECT S29: <i>MODELING & SIMULATION - Adv Tech Dev</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
structural materials models for metals, composites, and elastomers accounting for variations in strength and fracture material properties.			
Accomplishments/Planned Programs Subtotals	5.651	7.380	6.052

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>				PROJECT S31: <i>Modeling and Simulation Infrastructure Technology</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
<i>S31: Modeling and Simulation Infrastructure Technology</i>	10.103	4.900	8.730	-	8.730	10.483	10.515	10.637	10.818	Continuing	Continuing

Note

Not applicable for this item.

A. Mission Description and Budget Item Justification

Efforts in this project research, mature, and demonstrate a distributed Modeling and Simulation (M&S) environment referred to as the Modeling Architecture for Technology, Research, and Experimentation (MATREX). MATREX researches and develops a robust M&S environment wherein a collection of multi-fidelity models, simulations and tools can be integrated as well as mapped to an evolving architecture for conducting multi-scale (time and spatial resolution) M&S activities to provide M&S data and information to multiple users for decision-making. MATREX provides a unifying M&S architecture and supporting structure that synchronize and integrate multi-resolution (time and space) modeling applications such as Live, Virtual, and Constructive experimentation. It also exploits applications, operational studies of Network-Centric Operations concepts and technologies, or the modeling of Battle Command operations with elements of advanced communications, information flow, data fusion, decision-making, and information warfare. MATREX also works to address M&S issues of model scalability, network design, enterprise services, and third party software compatibility issues. MATREX ultimately comprises a portfolio of one or more year efforts focused on researching cutting edge M&S methods to enable the Army and DoD to perform critical System of Systems (SoS) analysis, experimentation, technology tradeoffs, capability assessments, concept development, testing, and training.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led by the Research, Development, and Engineering Command (RDECOM), Army Research and Engineering Laboratory, Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, FL, and executed across the Command.

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

	FY 2010	FY 2011	FY 2012
Title: MATREX	10.103	4.900	8.730
Description: This effort matures and demonstrates modeling and simulation technologies and techniques that support Army experimentation and test events to assess and support system acquisition and military planning decision-making through the use of multi-fidelity models, simulations and tools.			
FY 2010 Accomplishments: Matured a multi-organization Army laboratory data collection process to support Army technology readiness level demonstrations and to enable consistent data structure/interoperability for multi-organization use throughout the development/design cycle;			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>	PROJECT S31: <i>Modeling and Simulation Infrastructure Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>assessed and improved current analysis tools to provide an integrated acquisition support capability for Army decision making; improved simulation for modeling of weather, terrain, chemical-biological-radiological-nuclear effects, human behavior, human decision-making and networked sensor fusion; and improved M&S support architectures for cross-domain M&S environment interoperability to include live fire testing, Soldier and hardware-in-the-loop experiments, and software-based testing environments.</p> <p>FY 2011 Plans: Demonstrate cross-command data collection and analysis tools for integrated acquisition support capability; mature integrated M&S representation of Battle Command (future force network planning, pre-operation checkout, and integration with tactical command and control devices); integrate M&S support architectures for cross-domain M&S environment interoperability; and fuse multi-resolution capabilities for modeling weather, terrain, chemical-biological effects and human behavior/human decision-making, networked sensor fusion, and tactical network to meet future analysis needs.</p> <p>FY 2012 Plans: Will demonstrate simulation and systems engineering tools for distributed integration and M&S reuse focused on System of Systems (SoS); research and demonstrate emerging simulation methods to enable short turn around, critical analyses for the Army and DoD to include models for soldier protection and performance trade space; will demonstrate executable architectures for analysis, event management, and simulation initialization, on the RDECOM Virtual Testbed; will research and identify hardware and software technology solutions for current and future M&S challenges, concentrating on distributed execution of M&S.</p>				
Accomplishments/Planned Programs Subtotals		10.103	4.900	8.730
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>				PROJECT S33: <i>TRAINING AND SIMULATION SYSTEMS INITIATIVES (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
S33: <i>TRAINING AND SIMULATION SYSTEMS INITIATIVES (CA)</i>	5.253	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Training and Simulation Systems advanced technology development. Joint Medical Simulation Technology Research & Development Center. Supported collaboration between defense organizations conducting research and development in medical modeling and simulation for training, therapy, and rehabilitation.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Joint Medical Simulation Technology Research & Development Center</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported collaboration between defense organizations conducting research and development in medical modeling and simulation for training, therapy, and rehabilitation.</p>	1.773	-	-
<p>Title: HapMed Combat Medic Trainer</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Investigated technology options to provide soldiers and medics with the ability to practice critical lifesaving tasks in realistic training scenarios.</p>	0.990	-	-
<p>Title: Combat Medic Trainer</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Assessed technology options for developing a leg tourniquet trainer and a needle chest decompression trainer.</p>	2.490	-	-
Accomplishments/Planned Programs Subtotals	5.253	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603015A: <i>Next Generation Training & Simulation Systems</i>	PROJECT S33: <i>TRAINING AND SIMULATION SYSTEMS INITIATIVES (CA)</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603020A: <i>TRactor rose</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	13.997	12.309	12.597	-	12.597	13.261	17.014	17.276	17.570	Continuing	Continuing
B84: <i>DB84</i>	2.581	2.677	2.696	-	2.696	2.429	2.472	2.510	2.553	Continuing	Continuing
B96: <i>DB96</i>	2.030	-	-	-	-	-	-	-	-	Continuing	Continuing
DB1: <i>DDB1</i>	9.386	9.632	9.901	-	9.901	10.832	14.542	14.766	15.017	Continuing	Continuing

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	-	-	-	-	-
Current President's Budget	13.997	12.309	12.597	-	12.597
Total Adjustments	13.997	12.309	12.597	-	12.597
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	13.997	12.309	12.597	-	12.597

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603020A: <i>TRactor rose</i>	PROJECT B84: <i>DB84</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
B84: <i>DB84</i>	2.581	2.677	2.696	-	2.696	2.429	2.472	2.510	2.553	Continuing	Continuing

Note

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program (SAP) Annual Report to Congress

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

	FY 2010	FY 2011	FY 2012
Title: .	2.581	2.677	2.696
Description: DB84			
FY 2010 Accomplishments: SAP			
FY 2011 Plans: SAP			
FY 2012 Plans: SAP			
Accomplishments/Planned Programs Subtotals	2.581	2.677	2.696

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army									DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603020A: <i>TRactor rose</i>				PROJECT B96: <i>DB96</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
B96: <i>DB96</i>	2.030	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119 (a)(1) in the Special Access Program (SAP) Annual Report to Congress

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

	FY 2010	FY 2011	FY 2012
Title: DB 96	2.030	-	-
Description: SAP			
FY 2010 Accomplishments: SAP			
Accomplishments/Planned Programs Subtotals	2.030	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603020A: <i>TRactor rose</i>	PROJECT DB1: <i>DDB1</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
DB1: <i>DDB1</i>	9.386	9.632	9.901	-	9.901	10.832	14.542	14.766	15.017	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(l) in the Special Access Program (SAP) Annual Report to Congress.

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

	FY 2010	FY 2011	FY 2012
Title: .	9.386	9.632	9.901
Description: DB1			
FY 2010 Accomplishments: SAP			
FY 2011 Plans: SAP			
FY 2012 Plans: SAP			
Accomplishments/Planned Programs Subtotals	9.386	9.632	9.901

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603105A: <i>MILITARY HIV RESEARCH</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	29.277	6.688	6.796	-	6.796	6.909	7.031	7.130	7.235	Continuing	Continuing
H29: <i>MED PROTECT AGNST HIV</i>	6.397	6.688	6.796	-	6.796	6.909	7.031	7.130	7.235	Continuing	Continuing
T16: <i>MILITARY HIV INITIATIVES CA</i>	22.880	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates advanced technology of candidate human immunodeficiency virus (HIV) vaccines, prepares and conducts human clinical studies to assess safety and efficacy of candidate HIV vaccines, conducts research to control HIV infection in military environments, protects the military blood supply from HIV, and protects military personnel from risks associated with the HIV infection. All HIV technology development activities are conducted in compliance with US Food and Drug Administration (FDA) regulations. FDA requires thorough testing in animal models (preclinical testing) to ensure safety and efficacy prior to approving controlled clinical evaluation of drugs, vaccines, and medical devices in humans. Normally, clinical trials are conducted in three phases to prove safety and effectiveness of the drug, vaccine, and device for the targeted disease or condition. An increasing number of test subjects are used in each subsequent phase. All results are submitted to FDA for evaluation to ultimately obtain approval (licensure) for routine medical use. This program is jointly managed through an Interagency Agreement by the US Army Medical Research and Materiel Command (MRMC), the National Institutes of Health, and the National Institute of Allergy and Infectious Diseases (NIAID).

This project contains no duplication with any effort within the Military Departments or other government organizations.

Work is fully coordinated with work funded in program element PE 0602787A, project 873 (HIV Exploratory Research).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD, and its overseas laboratories; and the Naval Medical Research Center (NMRC), Silver Spring, MD, and its overseas laboratories. The Henry M. Jackson Foundation, located in Rockville, MD provides support for FDA testing and other research under cooperative agreement.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603105A: <i>MILITARY HIV RESEARCH</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	29.502	6.688	6.796	-	6.796
Current President's Budget	29.277	6.688	6.796	-	6.796
Total Adjustments	-0.225	-	-	-	-
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.225	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603105A: <i>MILITARY HIV RESEARCH</i>	PROJECT H29: <i>MED PROTECT AGNST HIV</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
H29: <i>MED PROTECT AGNST HIV</i>	6.397	6.688	6.796	-	6.796	6.909	7.031	7.130	7.235	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds research to develop candidate human immunodeficiency virus (HIV) vaccines, assess their safety and effectiveness in evaluation with human subjects, and protect the military personnel from risks associated with HIV infection. In addition, it is designed to find ways to protect the blood supply from contamination with the virus. All HIV technology development is conducted in compliance with US Food and Drug Administration (FDA) regulations. Evaluations in human subjects are conducted to demonstrate safety and effectiveness of candidate vaccines, as required by FDA regulation. Studies are conducted stepwise, first to prove safety, second to demonstrate the desired effectiveness of the drug, vaccine or device for the targeted disease or condition in a small study, and third to demonstrate effectiveness in large, diverse human population trials. All results are submitted to the FDA for evaluation to ultimately obtain approval (licensure) for medical use. This project supports studies for effectiveness testing on small study groups after which they transition to the next phase of development for completion of effectiveness testing in larger populations.

This program is jointly managed through an Interagency Agreement by the US Army Medical Research and Materiel Command (MRMC) and the National Institute of Allergy and Infectious Diseases (NIAID). This project contains no duplication with any effort within the Military Departments or other government organizations.

Work is fully coordinated with work funded in program element PE 0602787A, project 873 (HIV Exploratory Research) are further matured under PE 0603807A, project 811.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD, and its overseas laboratories. Significant work is conducted under a cooperative agreement with the Henry M. Jackson Foundation, Rockville, MD.

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

	FY 2010	FY 2011	FY 2012
Title: HIV Program	6.397	6.688	6.796
Description: This project funds research to develop candidate HIV vaccines, assess their safety and effectiveness in evaluations with human subjects, and protect military personnel from risks associated with HIV infection.			
FY 2010 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603105A: <i>MILITARY HIV RESEARCH</i>	PROJECT H29: <i>MED PROTECT AGNST HIV</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Evaluated in human volunteers in Africa to assess the safety and physiological response of vaccines prepared with additional HIV subtypes. Continued large-scale evaluations in humans in Thailand.</p> <p>FY 2011 Plans: Expand evaluations in human volunteers in Africa and Asia to assess the safety and effectiveness of a vaccine combination designed for more than one HIV subtype.</p> <p>FY 2012 Plans: Will perform tests under Good Laboratory Practice FDA guidelines to assess performance and ability of HIV vaccine candidates to provoke an immune response in human trials. Will prepare and conduct safety studies in human volunteers with new vaccine candidates at multiple sites worldwide.</p>				
Accomplishments/Planned Programs Subtotals		6.397	6.688	6.796
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603105A: <i>MILITARY HIV RESEARCH</i>				PROJECT T16: <i>MILITARY HIV INITIATIVES CA</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
T16: <i>MILITARY HIV INITIATIVES CA</i>	22.880	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item projects for HIV Research.

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

	FY 2010	FY 2011	FY 2012
Title: Test, Treatment and Preventive Vaccines Description: This is a Congressional Interest Item. FY 2010 Accomplishments: This Congressional Interest Item conducts research into human immunodeficiency virus.	19.896	-	-
Title: HIV Prevention and Reducing Risk to US Military Personnel Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Conducted research on HIV prevention and risk reduction.	2.984	-	-
Accomplishments/Planned Programs Subtotals	22.880	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE								
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603125A: <i>Combating Terrorism - Technology Development</i>								
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	11.366	10.550	12.191	-	12.191	9.611	9.941	10.016	10.101	Continuing	Continuing
DF5: <i>AGILE INTEGRATION & DEMONSTRATION</i>	11.366	10.550	12.191	-	12.191	9.611	9.941	10.016	10.101	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) demonstrates technologies with high payoff potential to address current technology shortfalls or future force capability gaps.

Work in this PE complements and is fully coordinated with PE 0603710A (Night Vision Advanced Technology), PE 0602303A (Missile Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602601A (Combat Vehicle and Automotive Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology) and PE 0602705A (Electronics and Electronic Devices).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM) and the Army Engineer Research and Development Center.

B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	11.927	10.550	12.191	-	12.191
Current President's Budget	11.366	10.550	12.191	-	12.191
Total Adjustments	-0.561	-	-	-	-
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.153	-			
• SBIR/STTR Transfer	-0.408	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603125A: <i>Combating Terrorism - Technology Development</i>				PROJECT DF5: <i>AGILE INTEGRATION & DEMONSTRATION</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
DF5: <i>AGILE INTEGRATION & DEMONSTRATION</i>	11.366	10.550	12.191	-	12.191	9.611	9.941	10.016	10.101	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project demonstrates technologies with high payoff potential to address current technology shortfalls or future force capability gaps. Efforts include hybrid electric power technologies to reduce use of fossil fuel generators and deployable force protection technologies.

Work in this project is complementary to and is fully coordinated with PE 0603710A (Night Vision Advanced Technology), PE 0602303A (Missile Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602601A (Combat Vehicle and Automotive Technology), PE 0602784A (Military Engineering Technology), PE 0603734A (Military Engineering Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology) and PE 0602705A (Electronics and Electronic Devices).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM) and the Army Engineer Research and Development Center.

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

	FY 2010	FY 2011	FY 2012
Title: Agile Integration & Demonstration	7.676	-	-
Description: This effort accelerates the development and testing of capabilities that address future force needs. It identifies maturing technologies from within all Army research and development (R&D) activities and the Department of Energy (DOE) to accelerate the development of suitable technologies to the Warfighter for demonstration. Emphasis continues to be on those high payoff and cost effective areas that provide the operational forces increased protection and survivability and meet the Operational Need Statements of the deployed forces in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF).			
FY 2010 Accomplishments: Integrated 3-D fusion algorithms for persistent stare operations on the Constant Hawk manned aircraft sensor collection system; fielded advanced trauma and wound treatments for hemostasis/clotting; integrated 30mm ammunition lethality improvements; and fielded advanced improvised explosive device (IED) integration, communication and thermal viewing technologies to route clearance teams in Afghanistan and Iraq.			
Title: Transportable Hybrid Electric Power Station (THEPS)	3.690	4.850	4.691

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603125A: <i>Combating Terrorism - Technology Development</i>	PROJECT DF5: <i>AGILE INTEGRATION & DEMONSTRATION</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort is developing and demonstrating intelligent power management technology to reduce use of fossil fuel generators while proving the ability to incorporate solar, wind and advanced storage technology.</p> <p>FY 2010 Accomplishments: Conducted THEPS demonstration at remote sites and operating bases; continued demonstrations at Forward Operating Bases (FOB) with less logistics tail and more cost avoidance as a result of consuming less fossil fuel.</p> <p>FY 2011 Plans: Hybrid Intelligent Power (HI Power) is maturing and demonstrating technologies for an intelligent power grid that allows for the most efficient use of the tactical power sources available in support of remote operations and tactical command posts. In FY11, demonstrate a 30 kilowatt HI Power grid; conduct efficiency testing on demonstrators; mature and demonstrate a direct current distribution architecture and associate power electronics.</p> <p>FY 2012 Plans: Will develop and demonstrate an autonomous hybrid power grid architecture for the power range of 3 to 60 kilowatt capable of accepting direct current (DC) input from 20 volts DC to 32 volts DC, and be scalable to 500 kilowatts; will develop and demonstrate advance control hardware and software; will develop and assess a standard secure communication protocol; will continue development of a draft system specification.</p>				
<p>Title: Rapid Deployable Force Protection Technologies</p> <p>Description: This effort improves design, development and employment of force protection technologies that are rapidly deployable to support troops operating in forward areas. These technologies must be readily transportable; require minimal set up, take down, and operational effort; and easily adaptable across a variety of missions, environments, and threats. This effort is coordinated with PE 0602784A, PE 0603734A, PE 0602786A, and PE 0603313A.</p> <p>FY 2011 Plans: Identify force protection technologies that meet the rapidly deployable construct; develop criteria for initial selection and criteria for assessments of candidate force protection technologies based on stakeholder prioritized needs for force protection functions and system characteristics; design and conduct a series of demonstrations to baseline performance of selected force protection technologies, such as passive protection and/or non line-of-sight sensing, and to identify improvements in design, development and implementation; coordinate proposed improvements with designers, developers, and stakeholders. Scope includes assessing systems vulnerabilities regarding the ability to conduct force protection effectively.</p> <p>FY 2012 Plans:</p>		-	5.700	7.500

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603125A: <i>Combating Terrorism - Technology Development</i>	PROJECT DF5: <i>AGILE INTEGRATION & DEMONSTRATION</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Will refine and update criteria for deployable force protection technologies in order to meet capability gaps based on stakeholder input; will mature and evolve promising technologies identified and assessed in prior year's effort; will identify new and emerging force protection technologies that meet the rapidly deployable construct; will select and assess candidate force protection technologies to support a system of systems design for force protection based on prioritized needs from stakeholders; will include advanced assessments of technology improvements based on prior year's efforts; will design and conduct a series of demonstrations and experiments to assess performance of selected force protection technologies and to identify improvements in design, development and implementation; will include assessing systems vulnerabilities regarding the ability to conduct force protection effectively; and will coordinate improvements with designers, developers, and stakeholders.			
Accomplishments/Planned Programs Subtotals	11.366	10.550	12.191

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603130A: <i>TRACTOR NAIL</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	-	-	4.278	-	4.278	3.450	3.158	3.399	3.457	Continuing	Continuing
DS8: <i>TRACTOR NAIL</i>	-	-	4.278	-	4.278	3.450	3.158	3.399	3.457	Continuing	Continuing

Note

Not Applicable for this Item

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program (SAP) Annual Report to Congress

B. Program Change Summary (\$ in Millions)

	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	-	4.278	-	4.278
Total Adjustments	-	-	4.278	-	4.278
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments 1	-	-	4.278	-	4.278

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603130A: <i>TRACTOR NAIL</i>	PROJECT DS8: <i>TRACTOR NAIL</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
DS8: <i>TRACTOR NAIL</i>	-	-	4.278	-	4.278	3.450	3.158	3.399	3.457	Continuing	Continuing

Note

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(l) in the Special Access Program (SAP) Annual Report to Congress

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

	FY 2010	FY 2011	FY 2012
Title: .	-	-	4.278
Description: DS8			
FY 2012 Plans: SAP			
Accomplishments/Planned Programs Subtotals	-	-	4.278

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

N/A

D. Acquisition Strategy

Not Applicable SAP

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603131A: <i>TRACTOR EGGS</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	-	-	2.261	-	2.261	2.298	2.340	2.375	2.415	Continuing	Continuing
DS9: <i>TRACTOR EGGS</i>	-	-	2.261	-	2.261	2.298	2.340	2.375	2.415	Continuing	Continuing

Note

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program (SAP) Annual Report to Congress

B. Program Change Summary (\$ in Millions)

	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	-	2.261	-	2.261
Total Adjustments	-	-	2.261	-	2.261
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	2.261	-	2.261

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603131A: <i>TRACTOR EGGS</i>				PROJECT DS9: <i>TRACTOR EGGS</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
DS9: <i>TRACTOR EGGS</i>	-	-	2.261	-	2.261	2.298	2.340	2.375	2.415	Continuing	Continuing

Note

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program (SAP) Annual Report.

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

	FY 2010	FY 2011	FY 2012
Title: .	-	-	2.261
Description: DS9			
FY 2012 Plans: SAP			
Accomplishments/Planned Programs Subtotals	-	-	2.261

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

N/A

D. Acquisition Strategy

Not Applicable

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>							
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	23.766	18.350	23.677	-	23.677	21.501	22.459	22.690	23.333	Continuing	Continuing
K12: <i>EW Demonstrations (CA)</i>	5.172	-	-	-	-	-	-	-	-	Continuing	Continuing
K15: <i>ADVANCED COMM ECM DEMO</i>	9.114	9.393	12.048	-	12.048	9.724	9.907	9.782	10.062	Continuing	Continuing
K16: <i>NON-COMMO ECM TECH DEM</i>	9.480	8.957	11.629	-	11.629	11.777	12.552	12.908	13.271	Continuing	Continuing

Note

FY12 funding increase for Combat ID Demos, EW Integrated Test, and Ground EW Networking Demos.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates electronic warfare (EW) technologies intended to deny, disrupt, locate, or destroy the enemy's command, control, and communications (C3) systems and intelligence, surveillance and reconnaissance assets. This PE matures both countermeasures (CM) and counter-countermeasures (CCM) to deny the enemy the use of their systems while protecting US assets from enemy deception and jamming. Project K12 funds congressional special interest items. Project K15 matures and demonstrates technologies to locate and exploit enemy communication systems including computer networks. Project K16 matures and demonstrates multifunctional EW capability to enhance platform survivability (jamming) and the detection, identification and geo-location of emitters of interest to provide near real-time situational awareness to the commander.

Work in this PE is complimentary of PE 0602270A (EW Techniques), PE 0602120A (Sensors and Electronic Survivability), and PE 0603772A (Advanced Tactical Computer Science), and fully coordinated with PE 0603313A (Missile and Rocket Advanced Technology) and PE 0603003A (Aviation Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Monmouth, NJ and Aberdeen Proving Ground, MD.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	21.877	18.350	18.654	-	18.654
Current President's Budget	23.766	18.350	23.677	-	23.677
Total Adjustments	1.889	-	5.023	-	5.023
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	2.387	-			
• SBIR/STTR Transfer	-0.498	-			
• Adjustments to Budget Years	-	-	5.023	-	5.023

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>	PROJECT K12: <i>EW Demonstrations (CA)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
K12: <i>EW Demonstrations (CA)</i>	5.172	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Electronic Warfare Demonstrations.

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

	FY 2010	FY 2011	FY 2012
<p>Title: ALQ-211 Networked EW Controller</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed software algorithms and on-board/off-board networking capability for advanced radar warning receiver (RWR) and electronic countermeasures (ECM) systems deployed on rotary wing aircrafts to enable the sharing of RF threat warning and situation awareness data among combat team elements.</p>	0.796	-	-
<p>Title: Advanced Ground Electronic Warfare & Signals Intelligence System</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a next generation system that can be used to detect & jam enemy communications, improvised explosive devices (IEDs), and other EW threats.</p>	1.989	-	-
<p>Title: Fourth GEN Wireless Exploitation</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed technology to improve communication and intelligence gathering.</p>	2.387	-	-
Accomplishments/Planned Programs Subtotals	5.172	-	-

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

N/A

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>	PROJECT K12: <i>EW Demonstrations (CA)</i>

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>				PROJECT K15: <i>ADVANCED COMM ECM DEMO</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
K15: <i>ADVANCED COMM ECM DEMO</i>	9.114	9.393	12.048	-	12.048	9.724	9.907	9.782	10.062	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies to locate and identify modern tactical battlefield enemy and blue force (friendly) radio frequency (RF) communications, radars, and computer networks and nodes. This project enables uninterrupted air and ground based intelligence collection and long range targeting operations in a hostile electromagnetic and cyber environment. This project matures and demonstrates communications countermeasure (CM) and counter-countermeasure (CCM) technologies to first intercept, identify, and locate tactical communications, then degrade threat-computer networks and their components.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications - Electronics Research, Development, and Engineering Center (CERDEC), Ft. Monmouth NJ and Aberdeen Proving Ground, MD.

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

	FY 2010	FY 2011	FY 2012
Title: Offensive Operations	4.557	4.696	7.307
Description: This effort matures and demonstrates integrated electronic attack (EA) and computer network operations (CNO) technologies to execute force protection (FP), EA, electronic surveillance (ES), and signals intelligence (SIGINT) missions in a dynamic, distributed and coordinated fashion. This results in the capability to engage a multitude of diverse multi-node, multi-waveform, multi-platform and cyber (internetworked computers) targets while maximizing overall network efficiency and effectiveness while preserving blue force/non-combatant communications. Work being accomplished under PE 0603270A/project K16 compliments this effort.			
FY 2010 Accomplishments: Devised and Coded algorithms for distributed scheduling and predicted impact; devised and coded high-fidelity models of next generation techniques to include lethal effects and threat/node characterization.			
FY 2011 Plans: Enhance system baseline for distributed operation; focus techniques development on threat priorities; identify and implement EW asset and network load balancing techniques to ensure effective and efficient operation; develop techniques to ensure			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>	PROJECT K15: <i>ADVANCED COMM ECM DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>coordination and interoperability with Counter Remote Control Improvised Explosive Device (RCIED) Electronic Warfare (CREW) systems.</p> <p>FY 2012 Plans: Will continue fabrication and coding of integrated networked EW technologies and techniques to address current and emerging threat priorities; will complete network load balancing and resource management techniques to aid in this integration; will refine and integrate real-time, On-The-Move (OTM) direction finding / Geolocation technologies; will demonstrate EW technologies in a distributed Comms-EW mission at various levels of interoperability with network registered assets (e.g., coexistence, interoperation, and fully integrated) in conjunction with an existing FP mission. Possible demonstration scenario: an individual EW asset acquires three threat signals but is only able to address and defeat one of them due to constraints (e.g., power, bandwidth, or etc.). Because all three detections are reported to the network, other EW assets can address and defeat the two outstanding signals.</p>				
<p>Title: Stand-off Non-Cooperative Multi-Intelligence Technologies</p> <p>Description: This effort matures and demonstrates technologies to detect, identify, map, and display structural layouts, identify and locate personnel, RF devices and anomalies located within structures and complex terrain to provide dismounted and remote users with the capability to conduct standoff intelligence, surveillance and reconnaissance in a three dimensional urban battlespace.</p> <p>FY 2010 Accomplishments: Analyzed and designed optimum sensor mix to identify and locate personnel, RF devices, and anomalies as well as detect structural layouts; devised and coded software algorithms for sensor data fusion and sensor hardware; matured modeling and simulation to aid in assessing sensors for determining optimum sensor mix.</p> <p>FY 2011 Plans: Improve and implement new algorithms and techniques for detection of slow-moving and stationary personnel inside structures and reduce false positives due to multipath signal propagation in urban environments; leverage data from IED efforts to develop algorithms that would allow through-the-wall detection of personnel carrying weapons and explosive devices; assess/leverage recent developments in 3-D visualization and mapping efforts and apply radio frequency detection techniques as necessary to selected ground radars and/or their ground stations.</p> <p>FY 2012 Plans: Will integrate and demonstrate software, algorithms and techniques that provide stand-off sense-through-the-wall, counter-cover/concealment/camouflage, and denial-and-deception as pre-planned product improvement increments into PEO Soldier/PM Soldier Sensors & Lasers hand held devices; will demonstrate target identification and discrimination technologies (e.g., RF measures</p>		4.557	4.697	4.741

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>		PROJECT K15: <i>ADVANCED COMM ECM DEMO</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
and signals intelligence appliques, personnel detection and fused reporting) against select modern RF emitter threats, RCIEDs and other targets with low or indistinct emissions for both airborne and ground based platforms.					
Accomplishments/Planned Programs Subtotals			9.114	9.393	12.048
C. Other Program Funding Summary (\$ in Millions) N/A					
D. Acquisition Strategy N/A					
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>				PROJECT K16: <i>NON-COMMO ECM TECH DEM</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
K16: <i>NON-COMMO ECM TECH DEM</i>	9.480	8.957	11.629	-	11.629	11.777	12.552	12.908	13.271	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates non-communication, multi-functional electronic warfare (EW) capabilities that enhance the survivability of Army air and ground platforms and dismounted forces. This project matures and demonstrates radio frequency (RF), infrared (IR) and electro-optical (EO) sensor and jamming source technologies to detect, locate, deceive, and neutralize (jam) booby traps, radar-directed target acquisition systems, target-tracking sensors, surface-to-air missiles (SAMs), air-to-air missiles (AAMs), and top-attack and electronically-fuzed munitions. This project also matures and demonstrates electronic support (ES) technologies to detect, identify, and geolocate emitters of interest from an effective standoff distance and provide near real-time situational awareness.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronic Research, Development, and Engineering Center (CERDEC), Ft. Monmouth NJ and Aberdeen Proving Ground, MD, and the Army Research Lab, Adelphi MD.

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

	FY 2010	FY 2011	FY 2012
Title: Distributed Aperture Infrared Countermeasures (DAIRCM) Technologies	4.642	4.405	4.444
Description: This effort matures and demonstrates an integrated laser source, distribution system, and beam director that support multi-function helicopter protection with an integrated cueing capability.			
FY 2010 Accomplishments: Aligned a non-mechanical pointer tracker with a multi-band IRCM laser. The pointer tracker scanned areas of interest cued by various missile warning systems and detected the incoming threat.			
FY 2011 Plans: Complete design of closed loop IRCM techniques and multi-band laser demonstrator; integrate advanced two color IR missile warning capability to improve overall demonstrator performance with high probability of detection/low false alarm, while the pointer-tracker expands the mission profile by increasing pointer-tracker reliability and permits simultaneous multiple threat engagement; develop target identification database for mission post analysis; finalize digital threat-warning hardware design; perform assessment on correlation algorithms and architecture.			
FY 2012 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>		PROJECT K16: <i>NON-COMMO ECM TECH DEM</i>
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will conduct field demonstration of single modular, compact pointer tracker capability with a multiband laser jammer and an advanced 2-color missile warner capable of searching and defeating multiple engagements of enemy EO/IR threats; will demonstrate this capability against a representative advanced infrared man-portable air defense system.				
<p>Title: Advanced Tactical Radio Frequency Countermeasures (ATRFCM) Technologies</p> <p>Description: This effort matures and demonstrates an integrated EW/direction finding system for the protection of platforms from emerging RF threats. Work accomplished under PE 0602120A/project H15, PE 0602270A/project 906, and PE 0603270A/project K15 complements this effort.</p> <p>FY 2010 Accomplishments: Improved and demonstrated wideband frequency waveform generators for higher spectral purity and modulation flexibility, wideband receivers capable of high speed, dynamic signal demodulation and data collection, and efficient high-power RF amplifiers for improved EW/communications compatibility; began fabrication of a working brassboard for lab and field assessments; fabricated integrated and distributed packaging for improved vehicle integration and thermal performance.</p> <p>FY 2011 Plans: Optimize platform protection capabilities through the coordination of real-time dynamic antenna selection; demonstrate real time on-the-move direction finding and geolocation capabilities that complement targeting and cueing activities of overarching force protection and Comms EW missions to support a common operating picture</p> <p>FY 2012 Plans: Will demonstrate a distributed, networked, multi-platform (air and ground) EW framework enabling the coordinated detection, geolocation, reporting, and engagement of multiple diverse threat waveforms; will demonstrate automatic synchronization of EW framework with blue force communications to deconflict threats from friendly forces for improved survivability and situational awareness.</p>		4.838	4.552	4.685
<p>Title: Combat ID Technology Demonstrations</p> <p>Description: This effort matures and demonstrates real time Combat Identification technologies for light weight tactical vehicles and Soldiers. Work accomplished under PE 0602120A/project H15 compliments this effort.</p> <p>FY 2012 Plans: Will leverage light vehicle demonstration to complete final waveform modifications and select Software Radio Waveform interrogation approach for coding onto Joint Tactical Radio System platform.</p>		-	-	2.500
Accomplishments/Planned Programs Subtotals		9.480	8.957	11.629

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270A: <i>Electronic Warfare Technology</i>	PROJECT K16: <i>NON-COMMO ECM TECH DEM</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	83.649	84.553	90.602	-	90.602	77.540	72.921	54.201	59.679	Continuing	Continuing
206: <i>MISSILE SIMULATION</i>	3.384	3.502	3.554	-	3.554	3.612	3.677	3.644	3.524	Continuing	Continuing
263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>	40.861	42.002	60.716	-	60.716	61.086	62.528	38.110	34.829	Continuing	Continuing
550: <i>COUNTER ACTIVE PROTECTION</i>	7.831	8.547	7.522	-	7.522	0.008	0.009	0.009	4.100	Continuing	Continuing
704: <i>Advanced Missile Demo</i>	7.509	18.418	8.810	-	8.810	4.834	6.707	12.438	17.226	Continuing	Continuing
G03: <i>Area Defense Advanced Technology</i>	1.920	12.084	10.000	-	10.000	8.000	-	-	-	Continuing	Continuing
NA6: <i>Missile and Rocket Initiatives (CA)</i>	22.144	-	-	-	-	-	-	-	-	Continuing	Continuing

Note
 FY12 funding increase for Indirect Fire Protection Capability (IFPC) Technology Development.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates advanced missile technologies to enhance weapon system lethality, survivability, agility, deployability, and affordability. This PE focuses on smaller, lighter weight, more affordable missiles. This PE supports high fidelity simulations for advanced tactical missiles and interceptors (project 206); missile and interceptor components with capabilities for locating targets in clutter, precision guidance, high speed missile flight, and missile communications, command, and control (project 263); guided interceptors to work with ground combat vehicle active protection systems (project 550); technologies to detect and track rocket, artillery, and mortar threats (project 704); and technologies required for missile-based deployable force protection as well as defense against unmanned aerial vehicles and rotary wing aircraft (project G03). Project NA6 funds congressional special interest items.

Work in this PE is complimentary to PE 0602303A (Missile Technology), and is fully coordinated with PE 0603003A (Aviation Advanced Technology), PE 0603270A (Electronic Warfare Technology), PE 0602624A (Weapons and Munitions Technology), PE 0603004A (Weapons and Munitions Advanced Technology), and PE 0603005A (Combat Vehicle and Automotive Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC) located at Huntsville, AL.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	86.559	84.553	73.859	-	73.859
Current President's Budget	83.649	84.553	90.602	-	90.602
Total Adjustments	-2.910	-	16.743	-	16.743
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.796	-			
• SBIR/STTR Transfer	-2.114	-			
• Adjustments to Budget Years	-	-	16.743	-	16.743

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army								DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>				PROJECT 206: <i>MISSILE SIMULATION</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
206: <i>MISSILE SIMULATION</i>	3.384	3.502	3.554	-	3.554	3.612	3.677	3.644	3.524	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced modeling and simulation tools for missile design and analysis. Evaluation of missile technology by means of modeling and simulation provides a cost-effective method that supports missile maturation throughout weapon system life cycles. This effort permits a reduction in the number of flight tests required for programs of record as well as improves the confidence of flight test readiness and probability of flight test success.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center, (AMRDEC) Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
Title: Missile Simulation	3.384	3.502	3.554
Description: This effort designs, matures, and demonstrates advanced simulation technologies to support missile design, analysis, and evaluation including Hardware-in-the-Loop (HWIL) simulation, missile component and system simulations, and simulations to support missile design.			
FY 2010 Accomplishments: Integrated and evaluated performance of the following components: common HWIL computing and interface capabilities, personal computer based scene generation technology, a short-wave infrared projector, facility monitor technology, 6-degree-of-freedom simulations, a signal injection system, and seeker hardware integration technology; designed a sample interface for the HWIL laser radar (LADAR) projection system; integrated infrared solar source designed under PE 0602303A into the HWIL facility to analyze solar implications on missile system performance; and designed a visualization environment to parametrically evaluate art-of-the-possible missile design capabilities.			
FY 2011 Plans: Enhance the common HWIL computing capability to support data-intensive LADAR and radar projection seeker simulations; continue maturation of seeker signal injection for active radar and LADAR seekers; continue improvements to the solar simulator; continue design of a visualization environment capability to parametrically evaluate missile system performance.			
FY 2012 Plans: Will continue simulation maturation to improve run-time performance of scene generators; will improve HWIL multi-mode scene generation capabilities; will increase standardization of HWIL interfaces to reduce integration time of different guidance systems;			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 206: <i>MISSILE SIMULATION</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
will increase fidelity of real-time technical and programmatic modeling and simulation tools (visualization and fast-running models); and will leverage advancements in computer processing capabilities to improve fidelity and runtime of simulations.			
Accomplishments/Planned Programs Subtotals	3.384	3.502	3.554

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603313A: <i>Missile and Rocket Advanced Technology</i>				263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>	40.861	42.002	60.716	-	60.716	61.086	62.528	38.110	34.829	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced missile and interceptor technologies, such as seekers, guidance and controls, propulsion, and airframes . The project goal is to reduce the cost per kill of precision guided missiles. This project matures technologies from PE 0602303A and directly supports systems managed by the Program Executive Officer for Missiles and Space.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Technology for Non-Line-of-Sight Launch System (NLOS-LS) Variants</p> <p>Description: This effort focuses on demonstrating technologies that leverage the NLOS-LS Container Launch Unit (C/LU) to provide a versatile mix of fires for defeat of conventional and asymmetrical threats in all environments.</p> <p>FY 2010 Accomplishments: Designed and demonstrated critical components to support concept refinement and sample fabrication of NLOS-LS variant missiles capable of rapid, precision deployment of lethal and non-lethal payloads. Performed subsystem and system-level evaluation in a laboratory environment. Performed an evaluation of payload delivery feasibility through proof-of-principle flight demonstrations and high fidelity simulations. Investigated, identified, and coordinated design interfaces for selected high payoff payload candidates; evaluated and matured the most promising interfaces to enable integration into the NLOS-LS variant.</p>	4.269	-	-
<p>Title: Technology for Guided Missiles and Interceptors</p> <p>Description: This effort designs technologies for highly responsive missiles and interceptors. This effort matures and demonstrates guidance and control, seeker, propulsion, and airframe technologies. This effort compliments the: Enhanced Precision Interceptor Technology, Guided Interceptor Technology for Defense against RAM, Hit-to-Kill Interceptor Technology for Defense against RAM (PE 0603313, Project 263) and Kinetic Energy Active Protection System Guided Interceptor (PE 0603313, Project 550).</p> <p>FY 2011 Plans:</p>	-	7.219	5.674

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Design and demonstrate guidance, control, seeker, propulsion, and aerodynamic technologies in support of missile-based interceptor designs for force protection systems; design technologies to support highly responsive guidance of tactical interceptors to defeat high velocity threats.</p> <p>FY 2012 Plans: Will continue efforts to design and demonstrate guidance, control, propulsion, and airframe technologies to enable a highly responsive interceptor to defeat incoming RAM threats; will design small radar frequency seeker technologies capable of guiding an interceptor to incoming RAM threats; will integrate these technologies with guided interceptor designs for flight demonstration; and will update designs based on flight demonstration results.</p>				
<p>Title: Applied Smaller, Lighter, and Cheaper (SLC) Munition Components</p> <p>Description: This effort designs, fabricates, and demonstrates technology for increasingly smaller, lighter, and cheaper munition components to enhance current system capabilities against asymmetric threats. These technologies will transition to current and next generation small precision munitions. This effort matures and transitions technologies developed in PE602303A.</p> <p>FY 2010 Accomplishments: Fabricated, integrated, and functionally evaluated composite Joint Air-to-Ground Missile (JAGM) guidance electronics unit (GEU) housing for improving thermal dissipation; completed image-based stabilization/people tracking subsystems for non-gimbaled electro-optical seeker systems for small precision munitions; conducted a static and dynamic evaluation of JAGM electronic safe and arm device (ESAD) and completed the technical data package of the design; and down-selected Tube-launched, Optically-tracked, Wire-guided (TOW) rate sensor package for missile guidance to be flight demonstrated.</p> <p>FY 2011 Plans: Demonstrate image-based stabilization/tracking algorithms using captive flight; conduct static and dynamic evaluations of high performance insensitive munition propulsion systems; perform functional and environmental evaluation of composite JAGM sample GEU housing; demonstrate advanced interconnections in a representative small precision munition processor; and fabricate and field demonstrate form factored small semi-active laser seeker for small precision munitions.</p> <p>FY 2012 Plans: Will complete design of composite missile propulsion casing and perform static performance evaluation; will complete design of common ESAD in Javelin configuration; and will design uncooled state-of-the-art infrared seeker design and conduct captive flight demonstration in support of Javelin upgrades.</p>		7.176	11.656	8.000
<p>Title: Small Organic Precision Munition Integrated Technology Demonstration</p>		-	-	11.000

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort designs, fabricates, integrates, and flight demonstrates critical components to determine system-level performance of a small organic precision munition to enable small units to organically dominate asymmetric threats in complex terrain. This effort matures and demonstrates technology from PE602303A and the Applied Smaller, Lighter, and Cheaper Munition Components effort.</p> <p>FY 2012 Plans: Will integrate and flight demonstrate image stabilization and people tracking on a surrogate munition platform; will complete the design, fabricate, and conduct dynamic evaluations of a small height of burst sensor package to provide warhead effects against soft targets; will fabricate, integrate, and demonstrate a small warhead with improved effects against asymmetric threats; and will characterize the performance of the state-of-the-art in small seekers for guidance to targets in high clutter environments, digital data-links to enable the Warfighter to communicate with the munition while in flight, and power sources to enable longer operation.</p>				
<p>Title: Close Combat Networking of Weapons and Sensors</p> <p>Description: This effort matures and demonstrates enabling technology to provide network lethality capability for transition to Javelin and Tube-launched, Optically-tracked, Wire-guided (TOW) missile systems to increase Warfighter lethality, survivability, and situational awareness.</p> <p>FY 2010 Accomplishments: Completed and fully integrated all mission application enhancements with sample networked TOW Improved Target Acquisition System (ITAS) and networked Javelin Command Launch Unit (CLU) with strap-on Far Target Locator; performed system-level evaluation; performed CLU and ITAS network integration; conducted cooperative networked TOW ITAS and Javelin CLU capability demonstration in September 2010.</p>		5.362	-	-
<p>Title: Multi-Mission/Multi-Purpose Single Missile Propulsion</p> <p>Description: This effort matures and demonstrates advanced missile propulsion technology that provides longer ranges, increased mission flexibility, and shorter flight times while increasing system insensitive munitions capability in air-to-ground, ground-to-ground, and ground-to-air roles for transition to PEO Missiles & Space.</p> <p>FY 2010 Accomplishments: Completed performance evaluation of missile motor critical components, selected the best technical approach, and began design, analysis, and fabrication of flight-ready motor hardware for static demonstrations.</p> <p>FY 2011 Plans:</p>		4.696	3.382	4.363

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Complete static demonstrations of missile motors over operational temperature range; begin fabrication of flight-weight hardware assets for the best technical approach in order to conduct flight demonstrations. FY 2012 Plans: Will complete fabrication of best technical approach for demonstration; and will integrate the propulsion system in a controlled flight vehicle for demonstration of improved insensitive munition capabilities.				
Title: Defense against Rockets, Artillery, and Mortars (RAM) Description: This effort demonstrates an integrated launch system capable of 360 degree hemispherical protection from RAM threats. This effort is complementary to Enhanced Precision Interceptor Technology and Technical Fire Control Technology. Beginning in FY12, this effort will be captured in the Guided Interceptor Technology for Defense against RAM and Hit-to-Kill Interceptor Technology for Defense against RAM efforts. FY 2010 Accomplishments: Completed final designs of vertical launch and pitch-over components; integrated the launcher and pitch-over apparatus with the interceptor and technical fire control components for system level Hardware-in-the-Loop (HWIL) evaluation; and updated the vertical launch and pitch-over component designs, software, and simulations based on evaluation results. FY 2011 Plans: Continue system-level HWIL evaluation to verify required performance; fabricate components and integrate for guided flight demonstrations against single RAM targets; update the vertical launch and pitch over designs and system simulation based on evaluation results.		4.850	4.891	-
Title: Enhanced Precision Interceptor Technology Description: This effort demonstrates two technically different missile-based interceptor concepts with the required accuracy and lethality to defeat rocket, artillery, and mortar (RAM) threats. This effort conducts flight demonstrations of a guided missile-based interceptor with a high explosive warhead and a hit-to-kill guided missile-based interceptor against single and multiple simultaneous RAM threats in the required timeline to protect ground forces. This effort is complementary to the Defense against RAM effort and integrates technology developed in the Technology for Guided Missiles and Interceptors. Beginning in FY12, this effort will be captured in the Guided Interceptor Technology for Defense against RAM and Hit-to-Kill Interceptor Technology for Defense against RAM efforts. FY 2010 Accomplishments:		7.737	7.922	-

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Completed interceptor component final designs, fabrication, and performance evaluation; integrated interceptor components and conducted system-level Hardware-in-the-Loop (HWIL) evaluation; and updated the interceptor designs and simulations based on the evaluation results.</p> <p>FY 2011 Plans: Fabricate interceptors for guided flight demonstrations against single RAM targets and perform pre-flight HWIL evaluation on each interceptor; continue system-level HWIL evaluation and prepare interceptors for guided flight demonstrations; and update the interceptor design and system simulation based HWIL evaluation results.</p>				
<p>Title: Technical Fire Control Technology</p> <p>Description: This effort demonstrates technical fire control technology necessary to generate and execute a firing solution for defeat of rocket, artillery, and mortar (RAM) threats in the required timeline to protect ground forces. Complimentary work is performed in the Defense against RAM, Guided Interceptor Technology for Defense against RAM, Hit-to-Kill Interceptor Technology for Defense against RAM, and Counter RAM Tracking and Fire Control (PE 0603313 Project 704) efforts.</p> <p>FY 2010 Accomplishments: Completed final designs, fabrication, and performance evaluation of technical fire control components and software; integrated technical fire control components with interceptor to support system-level Hardware-in-the-Loop (HWIL) evaluation; and updated the technical fire control node design, software, and simulations based on evaluation results.</p> <p>FY 2011 Plans: Fabricate one technical fire control node for guided flight demonstration against single RAM targets; mature technical fire control software and integrate technical fire control node with the interceptor components to support system-level HWIL evaluation to verify correct fire control solution and launch command are generated; and update the technical fire control design and system simulation based on HWIL evaluation results.</p> <p>FY 2012 Plans: Will complete fabrication of a technical fire control node for each interceptor flight demonstration; will integrate technical fire control components with interceptor guidance section and tracking and fire control system components for pre-flight evaluation in HWIL; will fully integrate technical fire control hardware and software with the tracking and fire control sensor to obtain incoming RAM threat state information; integrate technical fire control with interceptors to provide interceptor control for guided flight demonstrations; will conduct guided flight demonstrations using technical fire control nodes to control each counter RAM interceptor through live-fire shoot down of single RAM threats; and will update technical fire control design and system simulation based on HWIL evaluation and flight demonstration results.</p>		6.771	6.932	6.835
Title: Guided Interceptor Technology for defense against Rockets, Artillery, and Mortars		-	-	11.976

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort demonstrates a guided missile-based interceptor system with a high explosive warhead initially focused to defeat rockets, artillery, and mortars (RAM) threats with the potential for precision ground-to-ground applications. This effort designs, fabricates, evaluates, and flight demonstrates a guided missile-based interceptor and launch unit. The complementary efforts: Technical Fire Control Technology provides the interceptor with a firing solution and launch command and Counter RAM Tracking and Fire Control, in PE 0603313A Project 704, tracks the RAM threat. Beginning in FY12, this effort combines the Defense against RAM and Enhanced Precision Interceptor Technology efforts to provide more detail on the two technically different missile-based counter-RAM systems that are being flight demonstrated.</p> <p>FY 2012 Plans: Will update guided interceptor and launch system designs based on hardware-in-the-loop (HWIL) evaluation; will integrate components and fabricate interceptors and a launch system for flight demonstration against single RAM threat; will conduct pre-flight HWIL evaluation of each guided interceptor to ensure successful flight demonstration; will integrate the interceptor and launch system with the technical fire control node and tracking and fire control system; will flight demonstrate integrated interceptors, launch system, technical fire control node, and tracking and fire control system capability to defeat single RAM threats in flight within the required timeline; will update designs and system simulation based on flight demonstration results.</p>				
<p>Title: Hit-to-Kill Interceptor Technology for Defense against Rockets, Artillery, and Mortars</p> <p>Description: This effort demonstrates a compact, radar frequency guided hit-to-kill missile-based interceptor initially focused to defeat rockets, artillery, and mortar (RAM) threats in flight with the potential for use on air launched platforms, small weapons platforms, and ground-to-ground applications. This effort designs, fabricates, evaluates, and flight demonstrates a hit-to-kill counter RAM system consisting of interceptors and a launch system. The complementary efforts: Technical Fire Control Technology provides the firing solution and launch command and Counter RAM Tracking and Fire Control, PE 0603313A Project 704, provides tracking of the RAM threat for intercept. Beginning in FY12, this effort combines the Defense against RAM and Enhanced Precision Interceptor Technology efforts to provide more detail on the two technically different missile-based counter-RAM systems that are being flight demonstrated.</p> <p>FY 2012 Plans: Will update the hit-to-kill interceptor and launch system designs based on hardware-in-the-loop (HWIL) evaluation; will integrate components and fabricate interceptors and launch system for flight demonstration; will conduct pre-flight HWIL evaluation of each hit-to-kill interceptor to ensure successful flight demonstration; will integrate the interceptor and launch system with the technical fire control node and tracking and fire control system; will flight demonstrate the ability of the integrated interceptors, launch</p>		-	-	12.868

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 263: <i>FUTURE MSL TECH INTEGR(FMTI)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
system, technical fire control node, and tracking and fire control system to defeat single RAM threats in flight within the required timeline; will update designs and system simulation based on flight demonstration results.			
Accomplishments/Planned Programs Subtotals	40.861	42.002	60.716

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 550: <i>COUNTER ACTIVE PROTECTION</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
550: <i>COUNTER ACTIVE PROTECTION</i>	7.831	8.547	7.522	-	7.522	0.008	0.009	0.009	4.100	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates integrated survivability technologies and techniques for lightweight combat platforms including light armored vehicles, tactical wheeled vehicles, and helicopters. Efforts include the development of guided interceptors for active protection systems capable of defeating tank-fired large caliber anti-armor threats, anti-tank guided missiles and long range rocket propelled grenades. Work in this project is in collaboration with PE 0602624A (Weapons and Munitions Technologies) Project H28, PE 0603004 (Advanced Munitions Demonstration), and PE 0603005A (Combat Vehicle and Automotive Advanced Technology) Project 221. This project complements work done on adaptive infrared suppressor and acoustic signature technologies matured in the PE 0603003A (Aviation Advanced Technology) Project 313. This effort is building on the expertise gained through support of rockets, missile, sensors, and active control technology to create innovative solutions for survivability.

The cited work is consistent with the Department of Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
Title: Kinetic Energy Active Protection System (KEAPS) Guided Interceptor	7.831	8.547	7.522
Description: This effort designs, fabricates, and flight demonstrates an interceptor to defeat threats to combat vehicle survivability focusing on tank fired kinetic energy threats. This effort demonstrates interceptor performance against kinetic energy tank rounds through a series of guided flight demonstrations incrementally integrating key components as their designs mature.			
FY 2010 Accomplishments: Conducted guided flight demonstrations to evaluate guidance accuracy under increasing degrees of launch error and electronic safe and arm device (ESAD) performance; integrated the target detection device (TDD) into guided interceptor for flight demonstration; conducted dynamic/dynamic warhead evaluation to verify warhead performance against kinetic energy tank rounds.			
FY 2011 Plans: Conduct guided flight demonstrations against live threats to evaluate TDD performance limits; integrate interceptor and conduct guided flight demonstrations to verify the interceptor can navigate to the intercept point; and integrate warhead into interceptor.			
FY 2012 Plans:			

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 550: <i>COUNTER ACTIVE PROTECTION</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Will continue flight demonstration of interceptors with the TDD integrated; will fabricate interceptors with seeker, ESAD, TDD, and warhead integrated to demonstrate the capability to defeat tank fired kinetic energy rounds in flight; will complete full horizontal launch end-to-end flight demonstrations with an integrated warhead demonstrating guidance to the intercept point of tank fired kinetic energy round.			
Accomplishments/Planned Programs Subtotals	7.831	8.547	7.522

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603313A: <i>Missile and Rocket Advanced Technology</i>				704: <i>Advanced Missile Demo</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
704: <i>Advanced Missile Demo</i>	7.509	18.418	8.810	-	8.810	4.834	6.707	12.438	17.226	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures advanced missile system concepts and related hardware to enhance weapon system lethality, survivability, agility, versatility, deployability, and affordability for defense against the future air and ground, armored and non-armored threats.

The cited work is consistent with the Department of Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Counter Rockets, Artillery, Mortars (RAM) Tracking and Fire Control</p> <p>Description: This effort matures and demonstrates system technology to provide 360 degree, near hemispherical coverage for tracking and intercept of RAM threats. This effort determines the trajectory and location of the incoming RAM threat and feeds that information to the technical fire control node to generate a firing solution. Complementary work is conducted in the Technical Fire Control Technology effort in PE 0603313A Project 263.</p> <p>FY 2010 Accomplishments: Completed fire control system assembly fabrication and began to integrate with the other system components; conducted laboratory evaluations to demonstrate the fire control system can track RAM targets with the required accuracy.</p> <p>FY 2011 Plans: Complete fabrication of the fire control system hardware and software for guided flight demonstrations of interceptors; evaluate tracking and fire control system accuracy through modeling and simulation to verify it meets the required performance; and update the tracking and fire control system designs and system simulations based on evaluation results.</p> <p>FY 2012 Plans: Will update tracking and fire control system hardware and software designs; will integrate tracking and fire control systems with technical fire control nodes to provide RAM threat state information to support live-fire guided flight demonstrations of interceptors to shoot down a single RAM threat; will conduct demonstrations to verify the tracking and fire control system can detect incoming</p>	7.509	11.918	8.810

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT 704: <i>Advanced Missile Demo</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
RAM threats and provide the technical fire control node with a firing solution; will update the system simulation based on flight demonstration results.				
Title: Counter Rocket, Artillery, and Mortar (RAM) Interceptor Integration Description: This effort integrates technologies from Defense against RAM, PE 0603313A Project 263 and performs system-level Hardware-in-the-Loop (HWIL) evaluation to verify system performance. FY 2011 Plans: Support system-level HWIL evaluation. Integrate technologies for two missile concept designs to perform guided flight demonstrations against single RAM threats.		-	6.500	-
Accomplishments/Planned Programs Subtotals		7.509	18.418	8.810
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>				PROJECT G03: <i>Area Defense Advanced Technology</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
<i>G03: Area Defense Advanced Technology</i>	1.920	12.084	10.000	-	10.000	8.000	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates Deployable Force Protection missile technology for small command outposts and air defense missile technology to protect against: unmanned aerial vehicles, rotary wing aircraft large caliber rockets, and cruise missiles as well as expands the protection envelope to a division/corps area.

The cited work is consistent with the Department of Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Air Defense Advanced Technology</p> <p>Description: This effort matures and demonstrates missile technology to provide capability for Warfighter force protection against low and slow flying air vehicle threats in all environments without increasing the force structure. This effort leverages activities from PE 0602303A, project 214.</p> <p>FY 2010 Accomplishments: Matured the design of critical components for an air defense capability, performed component evaluation in a laboratory environment, and matured high fidelity simulations.</p> <p>FY 2011 Plans: Continue design and demonstration of critical components; and integrate and demonstrate an air defense system capability in a relevant environment.</p>	1.920	2.084	-
<p>Title: Deployable Force Protection Missile Technology</p> <p>Description: This effort demonstrates affordable missile technology to provide force protection for smaller forward operating bases (FOBs). This effort will integrate existing and developmental missile technology and design novel fire control, guidance, and control systems to use missiles for a force protection role.</p> <p>FY 2011 Plans:</p>	-	10.000	10.000

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT G03: <i>Area Defense Advanced Technology</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011	FY 2012
Demonstrate missile system technologies for affordable effects to provide area protection for smaller FOBs; design guidance, control, actuation, and propulsion technology to enable 360 degree protection; design fire control systems to provide 360 degree protection to a re-configurable protected area using multiple missiles and launchers. <i>FY 2012 Plans:</i> Will integrate missile component technologies into missile systems; will integrate missile system with the fire control systems; Will demonstrate missile and fire control systems individually and will evaluate performance of the combined systems.			
Accomplishments/Planned Programs Subtotals	1.920	12.084	10.000

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>				PROJECT NA6: <i>Missile and Rocket Initiatives (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
NA6: <i>Missile and Rocket Initiatives (CA)</i>	22.144	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Missile and Rocket advanced technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Rapid Response System for Protection of Air and Ground Vehicles</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported development of high data-rate passive infrared (IR) sensor technology to detect, cue, and track threat weapons for active protection technology for aircraft and ground vehicle applications.</p>	2.546	-	-
<p>Title: Long Range Hypersonic Interceptor</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported a study investigating technologies that apply to countering very high speed strike weapons.</p>	1.592	-	-
<p>Title: Advanced Commercial Technology Insertion for Aviation & Missile Research, Development, & Engineering</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Supported development of a system architecture for graphical scene generation for Hardware-in-the-Loop.</p>	3.084	-	-
<p>Title: Army Responsive Tactical Space System Exerciser (ARTSSE)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a system simulation testbed for performance analysis and evaluation of Operationally Responsive Space (ORS) technologies.</p>	2.985	-	-
<p>Title: Captive Carry Sensor Test-Bed</p>	2.388	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603313A: <i>Missile and Rocket Advanced Technology</i>	PROJECT NA6: <i>Missile and Rocket Initiatives (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Developed captive carry platforms for testing of complex guided munitions control units (GCUs) and associated sensors in realistic flight environments.				
Title: Anti-Tamper Research and Development		3.024	-	-
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Provided the research, development, and testing of technologies to reduce or eliminate the threat of reverse-engineering or software extraction from the guidance/avionics package for military aircraft and missiles.				
Title: Waterside Wide Area Tactical Coverage & Homing (WaterWATCH)		3.182	-	-
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Provided capability to continuously monitor waterway perimeters with an integrated/automated multi-phenomenology sensor suite.				
Title: Scenario Generation for Integrated Air and Missile Defense Evaluation		3.343	-	-
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Developed scenarios to support Integrated Air and Missile Defense testing and evaluation.				
Accomplishments/Planned Programs Subtotals		22.144	-	-
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603322A: <i>TRACTOR CAGE</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	11.741	9.986	10.315	-	10.315	10.806	11.006	11.038	11.224	Continuing	Continuing
B92: <i>DB92</i>	11.741	9.986	10.315	-	10.315	10.806	11.006	11.038	11.224	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	-	-	-	-	-
Current President's Budget	11.741	9.986	10.315	-	10.315
Total Adjustments	11.741	9.986	10.315	-	10.315
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-
• Adjustments to Budget Years	11.741	9.986	10.315	-	10.315

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603322A: <i>TRACTOR CAGE</i>	PROJECT B92: <i>DB92</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
B92: <i>DB92</i>	11.741	9.986	10.315	-	10.315	10.806	11.006	11.038	11.224	Continuing	Continuing

Note
Not Applicable

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program (SAP) Annual Report to Congress

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

	FY 2010	FY 2011	FY 2012
Title: .	11.741	9.986	10.315
Description: .			
FY 2010 Accomplishments: SAP			
FY 2011 Plans: SAP			
FY 2012 Plans: SAP			
Accomplishments/Planned Programs Subtotals			
	11.741	9.986	10.315

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	35.765	26.953	31.541	-	31.541	31.566	32.546	33.661	33.806	Continuing	Continuing
608: <i>COUNTERMINE & BAR DEV</i>	24.601	22.022	26.530	-	26.530	26.474	27.362	28.394	28.449	Continuing	Continuing
64C: <i>COUNTERMINE DEMONSTRATIONS (CA)</i>	6.447	-	-	-	-	-	-	-	-	Continuing	Continuing
683: <i>Area Denial Sensors</i>	4.717	4.931	5.011	-	5.011	5.092	5.184	5.267	5.357	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates sensor and neutralization technologies that can be used on ground and/or air platforms to detect, identify, and then mitigate the effects of landmines, minefields, and obstacles. This PE also conducts modeling and simulation activities to assess the effectiveness of detection and neutralization concepts. Project 608 supports the maturation and demonstration of enabling component and subsystems for countermine technologies in the areas of countermine and barrier development, Project 64C funds congressional special interest items, and Project 683 funds efforts on area denial sensors.

Work in this PE is fully coordinated with PE 0602120A (Sensors and Electronic Survivability), PE 0602624A (Weapons and Munitions Technology), PE 0602712A (Countermine Systems), PE 0602784A (Military Engineering Technology) and PE 0603710A (Night Vision Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	34.855	26.953	32.791	-	32.791
Current President's Budget	35.765	26.953	31.541	-	31.541
Total Adjustments	0.910	-	-1.250	-	-1.250
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	1.751	-			
• SBIR/STTR Transfer	-0.841	-			
• Adjustments to Budget Years	-	-	-1.250	-	-1.250

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>	PROJECT 608: <i>COUNTERMINE & BAR DEV</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
608: <i>COUNTERMINE & BAR DEV</i>	24.601	22.022	26.530	-	26.530	26.474	27.362	28.394	28.449	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates countermining technologies for finding and neutralizing surface and buried threats in varying vegetation, soil, weather, and diurnal conditions. Activities include remote/standoff detection of minefields and neutralization of explosive threats, landmines, and minefields. This project also evaluates airborne threat detection sensors and fabricates them for lightweight plug-and-play use, on unmanned aerial systems (UASs) in mission specific applications. Efforts are supported by modeling and simulation assessments to define potential system effectiveness.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Ft. Belvoir, VA. Minefield neutralization efforts are closely coordinated with Navy/US Marine Corps.

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

	FY 2010	FY 2011	FY 2012
Title: Threat Detection and Neutralization for Route Clearance:	10.316	10.365	8.418
Description: This effort demonstrates capabilities to detect and neutralize surface and shallow buried threats on primary and secondary roads from tactical standoff ranges.			
FY 2010 Accomplishments: Demonstrated standoff detection system integration concepts on manned ground vehicles; matured electro optic/infrared (EO/IR) graphical user interface (GUI) algorithms to improve system performance; matured radar fusion algorithms to reduce false alarms; and improved performance of grenade shape charge munitions from PE 0602712A, project H24 for standoff explosive threat neutralization capability.			
FY 2011 Plans: Complete fabrication of prototypes for the standoff detection and standoff neutralization grenade technologies; and perform tests and conduct demonstrations of the brassboards for the standoff detection and standoff neutralization grenade technologies as systems-of-systems concepts.			
FY 2012 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>		PROJECT 608: <i>COUNTERMINE & BAR DEV</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will conduct trade studies to establish system level options for neutralization of individual explosive devices and for mine fields; will validate emerging high energy laser techniques to neutralize individual explosive hazards; will substantiate evolving burst laser techniques to neutralize threats detected by primary sensors.				
<p>Title: Mine and Minefield Detection Payload for Tactical Unmanned Aerial Systems (TUAS):</p> <p>Description: This effort provides the TUAS with a capability to detect explosive threats, threat deployment activity, minefields and homemade explosives (HME).</p> <p>FY 2010 Accomplishments: Performed flight testing/data collections on manned aircraft; matured algorithms based on sensor data collections and analysis; and completed detailed payload design.</p> <p>FY 2011 Plans: Complete demonstrator payload build and sensor integration; complete laboratory evaluation of payload; integrate payload on a manned aircraft; conduct initial flight testing in a relevant environment to baseline payload and target detection performance; and complete the payload and begin testing to verify performance.</p> <p>FY 2012 Plans: Will integrate shortwave infrared (SWIR) into initial payload and integrate the payload on a manned aircraft; will complete baseline aided target recognition (AiTR) integration and conduct initial flight testing in a relevant environment to baseline payload and AiTR detection performance; will optimize payload from test data, perform final verification testing, specify and initiate build of a 3-band longwave infrared (LWIR) demonstrator; perform system design trade studies; conduct concept evaluation exercise with representative sensors.</p>		8.165	5.047	8.402
<p>Title: Threat/Mine Detection for In Road Obstacles:</p> <p>Description: This effort advances ground penetrating radar (GPR) and metal detection (MD) technologies integrated onto vehicles to detect the evolving underbelly threats on primary and secondary roads. This effort leverages the technology results from forward looking radar technology investigations under the Threat Detection and Neutralization for Route Clearance effort.</p> <p>FY 2010 Accomplishments: Completed GPR demonstration; began integration of a combined MD and GPR sensor suite which includes a modular lightweight mount to interface with tactical ground vehicles; and began fabrication of combined metal detection/GPR sensor.</p> <p>FY 2011 Plans:</p>		6.120	6.610	9.710

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>		PROJECT 608: <i>COUNTERMINE & BAR DEV</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Complete fabrication of system demonstrators for the integrated MD/GPR detection technologies; perform tests and conduct demonstrations of a MD/GPR system on a manned ground vehicle. <i>FY 2012 Plans:</i> Will perform size, weight and power (SWaP) analysis and system tradeoff studies for potential sensor payloads for the Pointer Upgraded Mission Ability Unmanned Aerial Vehicle (PUMA UAV) and evaluate complimentary sensors for a ground-based platform; will design a 3-band imaging sensor compatible with a forward motion compensation pointer; will evaluate aided target recognition approaches for compatibility with selected sensors; will conduct concept evaluation exercises of representative air and ground-based sensors using mission scenarios in a relative environment.				
Accomplishments/Planned Programs Subtotals		24.601	22.022	26.530
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE				PROJECT				
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>				64C: <i>COUNTERMINE DEMONSTRATIONS (CA)</i>				
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
64C: <i>COUNTERMINE DEMONSTRATIONS (CA)</i>	6.447	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Countermine advanced technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Advanced Demining Technology</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Provided a suite of robotic and intelligent systems to aid humanitarian efforts in all aspects of landmine and unexploded ordinance (UXO) clearance.</p>	4.696	-	-
<p>Title: Ultra Wideband Active RF Detection of IEDs</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed a sensor capability for ground looking RF detection and real-time discrimination of IED detection.</p>	1.751	-	-
Accomplishments/Planned Programs Subtotals	6.447	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603606A: <i>Landmine Warfare and Barrier Advanced Technology</i>				683: <i>Area Denial Sensors</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
683: <i>Area Denial Sensors</i>	4.717	4.931	5.011	-	5.011	5.092	5.184	5.267	5.357	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates surveillance, command, and control technology components for alternative area protection systems that minimize the risk of injury or loss to non-combatants from exposure to anti-personnel landmines (APLs). The technology includes distributed personnel surveillance systems and command and control systems to be used with man-in-the-loop overwatch fires. This project uses modeling and simulation to evaluate new concepts and modify doctrine. This project also fabricates components, as well as system architectures and conducts evaluations at the system level in field settings.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Area Denial Sensors:</p> <p>Description: This effort provides demonstration of surveillance technology components for area protection systems that minimize the risk of injury or loss to non-combatants from exposure to anti-personnel landmines (APLs).</p> <p>FY 2010 Accomplishments: Continued advancement of personnel detection sensors and algorithm demonstrations in laboratory environment; established and assessed concepts on how to use the sensors with alternative personnel landmine systems.</p> <p>FY 2011 Plans: Fabricate sensor hardware and integrate algorithms into demonstrators; and conduct initial laboratory tests in a simulated relevant environment of next generation sensor and discrimination system.</p> <p>FY 2012 Plans: Will continue the maturation and demonstration of the personnel detection system in an operationally relevant environment; and will validate the detection system components and sensor algorithm for the sensor detection and discrimination of combatants/non-combatants, and image processing for false alarm reduction.</p>	4.717	4.931	5.011
Accomplishments/Planned Programs Subtotals	4.717	4.931	5.011

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603606A: <i>Landmine Warfare and Barrier</i> <i>Advanced Technology</i>	PROJECT 683: <i>Area Denial Sensors</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE								
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603607A: <i>JOINT SERVICE SMALL ARMS PROGRAM</i>								
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	8.683	9.151	7.686	-	7.686	7.576	7.729	7.866	8.012	Continuing	Continuing
627: <i>JT SVC SA PROG (JSSAP)</i>	8.683	9.151	7.686	-	7.686	7.576	7.729	7.866	8.012	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates advanced technologies that integrate into individual and crew served weapons for all Services. This PE supports the maturation and demonstration of Lightweight Small Arms Technologies (LSAT) that offer significantly reduced weight over the currently fielded weapons and ammunition. All efforts are based upon the Joint Service Small Arms Master Plan (JSSAMP), the Joint Capabilities Integration Development System's Small Arms Analysis, and the resulting Capabilities Development Documents for the Services.

Work in this PE is related to and fully integrated with the efforts funded in PE 0602623A (Joint Service Small Arms Program) and PE 0603001 Warfighter Advanced Technology (Warfighter Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the US Army Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ.

B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	8.949	9.151	8.436	-	8.436
Current President's Budget	8.683	9.151	7.686	-	7.686
Total Adjustments	-0.266	-	-0.750	-	-0.750
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.266	-			
• Adjustments to Budget Years	-	-	-0.750	-	-0.750

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603607A: <i>JOINT SERVICE SMALL ARMS PROGRAM</i>	PROJECT 627: <i>JT SVC SA PROG (JSSAP)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
627: <i>JT SVC SA PROG (JSSAP)</i>	8.683	9.151	7.686	-	7.686	7.576	7.729	7.866	8.012	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced technologies that provide greater lethality, target acquisition, fire control, training effectiveness and range at a significantly reduced weight. These technologies lighten the Soldier's load, provide improved battlefield mobility, and reduce logistics burden while maintaining or improving current levels of performance.

Work in this PE is related to and fully integrated with the efforts funded in PE 0602623A (Joint Service Small Arms Program) and PE 0602624A (Weapons and Munitions Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the US Army Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Lightweight Small Arms Systems (LSAS)</p> <p>Description: This effort demonstrates caseless and case telescoped ammunition technologies for specific weapon systems and missions with goals to reduce the weapon and ammo weight, and to reduce training and maintenance costs. Cased telescoped ammunition is a 100% polymer cylindrical shaped case, inside of which are the projectile (i.e., telescoped inward) and the propellant, with a standard mechanical primer located at the base. The caseless cartridge also uses a telescoped bullet arrangement. A specialized High Ignition Temperature Propellant (HITP) provides not only the propulsive energy, but also serves as the cartridge structure and exterior surface.</p> <p>FY 2010 Accomplishments: Demonstrated TRL 5 for both the new caseless ammunition-firing lightweight machine gun and caseless ammunition; began fabrication of 8 cased telescoped ammunition-firing lightweight machine guns as well as 100K rounds of cased telescoped ammo; designed and fabricated lightweight carbine; continued integration of successful components evaluated from PE 0602623A into lightweight machine gun; refined the design of the caseless ammunition formulation and evaluated it in ballistic test fixture.</p> <p>FY 2011 Plans: Take delivery of lightweight machine guns and cased telescoped ammunition to conduct TRL 6 demonstration of tech maturity and military utility; achieve TRL 6 for cased-telescoped ammunition fired from light machine guns; fabricate and evaluate riflescope</p>	7.161	7.397	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603607A: <i>JOINT SERVICE SMALL ARMS PROGRAM</i>		PROJECT 627: <i>JT SVC SA PROG (JSSAP)</i>
B. Accomplishments/Planned Programs (\$ in Millions)				
				FY 2010
				FY 2011
				FY 2012
demonstrator with adaptive zoom lens on lightweight machine gun; conduct TRL 5 demonstration of lightweight cased telescoped carbine.				
<p>Title: Small Arms Technology Assessment and Effectiveness Modeling</p> <p>Description: This task addresses the application of technology component solutions to mitigate identified capability gaps in the JSSAP strategy.</p> <p>FY 2010 Accomplishments: Demonstrated and optimized value of weapon concepts developed for The Infantry Warrior Simulation (IWARS) and small team level One Semi-Automated Force (SAF) Testbed Baseline (OTB) force-on-force simulations that are derived from simulation results obtained previously utilizing these force-on-force effectiveness simulations.</p> <p>FY 2011 Plans: Mature and optimize force-on-force simulations based on results of small arms demonstrations.</p>				1.522
				1.754
				-
<p>Title: Small Arms Weapons and Fire Control Integration</p> <p>Description: The best of the breadboard concepts from the Advanced Fire Control Technology for Small Arms (0602623A/H21) will be integrated into lab demonstrators and evaluated on relevant current (M4, M16, M249, M240) and developmental small arms systems to optimize affordability, target acquisition, fire control, weight, and lethality.</p> <p>FY 2012 Plans: Will mature dynamic target tracking and range finding, as well as adaptive polymer zoom lens technologies; will demonstrate power distribution/sourcing technologies in an integrated weapon and fire control prototype will mature and demonstrate integrated thermal management small arms weapon technologies such as graphite foam and heat pipes.</p>				-
				-
				3.841
<p>Title: Small Arms Grenade Munitions Integration and Evaluation</p> <p>Description: The best of the breadboard concepts from the Advanced Lethality Armament Technology for Small Arms (0602623A/H21) project will be integrated into a 40mm ammunition prototype and evaluated on current (M203, M320, and M32 40mm grenade launchers) small arms systems to optimize affordability, effects, as well as lethality.</p> <p>FY 2012 Plans: Will demonstrate advanced lethality concepts, including course correction, as well as enhanced fragmentation/directionality technologies; will integrate and demonstrate recoil mitigation technologies.</p>				-
				-
				3.845
Accomplishments/Planned Programs Subtotals				8.683
				9.151
				7.686

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603607A: <i>JOINT SERVICE SMALL ARMS PROGRAM</i>	PROJECT 627: <i>JT SVC SA PROG (JSSAP)</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	81.157	39.912	42.414	-	42.414	40.727	41.523	42.933	43.410	Continuing	Continuing
K70: <i>NIGHT VISION ADV TECH</i>	33.855	24.491	25.767	-	25.767	24.076	25.257	25.375	25.517	Continuing	Continuing
K73: <i>NIGHT VISION SENSOR DEMONSTRATIONS (CA)</i>	32.132	-	-	-	-	-	-	-	-	Continuing	Continuing
K86: <i>NIGHT VISION, ABN SYS</i>	15.170	15.421	16.647	-	16.647	16.651	16.266	17.558	17.893	Continuing	Continuing

Note

FY10 funding increase for higher priority efforts.
 FY12 funding increase for Sensor Fusion Technology demos.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates sensor technologies that increase Warfighter survivability and lethality by providing sensor capabilities to acquire and engage targets at longer ranges in complex environments and operational conditions (e.g. day/night, obscured, smoke, adverse weather). This PE pursues technologies that improve the Soldier's ability to see at night, provide rapid wide area search, multispectral aided target detection (AiTD), and enable passive long range target identification (ID beyond threat detection) in both an air and ground test-beds (project K70). This PE also matures and evaluates sensors and algorithms designed to detect targets (vehicles and personnel) in camouflage, concealment and deception from airborne platforms, and provides pilotage and situational awareness imagery to multiple pilots/crew members independently for enhanced crew/aircraft operations in day/night/adverse weather conditions (project K86). Project K73 funds congressional special interest items.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is fully coordinated with efforts in PE 0602709A (Night Vision and Electro-Optics Technology), PE 0602712A (Countermeasure Systems), PE 0602270A (Electronic Warfare Technology), PE 0602120A (Sensors and Electronic Survivability), PE 0603606A (Landmine Warfare and Barrier Advanced Technology), PE 0603774A (Night Vision Systems Advanced Development), PE 0604710A (Night Vision Systems Engineering Development) and PE 0603005A (Combat Vehicle and Automotive Advanced Technology).

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC) /Night Vision and Electronic Sensors Directorate (NVESD), Fort Belvoir, VA.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	72.250	39.912	37.378	-	37.378
Current President's Budget	81.157	39.912	42.414	-	42.414
Total Adjustments	8.907	-	5.036	-	5.036
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	9.999	-			
• SBIR/STTR Transfer	-1.092	-			
• Adjustments to Budget Years	-	-	5.036	-	5.036

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K70: <i>NIGHT VISION ADV TECH</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
K70: <i>NIGHT VISION ADV TECH</i>	33.855	24.491	25.767	-	25.767	24.076	25.257	25.375	25.517	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates high-performance integrated sensor/multi-sensor technologies to increase target detection range, extend target identification range, and reduce target acquisition (TA) timelines for dismounted Soldiers and tactical vehicles against threats that are beyond today's detection ranges or are partially obscured by terrain, weather or other features.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC) /Night Vision and Electronic Sensors Directorate (NVESD), Fort Belvoir, VA.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Weapon Sight Technology</p> <p>Description: This effort develops, integrates, and demonstrates critical components for the next generation of weapon sight systems for mounted and dismounted Soldier use.</p> <p>FY 2010 Accomplishments: Developed and matured optical augmentation (OA) sensor and hardware; began Phase I weapon sight (WS) as defined in design studies and configuration definition; conducted technical evaluation of included technologies; and evaluated and selected the optimum technology demonstrator for system integration.</p> <p>FY 2011 Plans: Continue OA hardware prototype integration for demonstration and user evaluation; begin phase II weapon sight prototype hardware integration of down-selected configurations for dismounted and crew served applications; mature and demonstrate enhancement in Soldier situational awareness through increased target detection and engagement technologies; and conduct laboratory tests and assess the weapon sight system.</p> <p>FY 2012 Plans: Will complete counter surveillance system (CSS) brassboard integration; will demonstrate and conduct user evaluation then transition CSS technology to Program Manager-Soldier Sensors and Lasers (PM-SSL) and PM-Stryker; will complete weapon</p>	5.847	9.470	6.774

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K70: <i>NIGHT VISION ADV TECH</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011
sight brassboard integration; will demonstrate and conduct user evaluations of the weapon sight technology then transition the technology to PM-SSL.			
<p>Title: Urban Sensor Suite</p> <p>Description: This effort develops and integrates 360 degree closed hatch vision capability with real time acoustic and non-real time on-the-move (OTM) moving target indicator (MTI) threat detection and cueing sensors and algorithms, high resolution interrogation sensors (for slew to cue identification), improved resolution driving sensors, and high bandwidth video capture capabilities in urban operations for improved survivability, lethality.</p> <p>FY 2010 Accomplishments: Evaluated threat detection sensors and baseline acoustic cueing, non-real time OTM MTI and slew to cue algorithm performance; integrated baseline detection sensors and acoustic cueing algorithms into vehicle demonstration platform; conducted demonstration of integrated detection and slew capabilities; demonstrated baseline 360 degrees video capture approach for improved situational awareness while OTM; matured and integrated the acoustic cueing sensor system.</p> <p>FY 2011 Plans: Complete development of system architecture, hardware, and software for integrated processing of video and multiple threat detection alerts (acoustic/ MTI); complete integration of improved resolution driving cameras, high resolution slew to cue camera, and weapons fire detection sensors; complete maturation of software for graphical user interface with camera and sensors to assess threat detection and discrimination of imagery analysis; and complete integration, maturation, and demonstration of detection systems on vehicle platform.</p> <p>FY 2012 Plans: Will demonstrate advanced crew stations with the state of the art electro-optic indirect vision systems (high resolution threat interrogation and driving sensors, autonomous threat detection and cueing, and digital video recording and displays); will complete maturation of products to include: sensor interface for target handoff and pointing to/from dismounted Soldiers, high resolution forward looking infrared, image intensified and visual sensors, threat cueing sensors and algorithms for weapons fire detection/location; will develop signal processing algorithms for pixel level sensor fusion and information fusion.</p>		9.510	10.677
<p>Title: Unmanned Tactical Ground Persistent Surveillance and Targeting</p> <p>Description: This effort matures and demonstrates high-performance integrated sensor/multi-sensor technologies to increase local situational awareness and target discrimination capabilities and reduce target acquisition (TA) timelines for dismounted Soldiers, combat vehicles, tactical robots, ground and urban sensors against threats that are beyond today's ranges or discrimination capabilities or are partially obscured by terrain.</p>		-	4.800

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K70: <i>NIGHT VISION ADV TECH</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2012 Plans:</i> Will initiate development of higher performance, lower cost advanced sensor technology and incorporate new sensors into manned and unmanned vehicles, as well as Soldier borne applications, to acquire targets at extreme ranges while reducing the size and power needs to the platform.				
<i>Title:</i> Advanced Sensors for Precision <i>Description:</i> This effort matures and demonstrates technologies that allow combat vehicle commanders and crewmen to detect more rapidly, identify and geo-locate threat targets to enable fire control for platform weaponry. The effort leverages advance infrared imaging technology, 3-dimensional (3-D) imaging sensor techniques, and precise far target location technology to increase target detection range, extended target and reduce target acquisition timelines.		-	-	5.281
<i>FY 2012 Plans:</i> Will mature a 3-D sensor suite with precise target acquisition technology (target identification and location); will demonstrate and validate the performance of precision sensors for combat vehicle target acquisition sighting and fire control system for demonstration onboard a Heavy Brigade Combat Team (HBCT) vehicle.				
<i>Title:</i> Laser Designator Technology <i>Description:</i> This effort leverages US Army investments in low power laser designation technology to provide advanced lightweight target detection and call for fire capability.		17.067	4.344	-
<i>FY 2010 Accomplishments:</i> Completed the fabrication and demonstration of two demonstrators, a 15 micrometer, 640 x 480 cooled Midwave Infrared (MWIR) imager and a 17 micrometer, 640 x 480 uncooled Longwave Infrared (LWIR) imager. Both demonstrators incorporated miniaturized electronics for an integrated far target location (FTL) capability and have an embedded see-spot capability in association with the demonstration of a prototype lightweight clip-on common designator module; continued the development of the Far Target Location Improvement effort by maturing the earth rate azimuth device and the Azimuth and Vertical Angle Module (AVAM) (these modules provide improved accuracy of the azimuth and vertical angle accuracy over the current digital magnetic compass in reducing target location error) for potential insertion into the Joint Effects Targeting System (JETS); began maturation of several efforts in the area of Micro-Electromechanical Systems (MEMS) gyroscope, MEMS accelerometer, fiber optic gyroscopes, and celestial				

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K70: <i>NIGHT VISION ADV TECH</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
navigation design and development to further reduce the size, weight and power requirements for the AVAM devices while maintaining or improving the performance; began design and development of a data collection system that will be used to demonstrate, verify, and validate the operational scenarios for the man portable, handheld far target location systems. FY 2011 Plans: Demonstrate reduced size, weight and power of the Target Location Designation System (TLDS) Azimuth & Vertical Angle Module (AVAM) that matures a far target location (FTL) technology; demonstrate the TLDS technology capabilities simultaneously in a brass-board system; and evaluate the small pixel, large format uncooled MWIR thermal sensor target acquisition.				
Title: Sensor and Information Fusion for Improved Hostile Fire Situational Awareness Description: This effort builds on existing distributed aperture system (DAS) architecture and demonstration hardware to demonstrate mature and evaluate automated pop up target detection algorithms and a 360 degree by 90 degree digital video recording capability with enabling gunfire detection and audible sensing on a vehicle platform. FY 2010 Accomplishments: Completed hardware development efforts; matured and demonstrated driving and situational awareness (SA) indirect vision / drive-by-wire / driver assist design concepts and guidelines, with a local SA display for dismounted Soldiers.		1.431	-	-
Accomplishments/Planned Programs Subtotals		33.855	24.491	25.767
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>				PROJECT K73: <i>NIGHT VISION SENSOR DEMONSTRATIONS (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
<i>K73: NIGHT VISION SENSOR DEMONSTRATIONS (CA)</i>	32.132	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Night Vision advanced technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Hyperspectral Sensors for Improved Force Protection (Hyper-IFP)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Integrated and tested an upgraded shortwave infrared hyperspectral system into the Cerberus architecture/platform.</p>	1.591	-	-
<p>Title: Brownout Situational Awareness Sensor</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Matured real-time 3-D ground imagery to helicopter pilots in brownout landing and takeoff conditions (including lateral drift sensing with visual quantification and audible warning).</p>	2.388	-	-
<p>Title: Night Vision Advanced Technology Research</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed and demonstrated combined midwave and longwave infrared sensor capabilities for the: Q2 airborne turret; hyperspectral sensors for tagging, tracking, and locating technologies that supported the concepts to track terrorists over a wide area once they have been identified; persistent imaging concepts for unmanned/unattended platforms; a thermal imager that can be clipped on to existing image intensifier goggles to provide dismounted forces an IR search capability while retaining night vision capability; development of a 1280 x 1024 pixel Short Wave IR (SWIR) camera with 15 micron pixels and miniaturized camera electronics; provided improved Compact Airborne Spectral Sensor (COMPASS) with enhanced real time processing of collected data as well as a man-portable ground-to-ground sensor package. Developed hyperspectral sensor for single airborne sensor system to be used with a variety of targets.</p>	8.953	-	-
<p>Title: Smart Sensor Supercomputing Center</p>	7.958	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K73: <i>NIGHT VISION SENSOR DEMONSTRATIONS (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Evaluated the robustness of sensor processing software and Real Time computing hardware to be able to pull with high probability of detection and low probability false alarms on dismounted targets in high background clutter.</p>				
<p>Title: Buster Backpack</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Provided an electrically powered fully autonomous, small unmanned aerial system that can be used as a test bed for small gimbaled infrared and day sensors.</p>		0.795	-	-
<p>Title: Enhanced Driver Situational Awareness</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Provided image-based situational awareness to military and/or civilian emergency vehicle drivers in zero-visibility conditions.</p>		0.796	-	-
<p>Title: Microterrain Persistent Surveillance</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Evaluated microterrain remote wireless video surveillance and sensor systems for identifying threats to the Soldier relative to enemy insurgent activities.</p>		1.592	-	-
<p>Title: Compact Airborne Multi-Mission Payload (CAMP)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Evaluated the design criteria for a compact airborne third generation hyperspectral system that can detect, classify and identify targets.</p>		1.592	-	-
<p>Title: Night Vision and Electronic Sensors Directorate</p> <p>Description: This is a Congressional Interest Item.</p>		1.990	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K73: <i>NIGHT VISION SENSOR DEMONSTRATIONS (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> Developed a 1280 x 1024 pixel Short Wave IR (SWIR) camera with 15 micron pixels and miniaturized camera electronics.				
<i>Title:</i> Bradley Third Generation (3rd Gen) Forward Looking Infrared (FLIR) <i>Description:</i> This is a Congressional Interest Item.		4.477	-	-
<i>FY 2010 Accomplishments:</i> Developed the 3rd Gen B-Kit designed to support the modernization effort for the heavy brigade combat team (Abrams and Bradley); integrated 3rd Gen B-Kit technology, including 3rd Gen forwarding infrared, reflective a focal, high-resolution color day television, laser rangefinder, and laser designator, into either the Primary Sight (GPS) for the Abrams Gunner or the Improved Bradley Acquisition Subsystem (IBAS) Target Acquisition Subsystem (TAS).				
Accomplishments/Planned Programs Subtotals		32.132	-	-
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K86: <i>NIGHT VISION, ABN SYS</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
K86: <i>NIGHT VISION, ABN SYS</i>	15.170	15.421	16.647	-	16.647	16.651	16.266	17.558	17.893	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates intelligence, surveillance, reconnaissance, targeting, and pilotage technologies in support of the Army's aviation and networked systems. This effort focuses on improved reconnaissance, surveillance and target acquisition and night pilotage sensors, high-resolution heads-up displays, sensor fusion, and aided target recognition (AiTR) capabilities for attack, scout, cargo, and utility helicopters and unmanned aerial systems (UAS). UAS payload efforts mature and demonstrate small, lightweight, modular, payloads (electro-optical/infrared, laser radar, designator) to support target detection, identification, location, tracking, and targeting of tactical targets for the Brigade Combat Team.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command (RDECOM)/Communications-Electronics Research, Development, and Engineering Center (CERDEC) /Night Vision and Electronic Sensors Directorate (NVESD), Fort Belvoir, VA.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Airborne Unmanned Persistent Imaging</p> <p>Description: This effort demonstrates day and night persistent surveillance imaging (PSI) and enhanced reconnaissance, surveillance, and target acquisition (RSTA) capabilities from a single payload on the extended range/multi-purpose (ER/MP) unmanned aerial system (UAS).</p> <p>FY 2010 Accomplishments: Matured step-stare software; and began intelligent, tiered data processing development and hardware design trade studies.</p> <p>FY 2011 Plans: Complete step-stare and ground-based processing software; demonstrate brassboard for tracking, image compression, and scene segmentation software; and finalize designs for tiered data processing and integrate designs for the 3rd generation focal plane array.</p> <p>FY 2012 Plans: Will integrate enhanced capabilities (high definition sensors and dual color infrared (midwave/longwave)) into a high definition demonstrator; will complete intelligent data compression subsystem to provide persistent wide-area activity monitoring, personnel/ vehicle tracking, and enhanced reconnaissance, surveillance and target acquisition capabilities to include high resolution target</p>	1.930	7.224	10.702

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>	PROJECT K86: <i>NIGHT VISION, ABN SYS</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011
search; will complete and demonstrate the 3rd generation focal plane array turret to provide the optimal infrared imaging band for prevailing battlefield conditions.			
<p>Title: High Definition Aviation Displays</p> <p>Description: This effort develops and demonstrates an advanced monocular, see-through, high definition, digital, helmet mounted display (HMD) to replace current limiting analog, cathode ray tube-based helmet and display sight systems.</p> <p>FY 2012 Plans: Will mature the capabilities of waveguide display optics technology; will expand field-of-view and resolution through innovative optical designs, materials and advanced display technologies; will begin to integrate and demonstrate the system (conduct laboratory and engineering flight tests).</p>		-	5.945
<p>Title: Advanced Lasers for Unmanned Aerial System (UAS) Payloads</p> <p>Description: This effort develops, integrates, and demonstrates an advanced target acquisition and designation laser payload to satisfy the reconnaissance, surveillance, and target acquisition (RSTA) mission requirements for the Class I unmanned aerial system (UAS) customized to a 7 lb payload capacity.</p> <p>FY 2010 Accomplishments: Validated performance of micro-turret payload laser, and imaging and stabilization components, and integrated them into a unified package; completed transition and incorporation of the laser designator/laser rangefinder component into the advanced demonstrator payload; matured and tested compact 2-axis laser/infrared stabilized payload components.</p> <p>FY 2011 Plans: Complete manufacturing and integration of the advanced demonstrator payload brassboard sensors; characterize and flight test the payloads in a relevant environment.</p>		9.117	5.294
<p>Title: Multi-mode system Payloads for Enhanced Targeting</p> <p>Description: This effort demonstrates improved targeting capabilities, (especially against difficult camouflage, concealment, and defilade targets), by combining the wide area search and identification capabilities of hyperspectral imaging with the three dimensional target identification and through foliage/camouflage capabilities of laser radar (LADAR) for target range interrogation).</p> <p>FY 2011 Plans: Leverage and mature mono-block laser technology to begin the development of a compact multi-function laser capable of providing standard eye-safe range-finding and LADAR laser functions.</p>		-	2.903
Title: Objective Pilotage for Utility and Lift (OPUL)		4.123	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603710A: <i>NIGHT VISION ADVANCED TECHNOLOGY</i>		PROJECT K86: <i>NIGHT VISION, ABN SYS</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<p>Description: This effort develops, integrates, tests, and demonstrates a sensor suite that provides multi-pilot helicopters and crews simultaneous multi-user, wide field of regard imagery of the immediate surroundings. The OPUL system is designed for pilotage and navigation, providing advanced sensors for improved image quality under degraded and brown out conditions.</p> <p>FY 2010 Accomplishments: Completed human factors performance studies; and conducted extensive flight evaluations and demonstrations with varying mission scenarios and environmental conditions.</p>					
Accomplishments/Planned Programs Subtotals			15.170	15.421	16.647
C. Other Program Funding Summary (\$ in Millions)					
N/A					
D. Acquisition Strategy					
N/A					
E. Performance Metrics					
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	16.584	15.878	15.959	-	15.959	14.027	14.182	14.724	14.406	Continuing	Continuing
002: <i>ENVIRONMENTAL COMPLIANCE TECHNOLOGY</i>	2.096	2.131	4.694	-	4.694	2.311	2.300	2.843	2.378	Continuing	Continuing
025: <i>POLLUTION PREVENTION TECHNOLOGY</i>	3.497	3.659	3.718	-	3.718	3.780	3.847	3.907	3.973	Continuing	Continuing
03E: <i>ENVIRONMENTAL RESTORATION TECHNOLOGY</i>	9.697	10.088	7.547	-	7.547	7.936	8.035	7.974	8.055	Continuing	Continuing
03F: <i>Environmental Quality Tech Demonstrations (CA)</i>	1.294	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

FY12 funding realigned to higher priority efforts.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies that assist Army installations in becoming environmentally compatible without compromising the readiness or training critical to the success of the future force. This program includes technology demonstrations for: restoration of sites contaminated with toxic and/or hazardous materials (such as unexploded ordnance) resulting from Army operations; pollution prevention to minimize the Army's use and generation of toxic chemicals and hazardous wastes; compliance with environmental laws by control, treatment, and disposal of hazardous waste products; and conservation of natural and cultural resources while providing a realistic environment for mission activities (Projects 002, 025, and 03E). This program demonstrates technological feasibility, assesses the technology as well as its producibility, and transitions mature technologies from the laboratory to the user. Technologies developed by this program element improve the ability of the Army to achieve environmental restoration and compliance at its installations, at active/ inactive ranges and other training lands, and at its rework as well as production facilities. Technologies demonstrated focus on reducing the cost of treating hazardous effluents and remediating Army sites contaminated by hazardous/toxic material.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

This program is fully coordinated and complementary to PE 0602720A (Environmental Quality Technology).

Work in this PE is performed by the US Army Engineer Research and Development Center, Vicksburg, MS, and the US Army Research, Development, and Engineering Command, Aberdeen Proving Ground, MD.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>
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Project 03F funds Congressional Interest Items.

B. Program Change Summary (\$ in Millions)	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012 Base</u>	<u>FY 2012 OCO</u>	<u>FY 2012 Total</u>
Previous President's Budget	16.121	15.878	18.709	-	18.709
Current President's Budget	16.584	15.878	15.959	-	15.959
Total Adjustments	0.463	-	-2.750	-	-2.750
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	0.797	-			
• SBIR/STTR Transfer	-0.334	-			
• Adjustments to Budget Years	-	-	-2.750	-	-2.750

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>				PROJECT 002: <i>ENVIRONMENTAL COMPLIANCE TECHNOLOGY</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
002: <i>ENVIRONMENTAL COMPLIANCE TECHNOLOGY</i>	2.096	2.131	4.694	-	4.694	2.311	2.300	2.843	2.378	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies transitioned from PE 0602720A (Environmental Quality Technology), Projects 048 and 896, that assist Army installations in achieving environmental compliance. These technologies reduce the cost of treating hazardous effluents from Army installations, including forward operating bases, to satisfy increasingly stringent waste, wastewater and air pollutant discharge requirements. Army facilities are subject to fines and facility shutdowns for violation of federal, state, and local environmental regulations. This technology is essential to control and reduce the generation of waste to satisfy hazardous waste reduction goals and to avoid future environmental costs as well as liabilities to the Army. Efforts under this project enable the Army to reduce environmental constraints at installations while complying with the myriad of federal, state, and host country environmental regulations and policy. Technologies demonstrated also reduce the cost of resolving training noise compliance issues for the Army, avoid reductions in availability of training facilities, and sustain the viability of testing and training ranges as well as protect the critical resources, i.e. land, air, and waters of the Army.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

Work in this project is performed by the US Army Engineer Research and Development Center , Vicksburg, MS.

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

	FY 2010	FY 2011	FY 2012
Title: Installation Operations	2.096	2.131	4.694
Description: This effort demonstrates environmentally safe and cost-effective technologies to manage and reduce the increase in noise and pollution concerns associated with training ranges.			
FY 2010 Accomplishments: Developed and matured a cell-based sensor for detecting toxins with on-board reactive oxygen species electrode; developed a portable device to measure low frequency characteristics of ground surfaces to provide accurate single event noise assessments for managing the training noise environment.			
FY 2011 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>		PROJECT 002: <i>ENVIRONMENTAL COMPLIANCE TECHNOLOGY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<p>Complete integration of cell-based sensor components and will initiate performance evaluation phase for field assessment of perchlorate and lead. Initiate demonstration of noise mapping software utilizing real-time meteorology to enable the Army's Operational Noise Program and Sustainable Range Program.</p> <p><i>FY 2012 Plans:</i> Will mature and demonstrate a cell-based, field portable sensor design for real time analysis to detect and quantify or evaluate toxicity of water; will mature noise assessment models corrected to adequately reflect discrete noise events, local community response to training noise metrics, and continuous noise mapping software to ensure compliance.</p>					
Accomplishments/Planned Programs Subtotals			2.096	2.131	4.694
C. Other Program Funding Summary (\$ in Millions)					
N/A					
D. Acquisition Strategy					
N/A					
E. Performance Metrics					
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>				PROJECT 025: <i>POLLUTION PREVENTION TECHNOLOGY</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
025: <i>POLLUTION PREVENTION TECHNOLOGY</i>	3.497	3.659	3.718	-	3.718	3.780	3.847	3.907	3.973	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates pollution prevention advanced technologies required for sustainable operation of Army weapon systems, to include compliance with regulations mandated by federal, state, and local environmental and health laws. Technology thrusts under this project include demonstration of advanced technologies to enable sustainment of propellant, explosive and pyrotechnic production and maintenance facilities and training ranges through elimination or significant reduction of environmental impacts. These technologies will ensure that advanced energetic materials required for future force's high performance munitions are developed that meet weapons lethality and survivability goals and that are compliant with environmental and health laws.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

The project is fully coordinated and complementary to PE 0602720A, Project 895. This project transitions technologies developed under that PE.

Work in this project is performed by the Research, Development, and Engineering Command the Army Research Laboratory, Aberdeen Proving Ground, MD, the Armaments Research, Development, and Engineering Center, Picatinny Arsenal, NJ, and the Aviation and Missile Research, Development, and Engineering Center, Redstone Arsenal, AL in conjunction with the Army Public Health Command (Provisional), Aberdeen Proving Ground, MD.

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

	FY 2010	FY 2011	FY 2012
Title: Pollution Prevention Technology	3.497	3.659	3.718
Description: This effort demonstrates pollution prevention advanced technologies required to sustain operation of Army weapons systems to comply with state, federal, and local environmental and health laws and regulations.			
FY 2010 Accomplishments: Rocket and Missile Propellants: demonstrated hypergolic propulsion system as potential alternative to ammonium perchlorate; Conventional Ammunition: assessed performance of potential RDX replacements in representative compositions; Pyrotechnics: evaluated low-toxicity colored smoke formulations in a relevant environment.			
FY 2011 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>		PROJECT 025: <i>POLLUTION PREVENTION TECHNOLOGY</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<p>Rocket and Missile Propellants: develop flight-scale hardware for hydrazine and ammonium perchlorate replacement rocket motors; Conventional Ammunition: perform material qualification evaluation and assess performance of representative compositions for eventual transition into an end-item; Pyrotechnics: demonstrate a perchlorate-free countermeasure in a relevant end-item.</p> <p><i>FY 2012 Plans:</i> Rocket and Missile Propellants: will finalize design of flight-scale hardware and prepare to conduct flight performance evaluation; Conventional Ammunition: will refine and optimize compositions in a relevant end item; Pyrotechnics: will integrate flare, delay and signal formulations into system prototypes.</p>					
Accomplishments/Planned Programs Subtotals			3.497	3.659	3.718
C. Other Program Funding Summary (\$ in Millions)					
N/A					
D. Acquisition Strategy					
N/A					
E. Performance Metrics					
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>				PROJECT 03E: <i>ENVIRONMENTAL RESTORATION TECHNOLOGY</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
03E: <i>ENVIRONMENTAL RESTORATION TECHNOLOGY</i>	9.697	10.088	7.547	-	7.547	7.936	8.035	7.974	8.055	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies transitioned from PE 0602720A (Environmental Quality Technology), Project 835 that improve the Army's ability to achieve cost-effective environmental restoration and management of contamination resulting from Army training or operations at its installations, active and inactive ranges, its rework and production facilities, and on the battlefield. Advanced development activities address the management/mitigation of materials released to the natural environment and residual environmental effects of military training and operations. The emphasis of this effort includes restoration of legacy materials, e.g., traditional explosives and energetic; management of new materials, e.g., nanomaterials and emerging contaminants; and mitigation of residual impacts from implementation of sustainable technologies and processes. Technologies matured within this project enable the Army to cost effectively address current and future environmental liabilities resulting from the use of militarily relevant materials in the environment and implementation of the new family of sustainable technologies for energy production. Current and planned efforts enable the Army to efficiently characterize, evaluate, assess, and remediate soil and groundwater at installations, ranges, facilities, and during battlefield operations. Efforts also identify ways to economically comply with the myriad of federal, state, and host country regulations dealing with contaminated soil and groundwater. A key aspect of this work is the enhancement of risk assessment and life cycle analysis techniques that can more accurately display the environmental liabilities associated with fielding new systems and technologies. This program includes pilot scale field studies to establish technological feasibility and assess performance and productivity of the risk assessment techniques.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

Work in this project is performed by the US Army Engineer Research and Development Center, Vicksburg, MS.

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

	FY 2010	FY 2011	FY 2012
Title: Unexploded Ordnance (UXO)	2.060	3.077	2.200
Description: This effort matures and demonstrates active range ordnance impact assessment and positioning system in relevant environments. This effort also develops real time detection and discrimination methodologies for unique and emerging unexploded ordnance (UXO).			
FY 2010 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>		PROJECT 03E: <i>ENVIRONMENTAL RESTORATION TECHNOLOGY</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Identified range monitoring and maintenance systems for sustainable range operations; retained identification and characterization of unique and emerging UXO; and initiated development of protocols for adaptive detection. FY 2011 Plans: Complete performance characterization of UXO related range maintenance technologies; complete identification and characterization of unique and emerging UXO; complete protocols for implementation of adaptive, real time UXO detection, remediation, ordnance impact and monitoring; develop detection and discrimination methodologies for unique and emerging UXO; continue working on adaptive, real time UXO detection and remediation, methodologies. FY 2012 Plans: Will mature and demonstrate the active range ordnance impact assessment and positioning system in a relevant environment; will continue development of real time detection and discrimination methodologies for unique and emerging UXO.				
Title: Hazard/Risk Assessment Tools for Toxicity of Munitions Constituents (MCs) Description: This effort develops tools to assess hazard and risk of toxicity due to munitions constituents. FY 2010 Accomplishments: Devised mathematical models of effects and toxicity due to existing MCs. Characterized multiple stressor impacts on toxicity. Identified developmental pathways affected by MCs and toxicity mechanisms in alternate ecological species, and completed a cross species validation of MC effects; devised computational chemistry predictive methods of chemical structures and physical properties of MC adsorbed soils, MC reactivity and decomposition, and chemical mechanisms of MC breakdown by soil microbes. FY 2011 Plans: Complete construction of a computational biology tool for predictive toxicology; will define hydraulic, biological, geophysical, and chemical models for integration into a training range environmental evaluation and characterization system; will identify approaches for environmental life-cycle assessment of nanomaterials to support advanced Warfighter technologies development. FY 2012 Plans: Will provide a beta-version of computational tool for predictive toxicology for user review that implements ab initio quantum chemical and molecular dynamics approaches to aid in the prediction of sorption properties of MCs and emerging contaminants; will mature and demonstrate tools for rapid, standardized, and quantitative measurement of effects and toxicity from current MCs using toxicogenomics and computational biology.		6.843	7.011	4.347
Title: Characterization, Evaluation and Remediation of Distributed Source Contamination on Army Ranges Description: This effort provides capabilities to rapidly and accurately characterize, evaluate, and remediate distributed source contamination on Army ranges.		0.509	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>		PROJECT 03E: <i>ENVIRONMENTAL RESTORATION TECHNOLOGY</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> Provided the capability to rapidly and accurately quantify MC sources, distribution, and transport in soil and surface water and to cost-effectively manage residual MCs on active Army training ranges. This technology is in use in the ongoing Army Range Assessment Program providing improved certainty in site sampling and risk assessment.				
<i>Title:</i> Long Term Monitoring Applications <i>Description:</i> This effort develops and demonstrates monitoring technologies for long term monitoring of Army-related contamination.		0.285	-	-
<i>FY 2010 Accomplishments:</i> Completed the development of a rapid, sensitive, near real time technology that provided on-site assessment of Army-related contamination; this technology provides time and cost savings by reducing the need for shipping groundwater samples to labs for analysis.				
<i>Title:</i> Green Remediation Technologies <i>Description:</i> This effort investigates and matures technologies to control contaminant transport in soil on training ranges as well as assess and demonstrate novel detection capabilities for depleted Uranium on Army lands.		-	-	1.000
<i>FY 2012 Plans:</i> Will begin assessment and maturation of bioreactor technologies for control of contaminant transport in soil on training ranges; will assess and demonstrate novel detection capabilities for depleted Uranium on Army lands.				
Accomplishments/Planned Programs Subtotals		9.697	10.088	7.547
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603728A: <i>Environmental Quality Technology Demonstrations</i>	PROJECT 03F: <i>Environmental Quality Tech Demonstrations (CA)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
03F: <i>Environmental Quality Tech Demonstrations (CA)</i>	1.294	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This is a Congressional Interest Item

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

	FY 2010	FY 2011	FY 2012
Title: Wastewater Treatment System	0.497	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Researched and developed a transportable wastewater treatment system capable of supporting a 600-man forward operating base or civilian disaster relief base camp.			
Title: Texas Research Institute for Environmental Studies	0.797	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Developed technology to recover waste water and sludge into a potable and sustainable source of water.			
Accomplishments/Planned Programs Subtotals	1.294	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	40.423	27.393	36.516	-	36.516	30.708	26.403	23.335	23.521	Continuing	Continuing
T08: <i>COMBAT ENG SYSTEMS</i>	5.843	27.393	36.516	-	36.516	30.708	26.403	23.335	23.521	Continuing	Continuing
T13: <i>Stationary Power & Energy Tech Demonstrations (CA)</i>	27.417	-	-	-	-	-	-	-	-	Continuing	Continuing
T15: <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>	7.163	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

FY10 funding realigned to higher priority efforts.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates advanced military engineering and geospatial research and engineering technologies. Military engineering technologies include individual, group and asset protection such as overhead cover, structures, protective shields, barriers, and deployable force protection (DFP) to combat highly adaptive and increasingly severe threats (Project T08). Project T08 also funds geospatial research and engineering technologies including sensing systems and mapping tools that enable the Warfighter to understand the impact of the terrain and weather effects during planning and execution of military operations. Geospatial research and engineering also provides and optimizes decision aids and geospatial products that support network centric delivery and update of geospatial data and services to all echelons for battle command planning and mission rehearsal.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

This work is fully coordinated with and complementary to PE 0602784A (Military Engineering Technology). DFP activities are coordinated with US Army Research Development and Engineering Command, the Defense Advanced Research Projects Agency, and the Services.

Work in this PE is led, managed or performed by the US Army Engineer Research and Development Center, Vicksburg, MS.

Projects T13 and T15 fund Congressional Interest Items.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	45.394	27.393	35.016	-	35.016
Current President's Budget	40.423	27.393	36.516	-	36.516
Total Adjustments	-4.971	-	1.500	-	1.500
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-4.934	-			
• SBIR/STTR Transfer	-0.037	-			
• Adjustments to Budget Years	-	-	1.500	-	1.500

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>				PROJECT T08: <i>COMBAT ENG SYSTEMS</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
T08: <i>COMBAT ENG SYSTEMS</i>	5.843	27.393	36.516	-	36.516	30.708	26.403	23.335	23.521	Continuing	Continuing

Note
not applicable for this item

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates advanced military engineering and geospatial research and engineering technologies. Military engineering technologies demonstrated include individual, group and asset protection such as overhead cover, structures, protective shields, barriers, and deployable force protection (DFP) to combat highly adaptive and increasingly severe threats through integration, demonstrations, and red teaming. DFP activities are focused on solving critical gaps in protecting forces operating at smaller, remote bases. Geospatial research and engineering technologies demonstrated include Battlespace Terrain Reasoning and Awareness (BTRA) and Collaborative Battlespace Reasoning and Awareness (COBRA), which was titled Joint-Geospatial Enterprise Services (J-GES) in FY09 and FY10, technologies. BTRA enables the Warfighter to understand the impact of the terrain and weather effects during planning and execution of military operations. The COBRA program matures and demonstrates technology that supports network centric delivery and update of geospatial data and services to all echelons for battle command planning and mission rehearsal. Objectives include novel detection methods for persistent surveillance and applying Civil Military Operations algorithms addressing interrelationship between human and physical terrain.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

This work is fully coordinated with and complementary to PE 0602784A (Military Engineering Technology). DFP activities are coordinated with US Army Research Development and Engineering Command, the Defense Advanced Research Projects Agency, and the Services.

Work in this project is led, managed or performed by the US Army Engineer Research and Development Center, Vicksburg, MS. The work in deployable force protection is coordinated with US Army Research Development and Engineering Command, the Defense Advanced Research Projects Agency, and the Services.

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

	FY 2010	FY 2011	FY 2012
Title: Collaborative Battlespace Reasoning and Awareness (COBRA)	1.113	1.201	4.262
Description: This effort develops capabilities including multi-platform, cross-community applications and software services that support the integration and synchronization of intelligence and operations functions; these capabilities will enable Battle Command unification and result in faster and higher quality decision cycles through collaboration and real-time sharing, exploitation, and analysis to support the operational mission, tasks, and desired effects. This effort was titled Joint-Geospatial Enterprise Services in FY09 and FY10 and is renamed to better reflect actual activities.			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>		PROJECT T08: <i>COMBAT ENG SYSTEMS</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p><i>FY 2010 Accomplishments:</i> Conducted evaluations to assess geospatial data and information requirements for users and evaluated trade-offs with regard to force structure, location and storage of geospatial data and information, available bandwidth, and computation resources across the network.</p> <p><i>FY 2011 Plans:</i> Develop multi-platform, cross-community applications and services, collaboration services, decision support tools, and Commercial/Joint Mapping Tool Kit (CJMTK) enhancements.</p> <p><i>FY 2012 Plans:</i> Will demonstrate, evaluate and validate multi-platform, cross-community applications and services for transition to users, including CJMTK.</p>				
<p><i>Title:</i> Battlespace Terrain Reasoning and Awareness - Battle Command (BTRA-BC)</p> <p><i>Description:</i> This effort develops software analytics and decision tools that capture integrated terrain and weather effects; investigates and develops predictive decision tools to exploit those products; these systems provides information that empowers commanders, Soldiers, and systems to understand and incorporate the impacts of terrain and weather on their functional responsibilities and processes.</p> <p><i>FY 2010 Accomplishments:</i> Successfully demonstrated unified net-centric data strategies within common architecture and framework across Intelligence, Operations, and Geospatial communities; successfully concluded in FY10 and resulted in spiral transitions to CJMTK; Distributed Common Ground System; North Atlantic Treaty Organization; Environmental Systems Research Institute Defense Core; and the US Air Force.</p>		4.730	-	-
<p><i>Title:</i> Common Ground JCTD</p> <p><i>Description:</i> The effort designs and develops common geospatial enterprise software components that operationally unify and extend current US and Coalition command and control data, information architectures and systems; this effort will result in increased quality and agility of Service, Joint and Coalition Battle Command through Common Operating Environment Awareness.</p> <p><i>FY 2011 Plans:</i> Create a doctrinally based Coalition Operation Management Language for precision indexing to the Joint Command Control and Communications Information Exchange Data Model and geospatial products, creating commonality between command and control and simulations.</p>		-	3.064	-
<i>Title:</i> Defeat of Emerging Adaptive Threats		-	2.628	4.254

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>	PROJECT T08: <i>COMBAT ENG SYSTEMS</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort investigates, validates, and matures components of protective systems to combat highly adaptable and increasingly severe threats to save lives of Warfighters and also increase the survivability of fixed facilities and critical assets.</p> <p>FY 2011 Plans: Evaluate and validate novel layered protective systems incorporating multiple defeat mechanisms for the mitigation of blast, ballistic, and debris impact effects.</p> <p>FY 2012 Plans: Will demonstrate and validate performance of novel layered protective systems under live-fire tests in realistic environments; mature components, fabricate prototypes, optimize implementation, and establish initial fielding of protective systems to defeat large-caliber rockets, vehicle born improvised explosive devices (IED), human born IEDs, and shoulder-fired rockets.</p>				
<p>Title: Deployable Force Protection Technology Integration Demonstrations and Red Teaming</p> <p>Description: This work matures and demonstrates technologies for rapidly deployable force protection for smaller bases operating remotely or integrated with local communities but with a less overt security posture. This effort begins to fill a significant gap in force protection capabilities. This work is fully coordinated with PE0602784A/T40 and T41, Deployable Force Protection, PE0603313A/G03, PE 0602786A, and PE 0603125A.</p> <p>FY 2011 Plans: Identify critical force protection gaps and select most promising technology enabled solutions to detect, assess, and defend assets and personnel operating at smaller, remote bases including active and passive protection; fabricate sub and full-scale pre-prototypes for these solutions; assess performance of selected systems in asymmetric and other relevant environments utilizing red and blue teaming; develop and validate models and software; begin evaluation of integration of technologies.</p> <p>FY 2012 Plans: Will identify critical force protection gaps and down select most promising technology enabled solutions to advance active and passive protection, detection and assessment; will improve designs to reduce key factors such as size and/or weight, power and energy, manpower, and support requirements and to enhance performance of systems; will integrate capabilities based on stakeholder priorities; will continue to conduct full-scale demonstrations and user assessments and conduct red and blue team missions in asymmetric and other relevant environments to identify further areas for improving robustness of design and implementation and to increase systems effectiveness.</p>		-	20.500	28.000
Accomplishments/Planned Programs Subtotals		5.843	27.393	36.516

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>	PROJECT T08: <i>COMBAT ENG SYSTEMS</i>

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>				PROJECT T13: <i>Stationary Power & Energy Tech Demonstrations (CA)</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
T13: <i>Stationary Power & Energy Tech Demonstrations (CA)</i>	27.417	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

Congressional special interest projects to mature and demonstrate advanced military engineering and geospatial research and engineering technologies.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Gas Engine Driven Air Conditioning Demonstration (GEDAC):</p> <p>Description: This is a Congressional Interest Item</p> <p>FY 2010 Accomplishments: Completed field test and demonstration of commercialized 11-ton gas engine driven heat pumps, and prototype 5-ton dark start gas engine driven heat pump/generator units in DoD installations.</p>	2.387	-	-
<p>Title: Advanced Tactical Fuels for the Military</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed technologies for hydrogen and hydrocarbon fuels production for use by the U.S. military. Using JP-8 and renewable feedstock's, hydrogen was produced for use in fuel cells that drive vehicles or provide auxiliary or primary distributed power.</p>	3.183	-	-
<p>Title: Multi-Campus Base Facility Energy Independence:</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Demonstrated energy integration of three Ohio Army National Guard campuses for improved internal base energy security and increase cost savings.</p>	3.183	-	-
<p>Title: Quiet, Low-Impact Alternative Energy Technology</p> <p>Description: This is a Congressional Interest Item.</p>	1.990	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011				
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>		R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>		PROJECT T13: <i>Stationary Power & Energy Tech Demonstrations (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)						
				FY 2010		
				FY 2011		
				FY 2012		
<i>FY 2010 Accomplishments:</i> Evaluated performance and durability of the ammonia and urea electrolyzers of 1KW prototype.						
<i>Title:</i> Natural Gas Firetube Boiler Demonstration						
<i>Description:</i> This is a Congressional Interest Item.						
<i>FY 2010 Accomplishments:</i> Retrofitted and demonstrated a new combined water and heat fire tube boiler reclamation system (Super Boiler) with 15% higher efficiency.						
<i>Title:</i> Demonstration of Thin Film Solar Modules as a Renewable Energy Source						
<i>Description:</i> This is a Congressional Interest Item.						
<i>FY 2010 Accomplishments:</i> Installed and demonstrated a state of the art modular thin film solar photovoltaic array at an Army installation.						
<i>Title:</i> Amorphous Si Flexible Photovoltaics for Grid Parity						
<i>Description:</i> This is a Congressional Interest Item.						
<i>FY 2010 Accomplishments:</i> Developed and demonstrated a high speed manufacturing process for low cost building integrated photovoltaic systems.						
<i>Title:</i> Hybrid Energy Systems Design and Testing						
<i>Description:</i> This is a Congressional Interest Item.						
<i>FY 2010 Accomplishments:</i> Assessed the technical and operational feasibility of deploying a next-generation hybrid energy system on a US Army installation to combine traditional fossil fired power with available renewable energy sources.						
<i>Title:</i> Zinc Flow Electrical Energy Storage						
<i>Description:</i> This is a Congressional Interest Item.						
<i>FY 2010 Accomplishments:</i> Installed and demonstrated a flow battery electrical storage unit at an Army installation.						
<i>Title:</i> Integrated Alternative Power Systems						
				0.796	-	-
				0.796	-	-
				1.592	-	-
				1.990	-	-
				1.990	-	-
				2.069	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>		PROJECT T13: <i>Stationary Power & Energy Tech Demonstrations (CA)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Developed and demonstrated a comprehensive power management system to integrate wind and solar power supplies into the current infrastructure including utility and legacy backup generation.				
Title: Pacific Command Renewable Energy Security System		2.387	-	-
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Developed and operated a sustainable system to demonstrate how the Army can grow its own fuel on its own designated lands.				
Title: Conversion of Municipal Solid Waste to Renewable Diesel Fuel		2.507	-	-
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Continued the waste to diesel fuel plant demonstration to include a set of trials with various waste inputs, and laboratory analyses of fuel output.				
Title: Internal Base Facility Energy Independence		2.547	-	-
Description: This is a Congressional Interest Item.				
FY 2010 Accomplishments: Demonstrated the use of alternative fuel sources to power structures located on Military bases to enhance facility operations and management, improve internal base energy security and increase cost savings.				
Accomplishments/Planned Programs Subtotals		27.417	-	-
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>	PROJECT T15: <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
T15: <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>	7.163	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

These are Congressional Interest Items for Military Engineering Technology Demonstrations.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Lightweight Protective Roofing</p> <p>Description: This is a Congressional Interest Item</p> <p>FY 2010 Accomplishments: Investigated lightweight side wall panels for protection against both blast and fragments. This technology was transitioned to roofing components with enhanced ductility and energy absorption, providing protection from top attack munitions.</p>	1.193	-	-
<p>Title: Nanotechnology for Potable Water and Waste Treatment</p> <p>Description: This is a Congressional Interest Item</p> <p>FY 2010 Accomplishments: Designed and benchmark-tested low cost multifunctional nanomaterials to effectively purify water for potable supply and mitigate waterborne contaminants.</p>	1.592	-	-
<p>Title: University Center for Disaster Preparedness and Emergency Response</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Continued support of the Rutgers University Center.</p>	1.194	-	-
<p>Title: Enhancing the Commercial Joint Mapping Toolkit to Support Tactical Military Operations</p> <p>Description: This is a Congressional Interest Item.</p>	3.184	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603734A: <i>Military Engineering Advanced Technology</i>		PROJECT T15: <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2010	FY 2011	FY 2012
<i>FY 2010 Accomplishments:</i> Provided common tools to support spatially based prediction and projection of entities within a Joint Operating Environment.					
Accomplishments/Planned Programs Subtotals			7.163	-	-
C. Other Program Funding Summary (\$ in Millions) N/A					
D. Acquisition Strategy N/A					
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	50.856	24.873	30.600	-	30.600	33.563	37.735	38.945	39.609	Continuing	Continuing
101: <i>Tactical Command and Control</i>	13.441	14.702	15.289	-	15.289	15.391	17.566	17.892	18.195	Continuing	Continuing
1AA: <i>Tactical Computer Science Demonstrations (CA)</i>	3.781	-	-	-	-	-	-	-	-	Continuing	Continuing
1AB: <i>SENSOR DEMONSTRATIONS (CA)</i>	6.764	-	-	-	-	-	-	-	-	Continuing	Continuing
243: <i>Sensors and Signals Processing</i>	26.870	10.171	15.311	-	15.311	18.172	20.169	21.053	21.414	Continuing	Continuing

Note

FY10 funding realigned to higher priority efforts.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies that allow the Warfighter to effectively collect, analyze, transfer, and display situational awareness information in a network-centric battlefield environment. It matures and demonstrates architectures and provides technologies that enable synchronized Command and Control (C2) during rapid, mobile, dispersed, and Joint operations. Project 101 matures and develops software applications to more effectively integrate mission command across all echelons and to enable more effective utilization of resources. Projects 1AA and 1AB fund congressional special interest items. Project 243 matures signal processing and fusion technologies for Army sensors; matures and demonstrates radio frequency (RF) systems to track and identify enemy forces and personnel; and matures and demonstrates multi-sensor control and correlation for improving reconnaissance, surveillance, tracking, and target acquisition.

Work in this PE is complimentary of PE 0602270A (EW Technology), PE 0602705A (Electronics and Electronic Devices), PE 0602120A (Sensors and Electronic Survivability), PE 0602782A (Command, Control, Communications Technology), and PE 0603270A (EW Technology); and fully coordinated with PE 0602783A (Computer and Software Technology) and PE 0603008A (Electronic Warfare Advanced Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM), Communications-Electronics Research, Development, and Engineering, Center (CERDEC), Fort Monmouth, NJ and Aberdeen Proving Ground, MD.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army	DATE: February 2011
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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	57.062	24.873	29.566	-	29.566
Current President's Budget	50.856	24.873	30.600	-	30.600
Total Adjustments	-6.206	-	1.034	-	1.034
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-5.177	-			
• SBIR/STTR Transfer	-1.029	-			
• Adjustments to Budget Years	-	-	1.034	-	1.034

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>				101: <i>Tactical Command and Control</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
101: <i>Tactical Command and Control</i>	13.441	14.702	15.289	-	15.289	15.391	17.566	17.892	18.195	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies to move and display timely and relevant information across the battlefield to provide commanders at all echelons the situational awareness (SA) that allows them to understand, decide, and act faster than their adversaries, potentially resulting in increased operating tempo (OPTEMPO), improved force synchronization, and reduced fratricide. This project matures and demonstrates technology addressing information storage and retrieval; digital transfer and display of battlefield SA and position/location information; synchronization of combined and Joint force operations; software services optimized for Command and Control (C2) of unmanned air and ground robotic systems; and C2 On-the-Move (OTM).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command, Communications-Electronics Research, Development, and Engineering, Center (CERDEC), Fort Monmouth, NJ and Aberdeen Proving Ground, MD.

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

	FY 2010	FY 2011	FY 2012
Title: Integrated Battle Command (BC)	7.907	8.875	8.715
Description: This effort matures and demonstrates technologies that allow forces to effectively collect, analyze, transfer, and display information in a net-centric battlefield environment. Technology areas include intelligent software agents, server virtualization, knowledge management, and automated query technologies. Work accomplished under PE 0602782A/project 779 compliments this effort.			
FY 2010 Accomplishments: Coded and demonstrated intelligent agent-based BC services for compliance in a service oriented architecture; coded services to generate warnings and alerts relevant to commanders' critical information requirements; matured and assessed methods and software to improve information sharing and collaboration in network-enabled operations; demonstrated and validated data aggregation and alert technologies based on mission context; devised architecture for Warfighter-composable web-based and web-delivered applications; devised framework for the execution of composed applications.			
FY 2011 Plans: Demonstrate dynamic agent based service orchestration to provide workflow adaptation for unexpected events; mature smart filtering services to enable extraction of structured data (graphics, numeric) from free text; finalize and document all software for			

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>		PROJECT 101: <i>Tactical Command and Control</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>transition to PM BC; demonstrate and assess agent based BC services hosted at multi-echelons in a representative environment; mature additional functionality in data aggregation and alert capabilities and provide lessons learned; enhance methods and software to improve information sharing and collaboration in network-enabled operations; enhance Microsoft Office applications to allow the Warfighter to adapt them in the field to specific mission requirements; develop web-based gallery to support collaboration of Warfighter-developed applications.</p> <p>FY 2012 Plans: Will validate proof-of-concept for mission context data aggregation and alert algorithm for more effective use of available information; will further create and demonstrate methods to assess information sharing, decision making and collaboration in network-enabled operations to better understand how to align these technologies with Warfighter needs; will demonstrate technologies that enable the software to track progress in meeting mission goals and will provide mechanisms that offer the commander a real-time assessment of the mission; will demonstrate technologies permitting the Warfighter to customize and/or extend decision-enabling software in response to unique and evolving mission needs; will write algorithms to monitor text-based chat conversations, evaluate content meaning, and suggest information from other related chat sessions that may be applicable.</p>				
<p>Title: Command and Control (C2) for Unmanned Systems</p> <p>Description: This effort codes and demonstrates software services that provide coordinated dynamic battle command and tactical control of unmanned systems as well as software tool sets that enable the commander to manage teams of manned and multiple unmanned air and ground platform assets.</p> <p>FY 2010 Accomplishments: Coded and matured software services for collaboration and coordination of unmanned ground vehicles (UGVs) and unmanned aerial systems (UASs) which guide platform behaviors and provide C2 knowledge management of unmanned systems. This provided the capability to manage large numbers of air and ground robots over extended urban and other complex environments, necessitated by expansion in the use of unmanned assets in the battlespace.</p> <p>FY 2011 Plans: Mature mission planning, execution, and monitoring software services to support collaborative, teamed UAS/UGV operations as well as provide greater battlefield awareness and situational understanding for operations in urban terrain; enhance software algorithms for UAS/UGV perception and control technologies which facilitate increased autonomy and more complex missions; incorporate models for terrain and weather effects into planning software to enable more effective planning in complex environments; conduct experiments in modeling and simulation environments to evaluate effectiveness and establish a performance base line.</p> <p>FY 2012 Plans:</p>		3.537	3.759	3.516

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>	PROJECT 101: <i>Tactical Command and Control</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Will code user interface enhancements to facilitate manned/unmanned interaction, improve ability to monitor multiple unmanned assets, and improved visualization of vehicle status, task progression, and incoming sensor data; will continue to evolve mission planning, execution, and monitoring software services supporting collaborative UAS/UGV teaming; will continue to enhance software algorithms for UAS/UGV perception and control technologies that potentially facilitate increased autonomy and mission complexity; will continue modeling and simulation activities to evaluate software effectiveness and expand on performance base line.				
<p>Title: Battle Space Awareness and Positioning</p> <p>Description: This effort demonstrates position (pos) and navigation (nav) tools to mitigate the impacts of jamming, terrain features, and obstacles such as buildings that limit the performance of Global Positioning System (GPS)-only navigation systems.</p> <p>FY 2010 Accomplishments: Integrated pos/nav sensors with technologies that exploit the synergy between pos/nav and communications, such as radio frequency (RF) ranging and network-assisted navigation.</p> <p>FY 2011 Plans: Mature an integrated pos/nav suite combining advanced small inertial sensors, advanced GPS technology and algorithms and radio technologies to provide pos/location information in all terrains and environments.</p> <p>FY 2012 Plans: Will complete integration of a pos/nav suite for a software defined radio platform (e.g., Joint Tactical Radio System) combining RF-ranging and network-assisted navigation to provide position location information in all terrains and environments as well as under GPS-degraded conditions.</p>		1.997	2.068	3.058
Accomplishments/Planned Programs Subtotals		13.441	14.702	15.289
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>	PROJECT 1AA: <i>Tactical Computer Science Demonstrations (CA)</i>
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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
1AA: <i>Tactical Computer Science Demonstrations (CA)</i>	3.781	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Tactical Computer Science advanced technology development.

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

	FY 2010	FY 2011	FY 2012
Title: VideoArgus	1.394	-	-
Description: This is a Congressional Interest Item			
FY 2010 Accomplishments: Created compression/encoding technology to ensure that high definition video is transmitted in a way that captured key digital information that would otherwise be lost in the HD signal compression process.			
Title: SharedVision	2.387	-	-
Description: This is a Congressional Interest Item.			
FY 2010 Accomplishments: Developed 3D visualization tools to provide commanders with improved situational awareness, mission planning, and after action reviews while conducting C2 operations.			
Accomplishments/Planned Programs Subtotals	3.781	-	-

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

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

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COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
1AB: <i>SENSOR DEMONSTRATIONS (CA)</i>	6.764	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Sensor advanced technology development.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Advanced Radar Transceiver Integrated Circuits Development</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Developed phased array radar technology to support improvements in severe weather detection and quantitative precipitation estimations.</p>	0.795	-	-
<p>Title: Foliage Penetrating Reconnaissance, Surveillance, Tracking and Engagement Radar (FORESTER)</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Leveraged the current FORESTER design to build, integrate, and test a productized sensor capable of being operationally deployed on a wider array of unmanned aerial system (UAS) platforms utilized by the military and the Department of Homeland Security for surveillance under foliage and border patrol missions.</p>	1.592	-	-
<p>Title: Mobile Localization</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments: Addressed processing and analyzing sensor inputs from a single electro-optical/infrared sensor type in order to detect, identify, and provide location data on suspected enemy threats.</p>	1.193	-	-
<p>Title: Intelligence, Surveillance and Reconnaissance (ISR) Simulation Integration Laboratory</p> <p>Description: This is a Congressional Interest Item.</p> <p>FY 2010 Accomplishments:</p>	1.592	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
Researched and analyzed sensor and unmanned aerial system (UAS) modeling and simulation (M&S) technologies for incorporation into the UAS SIL (formerly ISR SIL); developed a first generation M&S configuration for the UAS SIL; designed and created physical assets to support UAS payload technology testing.				
Title: CERDEC Integrated Tool Control System Description: This is a Congressional Interest Item. FY 2010 Accomplishments: Analyzed the current tool container configurations used to support Army aircraft and avionics/weapon systems; designed common configurations to reduce cost, weight and size; and performed research and analysis to add tool control automatic identification technology (AIT) and software to the common tool container configurations.		1.592	-	-
Accomplishments/Planned Programs Subtotals		6.764	-	-
C. Other Program Funding Summary (\$ in Millions) N/A				
D. Acquisition Strategy N/A				
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				

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APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>				243: <i>Sensors and Signals Processing</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
243: <i>Sensors and Signals Processing</i>	26.870	10.171	15.311	-	15.311	18.172	20.169	21.053	21.414	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates improved radar, sensor fusion, and correlation technologies for wide area reconnaissance, surveillance, tracking, and targeting of platforms and individuals in all terrains, including complex and urban environments. Sensor fusion efforts mature and demonstrate sensor management, data correlation, and relationship discovery services of a multi-intelligence fusion system. Sensor and simulated sensor candidates may include moving-target-indicator (MTI)/synthetic aperture radar (SAR), electro-optical/infrared (EO/IR), signals intelligence (SIGINT), measurements and signatures intelligence (MASINT), human intelligence (HUMINT), and biometrics technologies. Technologies are matured with significant leveraging of achievements from industry, Defense Advanced Research Projects Agency (DARPA), and other Services.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Army Research, Development, and Engineering Command, Communications - Electronics Research, Development, and Engineering Center (CERDEC), Fort Monmouth NJ and Aberdeen Proving Ground, MD.

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

	FY 2010	FY 2011	FY 2012
<p>Title: Foliage Penetrating (FOPEN) Radar for Unmanned Aerial Systems (UASs)</p> <p>Description: This effort matures and demonstrates a FOPEN radar capability to meet the size, weight, and power requirements for a Class IV UAS. Advancements in both radar and exploitation processing technology enable increased radar performance to include ground and non-metallic building penetration for detection of hidden roadside target/weapons caches.</p> <p>FY 2010 Accomplishments: Obtained UAS test bed platform; completed integration of a second FOPEN system; continued integrating data link with radar for remote operation and data dissemination; continued conducting environmental and ground end-to-end acceptance assessments; conducted and completed radar performance flight assessments on a manned surrogate UAS platform; completed first system radar integration on target UAS; conducted UAS flight assessment on first system; began second system radar integration on target UAS.</p> <p>FY 2011 Plans: Complete second FOPEN system radar integration on target UAS and conduct UAS flight assessment on second system.</p>	16.137	2.963	-
<p>Title: Ground Moving Target Indicator (GMTI) and Imaging Surveillance Radar</p>	4.891	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603772A: <i>Advanced Tactical Computer Science and Sensor Technology</i>	PROJECT 243: <i>Sensors and Signals Processing</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>Description: This effort demonstrates an all-weather GMTI and synthetic aperture radar (SAR) for all-terrain (foliated and open) detection and tracking of mounted and dismounted threats in a package form-fit-function, size, weight, and power compatible with a rotary wing UAS. This effort matures DARPA investments in GMTI and SAR.</p> <p>FY 2010 Accomplishments: Completed development and demonstrated advanced tracking and exploitation algorithms, techniques and tools; demonstrated payload on a manned surrogate platform (UH-60 Blackhawk).</p>				
<p>Title: Measurement and Signature Intelligence Technologies (MASINT) for clandestine tagging, tracking, and locating (TTL)</p> <p>Description: This effort matures and demonstrates MASINT technologies capable of detecting, tracking, and/or identifying human activities and/or infrastructures. The emphasis is to identify appropriate technical approaches, demonstrate embedded processing, and mature algorithms for multi-mode fusion of sensor data. Candidate technologies include: fiber optic seismic/magnetic technologies (highly sensitive for detection of walking personnel with/without weapons and/or tunneling detection); air deployable (air droppable) networked sensor system for a jungle environment (integration of seismic/acoustic sensor with jungle canopy relay); human infrastructure detection technologies (algorithms, sensors, etc); radio frequency MASINT detector, ultra-light multi-target indicator radar for unattended ground sensors and unmanned air vehicles. Work accomplished under PE 0602120A/ project H16 compliments this effort.</p> <p>FY 2010 Accomplishments: Matured and down-selected candidate technologies for TTL based on updated guidance from user community and conducted brassboard demonstrator integration.</p> <p>FY 2011 Plans: Demonstrate/assess brassboard for potential spiral transition to the user community; investigate new TTL technologies to address emerging TTL user requirements.</p> <p>FY 2012 Plans: Will develop technologies that enable clandestine tagging and observation of targets from a distance to include contactless identification sensors, extended operational persistence and range, and forward based fusion and processing.</p>		1.896	1.955	2.376
<p>Title: Weapon-Locating (Ground) radar technologies</p> <p>Description: This effort matures and demonstrates medium-range sensor technologies for locating indirect fire weapons and extending traditional counter-fire target acquisition to shooters operating into or from within natural and urban canyons and firing in improvised fashions (tracks rocket, artillery and mortar targets).</p>		1.972	2.628	4.435

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p><i>FY 2010 Accomplishments:</i> Matured radar beam forming technologies and multi-aperture/multi-spectral unconventional signal processing (non-Fourier frequency transforms and non-Gaussian clutter estimates) techniques.</p> <p><i>FY 2011 Plans:</i> Develop improved clutter mitigation and discrimination algorithms to accommodate increased occurrence of ground clutter expected with additional radar coverage area.</p> <p><i>FY 2012 Plans:</i> Will complete brassboard system hardware; will conduct component and system level engineering and performance assessment against rocket, artillery and mortar targets fired at non-traditional trajectories; will integrate mature technologies under PM Radars Lightweight Counter Mortar Radar (LCMR(V)3) P31 program and into new radar developments.</p>				
<p><i>Title:</i> Omni-directional Situational Awareness (SA) (Airborne) radar technologies</p> <p><i>Description:</i> This effort matures and demonstrates coupled radar-electro-optical (EO)/infrared (IR) SA technologies for small unmanned aerial systems (UAS) to improve sensing and detection capabilities in support of wide-area persistent surveillance.</p> <p><i>FY 2010 Accomplishments:</i> Developed and matured a Ground Moving Target Indicator (GMTI) radar sensor weighing less than one pound with 360-degree field-of-view and investigated integration with an existing EO/IR payload including control and display software integration techniques necessary to facilitate efficient cueing and complementary usage of GMTI and EO/IR sensors.</p> <p><i>FY 2011 Plans:</i> Mature sensor payload to reduce size weight and power requirements; mature antenna design and processing techniques to support multi-sensor capability.</p> <p><i>FY 2012 Plans:</i> Will fabricate networking radar-EO/IR sensor pairs using ad-hoc methods; will devise network bandwidth and security requirements; will further mature antenna design and processing techniques to support multi-sensor capability and cross-cue to narrower fields of view and auto-tracker; will modify sensor payload to reduce size, weight and power requirements; will harden antenna and electronics design for field environment; and will code command, control, and display application on portable device (PDA, smart-phone, or similar).</p>		1.974	2.625	3.500
<p><i>Title:</i> Advanced All Source Fusion</p> <p><i>Description:</i> This effort develops software technologies for intelligence/battle command (Intel/BC) enterprise collaboration to provide faster and higher quality decision making support for the Commander and his key staff. Specific efforts focus on</p>		-	-	5.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012
<p>integrating the Intelligence Surveillance and Reconnaissance (ISR) planning and execution at the task force/battalion level through troop-level as well as efforts that enable the enterprise to identify, fuse, trace/track specific human targets in an asymmetric environment.</p> <p>FY 2012 Plans: Will devise a common data model that provides integrity for all data types to include data inter-relationships (time, locations, links, etc) that will provide source-agnostic extraction and exploitation capabilities; will integrate software products for extracting data, identifying, fusing, and tracking of specific entities into the Intelligence Enterprise (DCGS-A, INSCOM, JIEDDO); will code entity extractors, relational reasoning engines, and visualization products; will integrate human assisted extraction, interactive correlation and data mining techniques to enable the data fusion process and assist intel analysts with activity and relationship discovery; will integrate technologies into DCGS-A Systems Integration Laboratory (SIL) and architecture; will integrate biometric data matching and fusion algorithms for use in non-cooperative intelligence collection environment.</p>				
Accomplishments/Planned Programs Subtotals		26.870	10.171	15.311
C. Other Program Funding Summary (\$ in Millions)				
N/A				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.				