Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification									DATE: May 2009	
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 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	84.679	109.074	66.410						Continuing	Continuing
L94: ELECTRIC GUN SYS DEMO	9.298	11.539	11.731						Continuing	Continuing
L96: HIGH ENERGY LASER TECHNOLOGY DEMO	14.857	20.442	23.312						Continuing	Continuing
L97: SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY	.991	1.022	1.012						Continuing	Continuing
232: ADVANCED MUNITIONS DEM	30.605	37.958	30.355						Continuing	Continuing
43A: ADV WEAPONRY TECH DEMO	28.928	38.113	.000						Continuing	Continuing

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 component and subsystems that 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), and PE 0602622A (Chemical, Smoke, and Equipment Defeating 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.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
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

Work in this PE is performed by the Armament Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey; Edgewood Chemical and Biological Center (ECBC), Edgewood, MD; and the Space and Missile Defense Command (SMDC), Huntsville, AL.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	85.981	73.697	76.273	
Current BES/President's Budget	84.679	109.074	66.410	
Total Adjustments	-1.302	35.377	-9.863	
Congressional Program Reductions	.000	-.363		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	35.740		
Total Reprogrammings	.800	.000		
SBIR/STTR Transfer	-2.102	.000		

Change Summary Explanation

All FY 2009 increases are due to congressional adds.

FY10 funding was decreased due to transfers of Multi-mode High Power Microwave (HPM) and Laser Induced Plasma Channel (LIPC).

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER L94	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
L94: ELECTRIC GUN SYS DEMO	9.298	11.539	11.731						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 University of Texas at Austin, TX (a University Affiliated Research Center).

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
EM Gun System Demonstration: 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. In FY08, built a lightweight cantilevered high fidelity (4 meter) railgun with integrated breech and muzzle shunt and demonstrated threshold performance at hypervelocity; completed ballistic test of a live fuzed launch package demonstrating functionality in an EM gun environment; confronted technical issue posed by cracks within composite banding of one pulsed alternator rotor, implementing analytical modeling to resolve the pulsed power supply (PPS) path forward. In FY09, conduct composite material analyses and structural validation tests of the rotor banding process and reassess PPS performance; complete manufacture and verification testing of the major rotating machine components and assemble the pulsed alternators and switch converters; test fire an integrated launch package with a high explosive, fuzed warhead from a laboratory EM gun. In FY10, will assemble and integrate the compact, twin counter-rotating pulsed alternator power supply, will conduct subsystem functional tests and will accomplish high fidelity breadboard PPS demonstrations that establish and validate requisite performance criteria; will prepare threshold/goal performance specifications and investigate long lead/alternative	9.298	11.272	11.731	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER L94

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
technologies to support evolutionary concepts for an integrated EM armament system prototype selected on best balance of technical achievability and military utility.				
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.267	.000	
Total	9.298	11.539	11.731	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER L96	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
L96: HIGH ENERGY LASER TECHNOLOGY DEMO	14.857	20.442	23.312						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 one-hundred 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, 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 Battle Management Command, Control, and Computers (BMC3). The SSL technology effort in PE 0602307A addresses technical issues such as high average power output from compact and more efficient lasers; precision optical pointing and tracking; laser effects degradation due to atmospheric effects; lethality against a variety of targets; and effectiveness against low-cost laser countermeasures.

Work in this project is related to, and fully coordinated with, efforts in PE 0602307A (Advanced Weapons Technology), PE 0602890D8Z (High Energy Laser Research), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), and PE 0603924D8Z (High Energy Laser Advanced Technology Program), PE 0605605A (DOD High Energy Laser Systems Test Facility), PE 0603005A/441 (Combat Vehicle and Automotive Advanced Technology), and PE 0603313A (Missile and Rocket 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 is performed by the US Army Space and Missile Defense Command Technical Center, Huntsville, AL.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
High Energy Laser Technology Demonstrator (HEL TD): This effort matures and integrates solid state laser components and subsystems on a mobile platform to demonstrate a mobile 100kW class solid state High Energy Laser Technology Demonstrator.	14.857	19.870	23.312	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER L96

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY08, completed the preliminary design of the HEL TD ruggedized Beam Control System (BCS), incorporating technologies that improve pointing accuracy and minimize jitter. These designs include structural and vibration support platform, beam steering and focusing mechanisms with on-board target acquisition, and functional software; purchased some long lead item procurements for mirror substrates, mirror assemblies, and other optics; and began HEL TD systems engineering efforts to enable the integration of technologies into a mobile and tactically relevant weapon system capability, including development of detailed system specifications and interface requirements. Developed detailed system requirements for power, thermal management, and BMC3 (includes Fire Control) and analyzed, assessed, and selected appropriate tactical vehicle platform. In FY09, continue HEL TD system engineering efforts; complete the BCS design and begin the fabrication, assembly, and functional testing. In FY10, will complete the fabrication, assembly, and testing of the BCS; will initiate effort to conduct low power HEL testing utilizing the BCS to begin dynamic shoot down test planning activities; and will continue the system-level preliminary design of the integrated HEL mobile demonstrator.				
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.572	.000	
Total	14.857	20.442	23.312	

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.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER L97	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
L97: SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY	.991	1.022	1.012						Continuing	Continuing

A. Mission Description and Budget Item Justification

The project matures and demonstrates obscurant technologies that 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 advanced infra-red (IR) 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 Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Obscurant Enabling Technologies: This effort demonstrates the dissemination of advanced infra-red (IR) obscurants. In FY08, matured, fabricated, and tested the single-mode grenade concept to meet TRL-6 requirements. In FY09, evaluate dissemination methods and conduct modeling and analysis of advanced IR obscurants for artillery and mortar applications. In FY10, will design bi-spectral obscurant prototypes for initial dissemination evaluations.	.991	.993	1.012	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.029	.000	
Total	.991	1.022	1.012	

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER L97

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER 232	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
232: ADVANCED MUNITIONS DEM	30.605	37.958	30.355						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 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 Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Ground Based Networked Munitions Technologies: This effort provides follow on increments of ground based munitions systems currently being developed with improved capabilities, including a non-lethal response. In FY09, conduct initial design for a delivery system capable of deploying existing and future ground based munition systems to a precise location once released from the primary delivery mechanism such as MLRS, UAS, Fixed and Rotary wing platforms, etc. The effort is working approachs to guide sensors, communication nodes and effects devices to the ground once released from the carrier, in a pattern that allows optimal interaction among the components, eliminates communications degradation and provides an optimal engagement pattern. Develop a concept that integrates technologies which allow precision emplacement of Intelligent Munitions Systems (IMS) from a standoff distance that is as effective as hand emplaced IMS (PE 654808/D016). Conduct a trade study to evaluate different approaches for low collateral self destruct. In FY10, will mature non-lethal layered response concept, focusing on a delivery methodology for COTS munitions; will demonstrate initial prototype capability for low collateral self destruct in the laboratory environment; will demonstrate a passive communications repeater approach in the laboratory while maturing a 40mm flare-based deployment concept. Efforts described here are coordinated and complimentary to related efforts in PE/Project 0602624A/H19.	.000	3.113	2.933	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Fuze and Power for Advanced Munitions: This effort demonstrates technologies that reduce munition sizes while adding tailorable effects and improving advanced on-board munition power systems. In FY08, integrated electronic safe and arm devices (ESAD) subsystem. Conducted demonstration of gun launched multipoint warhead initiation. Conducted performance testing of micro electromechanical systems safe and arm (MEMS) (S&A) device and MEMS impact switch performance in 155 mm projectile. For sensors: demonstrated gun launch RADAR proximity fuze capability in direct fire application, validated stand-off improvements and size reduction. Achieved mortar configuration for laser detection and ranging (LADAR) sensor using advanced laser and detector. For power: demonstrated prototype organic chemistry based liquid reserve batteries and thermal management battery improvements with flight tests in a gun-launched munition. In FY09, conduct instrumented ballistic and guided flight tests; demonstrate pre-programmed maneuver and guide-to-hit capabilities in a ten mature prototypes of precision guided 105mm projectile; and optimize tactical design of sensors and fuze technologies Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/project H18.	4.750	3.543	.000	
Dual Use Composites (DUC): This effort demonstrates the application of carbon/thermoplastic materials in a UAV shaped munition. In FY08, mature design of fuze to be integrated in composite material projectile. In FY09, integrate fuze into projectile; demonstrate projectile lethality in a lab environment. In FY09, integrate fuze with the DUC for the design and development of the first tube/rail launch miniature lethal UAV; demonstrate DUC UAV structural integrity; test demo of the miniature lethal UAV (perform reconnaissance of objective, loiter and engage target).	.200	.600	.000	
Kinetic Energy Active Protection System (KEAPS): This effort matures and demonstrates warhead and fuze safe and arming technology to support KEAPS which enhances the survivability of lightly armored vehicles. In FY09, mature warhead and fuze safe and arm (S&A) device; demonstrate and validate their performance against primary class of threats and validate their performance against remaining classes of threats. Efforts described here are coordinated and complimentary to related efforts in PE 0602624/Project H28 and are developed and collaborated with efforts in PE 0603005A/project 221 and PE 0603313A/project 550.	.000	4.393	.000	
Reliability for the Future Force:	.812	.995	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009		
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 NUMBER 232	
B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
This effort matures advanced physics-based stochastic methods to enhance the reliability of critical micro electromechanical systems (MEMS) and devices. In FY08, matured physics-based models of the MEMS critical components for both the MEMS inertial measurement unit and MEMS safe and arm (S&A); matured design by determining the optimal initiation train formulation of S&A (i.e., 1 or 2 pressed charges and their exact formulation and process). In FY09, define critical failure mechanisms through probabilistic physics-based modeling; create explicit and implicit physics-based failure modes; identify the uncertainties for each variable, developed probability models; perform sensitivity analysis and optimized design and process.; Develop probabilistic models for MEMS failure physics and develop reliability models for each failure mode building from sub-component and material levels up through component subassembly to integrated S&A levels.				
Weaponization of Pulsed Laser Technologies: This effort matures and miniaturizes key directed energy (DE) technologies and subsystems to support DE weaponization with the potential to field leap-ahead capabilities in effectiveness and suitability. Laser Induced Plasma Channel (LIPC) uses a low energy femtosecond laser pulses with the unique capability to facilitate transmitting high voltage and/or radio frequency energy downrange to a target with tailored effects. In FY08, matured Laser Guided Energy (LGE) technology using femtosecond lasers to demonstrate feasibility at militarily relevant ranges. In addition, matured and demonstrated advanced solid state High Power Microwave (HPM) device designed to reduce the size and weight over that of existing solid state power HPM devices; and demonstrated HPM stackable, modular, and higher power density modules. In FY09, will model interaction between various directed energy sources and identify most mature LGE technology and will begin design to integrate compact solid state HPM and high voltage sources to obtain LGE in a directed energy weapon system demonstrator; Efforts described here are coordinated and complimentary to related efforts in PE/Projects: 0602624A/H18 and H19.	6.225	5.172	.000	
Common Smart Submunition (CSS): This effort pursues critical subsystem evaluations leading to system demonstrations of a submunition that offers increased operational efficiency through multiple kills per munition. In FY08, demonstrated full up functional CSS prototype submunitions at the suspended cable facility at Sandia; demonstrated sensor and algorithm technical maturity by carrying the sensor in an airborne platform for instrumented testing; verified laser radar and ranging/infrared (LADAR/IR) sensor and automatic target recognition (ATR)	8.703	.000	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER 232

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
discrimination algorithms in a dynamic flight test; verified all ATR performance sub-sets such as registration, target detection, key feature extraction, and target recognition during the flight test; conducted evaluations of integrated systems in relevant environments; conducted demonstrations of warhead effectiveness when integrated with multiple systems; finalized interface design for warhead to support integration of warhead with the CSS submunition; conducted final demonstration of CSS with live warhead and self-destruct capabilities. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/project H18.				
Tunable Pyrotechnics: This effort demonstrates reactive energetic technologies that enable the Warfighter to have pyrotechnic munitions for countermeasure missions. In FY08, evaluated the efficacy of tunable pyrotechnic formulations by integrating and combining ignitable reactive materials, nanotechnology and pyrotechnic chemistry. Evaluated the key processes, products, and physical parameters. In FY09, use the successful candidate formulations and conduct energetic characterization, sensitivity studies, and initial prototype application for countermeasures and battlefield effects simulators; develop and test low visibility infrared (IR) decoy flare compositions to protect aircraft from IR guided missiles without revealing aircraft position during night operations; and conduct signature and performance measurements on new nano pyrophoric and pyrotechnic formulations. In FY10, will test enhanced primer and tracer compositions; will mature countermeasure formulation; will integrate formulation into prototype decoys to demonstrate effectiveness against specific threat systems; will demonstrate battlefield effects by testing prototype battlefield effects simulators; will demonstrate feasibility of tunable compositions in battlefield effects.	1.032	2.571	2.959	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.776	.000	
Extended Area Protection and Survivability (EAPS): This effort demonstrates the use of command-guided medium caliber projectiles for the interception and destruction of incoming rockets, artillery and mortar rounds. In FY08, integrated projectile design based on results of comparison and demonstration firings between a course correcting projectile (round A) and an in-flight forward detonating projectile (round B). In FY09, demonstrate separately EAPS components: course correction, warhead, and auto gun subsystems; evaluate command operated course correction and warhead detonation through the air traffic service (ATS) radar as radio frequency (RF) linked communication; and fire ballistic simulators with auto gun.	2.688	2.779	3.911	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER 232

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will fabricate an integrated system including a course correction round and respective warhead subsystems; will investigate command of a projectile maneuver and a warhead detonation simultaneously through an RF link from the ATS radar ground station; will model and simulate the fire of a group of rounds, track them through the radar, and implement a course correction in flight to increase the intercept probability. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/project H28.				
Military Operations in Urban Terrain (MOUT)/Urban Lethal Technologies: This effort demonstrates the next generation of explosive wall breaching and shoulder launched weapon warhead technologies. In FY08, conducted modeling and validation testing of multi-mode warhead design concepts and fuze requirements which enabled demonstration and refinement of the precursor charge for shoulder launched munitions; for the light weight wall breaching system, demonstrated mature linear shaped charge liner and multipoint initiation. In FY09, evaluate advanced fuzing options of multimodal warheads and mature the bash-through warhead on shoulder launched munitions; for the light weight wall breaching system, refine liner and initiation concepts for system integration and demonstrate a one-shot, on-target tandem wall breaching system against appropriate targets; demonstrate multi-purpose capability (multiple targets) from a single shoulder launched munition; and demonstrate a single shot demolition device for the purpose of creating Soldier-sized entry holes in double rebar reinforced concrete walls in a single step. In FY10, will optimize precursor and bash-through warhead for reduced weight; will demonstrate warhead performance against target set for shoulder launched munitions; will demonstrate remote emplacement of a single step breaching system.	3.100	3.494	4.328	
Scalable Effect Weapons and Munitions System: This effort matures scalable warhead technology and materials and demonstrates them in weapon and munition concepts that can be gun or missile launched to deliver a broad spectrum of effects, ranging from non-lethal to lethal, against threat personnel and other targets. In FY08, established baseline, initiated modeling of hardware and conducted experiments to evaluate next generation explosives, reactive materials, and advanced warhead liners. In FY09, define and evaluate system selectability requirements to enable controlled lethality against targets and reduce collateral damage; evaluate warhead tailoring methodologies to control munition energy output and verify modeled scalability effects in reduced munition sizes for man-portable systems; and fabricate and test hardware for evaluation of multipurpose capabilities.	3.095	7.535	13.272	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will model detailed designs and simulate performance of components and system assemblies; will integrate technologies developed under PE 060624/Project H28 into a demonstrator to test advanced technology functions for medium and large caliber scalable and adaptive lethality munitions; will conduct static demonstrations of medium and large caliber munitions in a lab 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. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/project H18 and H28 and PE 0602303A/Project 214.				
Soldier and Small Unit Lethality Integration: This effort leverages the soldier radio waveform (SRW) to enable network lethality at the small combat unit (SCU) level. In FY09, demonstrate mission tasking, acoustic-based target geo-location (gun-fire detection), de-confliction and automated target hand-off from a small unmanned ground vehicle (UGV)/Soldier platform to a small unit effects network; and mature and validate algorithms that support target geo-location, de-confliction, hand-off, and weapon-target pairing for future soldier systems. In FY10, will integrate mission tasking, target geo-location and hand-off from a small UAV platform to a small unit effects network; and will participate and demonstrate small unit effects network at C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) On-The-Move (OTM) test bed. Efforts described here are coordinated and complimentary to related efforts in PE 0603001A/project J50.	.000	2.987	2.952	
Total	30.605	37.958	30.355	

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, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
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 NUMBER 43A	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
43A: ADV WEAPONRY TECH DEMO	28.928	38.113	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Advanced Weaponry Technology development.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Rapid Prototyping for Special Projects	4.829	.000	.000	
Disruptive Technology Acceleration	1.545	.000	.000	
RAMAN Chemical Identification System	1.545	1.550	.000	
Rapid Insertion of Developmental Technology	2.319	2.325	.000	
Electromagnetic Gun Initiative	1.932	.000	.000	
Reactive Nanocomposite Materials	.967	.000	.000	
Lightweight Cannon Recoil Reduction	.774	1.860	.000	
Common Smart Submunition (CSS)	.967	.000	.000	
Knowledge Driven Manufacturing System (KDMS)	.967	.000	.000	
Lightweight Munitions and Surveillance System (LMSS) for Unmanned Air & Ground Vehicles	3.865	2.713	.000	
Micro Electrical Mechanical Systems (MEMS) Application for Armor and Munitions	2.415	1.550	.000	
Nanotechnology Fuze-on-a-Chip	3.478	2.713	.000	
Development of Truck-Deployed Explosive Containment Vessel	1.392	1.550	.000	
Northern Ohio Integrated Command Operations Program	1.933	.000	.000	
Advanced Prototyping with Non-Traditional Suppliers	.000	3.100	.000	
Nanotechnology Manufacturing Center	.000	1.937	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
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 NUMBER 43A

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Precision Molding Manufacturing Technology for Infrared Aspheric Optics	.000	2.247	.000	
Lens-Less Micro Seeker System for Small Steerable Projectiles	.000	1.550	.000	
Advanced Lightweight Gunner Protection Kit	.000	1.163	.000	
Enhanced Jamming Resistant Technology for INS/GPS Precision Guided Munitions	.000	1.550	.000	
Advanced Medium Caliber Tungsten Penetrators	.000	1.550	.000	
Titanium Powder Advanced Forged Parts Program	.000	1.550	.000	
Advanced Fuzing Technologies	.000	3.488	.000	
Hybrid Luminescent Ammunition (pending transfer to 62623)	.000	.775	.000	
Novel Guidance Kit - Phase 2 (NGK2) for M864 Projectile	.000	3.875	.000	
SBIR/STTR	.000	1.067	.000	
Total	28.928	38.113	.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.