Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603004A: *Weapons and Munitions Advanced Technology*							
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: *ADVANCED LETHALITY & SURVIVABILITY DEMO*	29.511	43.573	54.210	-	54.210	54.941	62.281	65.856	68.452	Continuing	Continuing
43A: *ADV WEAPONRY TECH DEMO*	33.687	-	-	-	-	-	-	-	-	Continuing	Continuing
L94: *ELECTRIC GUN SYS DEMO*	6.053	-	-	-	-	-	-	-	-	Continuing	Continuing
L96: *HIGH ENERGY LASER TECHNOLOGY DEMO*	22.414	19.868	18.408	-	18.408	23.201	23.214	24.103	24.641	Continuing	Continuing
L97: *SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY*	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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army					DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*			R-1 ITEM NOMENCLATURE PE 0603004A: *Weapons and Munitions Advanced Technology*		
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

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
232: *ADVANCED LETHALITY & SURVIVABILITY DEMO*	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
Title: Ground Based Networked Munitions Technologies	2.885	3.101	3.237
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.			
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.			
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.			
FY 2012 Plans:			

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
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.			
Title: Scalable Effect Weapons and Munitions System ***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. ***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. ***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.	12.567	11.363	-
Title: Soldier and Small Unit Lethality Integration ***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. ***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. ***FY 2011 Plans:***	2.904	2.959	-

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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.			
Title: Tunable Pyrotechnics ***Description:*** This effort demonstrates reactive energetic technologies that enable the Warfighter to have pyrotechnic munitions for countermeasure missions. ***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. ***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. ***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.	2.910	2.928	2.997
Title: Extended Area Protection and Survivability (EAPS) ***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 ***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. ***FY 2011 Plans:***	3.888	4.358	9.901

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Demonstrate with a fully loaded round with the capability to track, perform command maneuver and detonate warheads through an RF link. ***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.			
Title: Military Operations in Urban Terrain (MOUT)/Urban Lethal Technologies ***Description:*** This effort demonstrates the next generation of explosive wall breaching and shoulder launched weapon warhead technologies. ***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. ***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 breeching warhead in a military relevant environment. ***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.	4.357	6.606	4.894
Title: Advanced Lethality Demonstration ***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. ***FY 2011 Plans:***	-	3.685	2.318

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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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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
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. ***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.			
Title: Advanced Power and Energy Management for Munitions ***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. ***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.	-	-	1.747
Title: Scale-up of Energetic Materials ***Description:*** This effort matures and demonstrates the performance and insensitivity of energetic materials in medium cal (direct fire) and large cal (indirect fire) weapons. ***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.	-	-	2.500
Title: Counter Countermeasure (CCM) Technology Demonstrations	-	-	1.345

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
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. ***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.			
Title: Lethality Efforts ***Description:*** This effort demonstrates several advanced lethality efforts. ***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.	-	-	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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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: *ADV WEAPONRY TECH DEMO*	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
Title: Rapid Insertion of Developmental Technology ***Description:*** This is a Congressional Interest Item. ***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.	1.593	-	-
Title: Lightweight Munitions and Surveillance System (LMSS) for Unmanned Air & Ground Vehicles ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Supported the maturation and demonstration of prototypes of a low cost extended range guided munition.	3.819	-	-
Title: Nanotechnology Fuze-on-a-Chip ***Description:*** This is a Congressional Interest Item. ***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	1.591	-	-
Title: Lens-Less Micro Seeker System for Small Steerable Projectiles ***Description:*** This is a Congressional Interest Item. ***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.	1.990	-	-
Title: Advanced Lightweight Gunner Protection Kit	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:*** Supported development and qualification of affordable lightweight ballistic armor gunner protection kits for tactical vehicle gunners.			
Title: Titanium Powder Advanced Forged Parts Program ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Supported development of a manufacturing process for lightweight titanium forged parts for critical DoD applications.	3.024	-	-
Title: Micro Inertial Navigation Unit Technology ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Supported integration of GPS and inertial navigation functions to enable navigation where GPS is jammed or otherwise unavailable.	1.194	-	-
Title: Soldier Protection through Unmanned Ground Vehicles ***Description:*** This is a Congressional Interest Item. ***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.	1.194	-	-
Title: Advanced Robot and Sensor Technology for Surveillance and Energy Efficiency Applications ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** Supported maturation and demonstration of specialized robots for monitoring HVAC systems and other surveillance.	1.194	-	-
Title: Next Generation Machining Technology and Equipment ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:***	1.592	-	-

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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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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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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: *ELECTRIC GUN SYS DEMO*	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
Title: EM Gun System Demonstration	0.216	-	-
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.)			
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.			
Title: Advanced Lethality Demonstration	5.837	-	-
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.			
FY 2010 Accomplishments:			

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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.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603004A: *Weapons and Munitions Advanced Technology*	PROJECT L96: *HIGH ENERGY LASER TECHNOLOGY DEMO*	

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: *HIGH ENERGY LASER TECHNOLOGY DEMO*	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:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603004A: *Weapons and Munitions Advanced Technology*	PROJECT L96: *HIGH ENERGY LASER TECHNOLOGY DEMO*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
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). ***FY 2012 Plans:*** 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.			
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.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603004A: *Weapons and Munitions Advanced Technology*	PROJECT L97: *SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY*	

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: *SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY*	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
Title: Obscurant Enabling Technologies ***Description:*** This effort demonstrates the dissemination of advanced infra-red (IR) obscurants. ***FY 2010 Accomplishments:*** Designed bi-spectral obscurant prototypes for initial dissemination evaluations. ***FY 2011 Plans:*** Mature, fabricate, and test grenade concept for bi-spectral obscuration and effective dissemination patterns. ***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.	0.973	0.997	1.013
Title: Forensic Analysis of Explosives ***Description:*** This effort demonstrates improved point and stand-off detection of explosives and HME precursors. ***FY 2012 Plans:***	-	-	1.446

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603004A: *Weapons and Munitions Advanced Technology*	PROJECT L97: *SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY*

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 ***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.	-	-	2.000
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.