Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification										DATE: February 2010	
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 2009 Actual**	**FY 2010 Estimate**	**Base FY 2011 Estimate**	**OCO FY 2011 Estimate**	**Total FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	112.544	89.861	64.438	0.000	64.438	67.325	72.403	85.384	110.595	0	666.988
232: *ADVANCED LETHALITY & SURVIVABILITY DEMO*	37.182	30.198	43.573	0.000	43.573	42.058	44.943	52.266	67.933	Continuing	Continuing
43A: *ADV WEAPONRY TECH DEMO*	43.226	29.266	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
L94: *ELECTRIC GUN SYS DEMO*	11.273	6.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
L96: *HIGH ENERGY LASER TECHNOLOGY DEMO*	19.869	23.191	19.868	0.000	19.868	20.808	24.992	29.406	37.713	Continuing	Continuing
L97: *SMOKE AND OBSCURANTS ADVANCED TECHNOLOGY*	0.994	1.007	0.997	0.000	0.997	4.459	2.468	3.712	4.949	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 components 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. 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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B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	109.074	66.410	68.726	0.000	68.726
Current President's Budget	112.544	89.861	64.438	0.000	64.438
Total Adjustments	3.470	23.451	-4.288	0.000	-4.288
• Congressional General Reductions		-5.969			
• Congressional Directed Reductions					
• Congressional Rescissions		0.000			
• Congressional Adds		29.420			
• Congressional Directed Transfers					
• Reprogrammings	6.181	0.000			
• SBIR/STTR Transfer	-2.711	0.000			
• Adjustments to Budget Years	0.000	0.000	-4.288	0.000	-4.288

Change Summary Explanation

FY10 Congressionally directed increases.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification									DATE: February 2010		
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COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**Base FY 2011 Estimate**	**OCO FY 2011 Estimate**	**Total FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
232: *ADVANCED LETHALITY & SURVIVABILITY DEMO*	37.182	30.198	43.573	0.000	43.573	42.058	44.943	52.266	67.933	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 Program ($ in Millions)

	FY 2009	**FY 2010**	**Base FY 2011**	**OCO FY 2011**	**Total FY 2011**
Program #1	5.172	0.000	0.000	0.000	0.000
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 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 FY09, modeled interaction between an ultra-short laser and variable high voltage sources as well as solid state high power microwave (HPM) sources for integration into a laser channeled weapon; began design to integrate compact solid state HPM and high voltage sources to obtain a DE weapon system demonstrator. Since system analysis demonstrated that solid state amplifier technology did not meet size and volume requirements for a weapon application using the HPM technology, efforts on the design of the laser guided weapon demonstrator were returned to PE 0602624A/Project H19 starting in FY10.					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 Ground Based Networked Munitions Technologies: This effort provides follow-on technology advancement to ground based munitions systems currently being developed with improved capabilities, including a non-lethal response. In FY09, conducted 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 Multiple Launch Rocket System (MLRS), Unmanned Aerial Systems (UAS), Fixed and Rotary wing platforms; developed a concept that integrates technologies that allow precision emplacement of Intelligent Munitions Systems (IMS) from a standoff distance that is as effective as hand emplaced IMS (PE 0654808/Project D016); and conducted a trade study to evaluate different approaches for low collateral self destruct. In FY10, mature non-lethal layered response concept, focusing on a delivery methodology for commercial off-the-shelf (COTS) munitions; demonstrate initial prototype capability for low collateral self destruct in a laboratory environment; and demonstrate a passive communications repeater approach in the laboratory while maturing a 40mm flare-based deployment concept. In FY11, will demonstrate a non-lethal layered response concept, focusing on ability to deploy munitions that can be fired in succession to intended ranges; will continue to mature low-collateral self destruct concept by demonstrating a system with a representative explosively formed penetrator warhead. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H19.	3.113	2.953	3.101	0.000	3.101

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 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 FY09, defined and evaluated system selectability requirements to enable controlled lethality against targets and reduce collateral damage; evaluated warhead tailoring methodologies to control munition energy output and verify modeled scalability effects in reduced munition sizes for man-portable systems; and fabricated and tested hardware for evaluation of multipurpose capabilities. In FY10, model detailed designs and simulate performance of components and system assemblies; integrate 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; conduct 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. In FY11, will fabricate and integrate hardware and 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 will verify system scalable lethality performance using technical	7.535	12.460	11.363	0.000	11.363

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
data and M&S analysis. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H18 and H28 and PE 0602303A/Project 214. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #4 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 FY09, conducted instrumented ballistic and guided flight tests; demonstrated pre-programmed maneuver and guide-to-hit capabilities in ten mature prototypes of precision guided 105mm projectile; and optimized the tactical design of sensors and fuze technologies. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/project H18. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	3.543	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #5	2.987	2.972	2.959	0.000	2.959
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, demonstrated 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 matured and validated algorithms that support target geo-location, de-confliction, hand-off, and weapon-target pairing for future soldier systems. In FY10, integrate mission tasking, target geo-location and hand-off from a small unmanned aerial vehicle (UAV) platform to a small unit effects network; and participate and demonstrate small unit effects network at command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) On-The-Move (OTM) test bed. In FY11, will refine and evaluate coordinated target hand-off, attack capability, and de-confliction with a small UGV/small UAV; and will demonstrate network fire capabilities and control decision. Efforts described here are coordinated and complimentary to related efforts in PE 0603001A/Project J50. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #6 Dual Use Composites (DUC): This effort demonstrates the application of carbon/thermoplastic materials in a UAV shaped munition. In FY09, integrated fuze into an artillery projectile; demonstrated projectile lethality in a lab environment; integrated fuze with the DUC projectile for the design and development of the first tube/ rail launch miniature lethal UAV; evaluated structural integrity of a DUC projectile integrated into an UAV; and demonstrated prototype of the miniature lethal UAV in a relevant environment (performed reconnaissance of objective, loiter and engagement of target). *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.600	0.000	0.000	0.000	0.000
Program #7 Tunable Pyrotechnics: This effort demonstrates reactive energetic technologies that enable the Warfighter to have pyrotechnic munitions for countermeasure missions. In FY09, used the successful candidate formulations and conducted energetic characterization, sensitivity studies, and initial prototype application for countermeasures and battlefield effects simulators; developed and tested low visibility infrared (IR) decoy flare compositions to	2.571	2.979	2.928	0.000	2.928

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
protect aircraft from infrared guided missiles without revealing aircraft position during night operations; and conducted signature and performance measurements on new nano pyrophoric and pyrotechnic formulations. In FY10, test enhanced primer and tracer compositions; mature countermeasure formulation; integrate formulation into prototype decoys to demonstrate effectiveness against specific threat systems; demonstrate battlefield effects by testing prototype battlefield effects simulators; and demonstrate feasibility of tunable compositions in battlefield effects. In FY11, will conduct a comprehensive evaluation on the performance of the compositions in a countermeasure mission using computer models of the decoy, will evaluate effectiveness against simulation threat systems and captive IR seeker threat systems; and will mature formulation characterization of IR and visible illumination compositions. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #8 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 FY09, demonstrated EAPS components separately: course correction, warhead, and auto-gun subsystems; evaluated command operated course correction and warhead detonation through radio frequency (RF) linked communication over the ammunition tracking system (ATS) radar as radio frequency (RF) linked communication;	2.779	3.915	4.358	0.000	4.358

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
and fired ballistic simulators with auto gun. In FY10, fabricate an integrated system including a course correction round and respective warhead subsystems; investigate command of a projectile maneuver and a warhead detonation simultaneously through an RF link from the ATS radar ground station; and 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. In FY11, will demonstrate with a fully loaded round with the capability to track, perform command maneuver and detonate warheads through an RF link. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/project H28 and PE 0603313A/Project 263. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #9 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 FY09, evaluated advanced fuzing options of multimodal warheads and matured the bash-through warhead on shoulder launched munitions; for the light weight wall breaching system, refined liner and initiation concepts for system integration and demonstrated a one-shot, on-target tandem wall breaching system against appropriate targets; demonstrated multi-purpose capability (multiple targets) from a single shoulder launched munition; and demonstrated a single shot demolition device for the purpose of creating Soldier-sized entry holes in double rebar reinforced concrete	3.494	4.357	6.606	0.000	6.606

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
walls in a single step. In FY10, optimize precursor and bash-through warhead for reduced weight; demonstrate warhead performance against target set for shoulder launched munitions; and demonstrate remote emplacement of a single step breaching system. In FY11, will mature fuzing technologies and build a prototype for shoulder launched weapons; will mature standoff breaching warhead design and will a build prototype; will test the enhanced shoulder launched weapon and breeching warhead in a Military relevant environment. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #10 Kinetic Energy Active Protection System (KEAPS): This effort matures and demonstrates warhead and fuze safe and arming (S&A) technology to support KEAPS, which enhances the survivability of lightly armored vehicles. In FY09, matured warhead and S&A device; and demonstrated and validated their performance against the primary class of threats and validated 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. *FY 2009 Accomplishments:* FY 2009	4.393	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #11 Reliability for the Future Force: This effort matures advanced physics-based stochastic methods to enhance the reliability of critical micro electromechanical systems (MEMS) and devices. In FY09, defined critical failure mechanisms through probabilistic physics-based modeling; created explicit and implicit physics-based failure modes; identified the uncertainties for each variable and developed probability models; performed sensitivity analysis and optimized design and process; and developed probabilistic models for MEMS failure physics and reliability models for each failure mode building from sub-component and material levels up through component subassembly to integrated S&A levels. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	0.995	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #12 Advanced Lethality Demonstration: This effort matures and demonstrates and assesses novel penetrator designs and 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 with equal or better performance to our currently fielded depleted uranium based rounds. In FY11, will initiate performance assessment of three novel penetrator configurations at both ordnance and hypervelocity. Will conduct system trade studies; will fabricate and bench test full scale surrogates to evaluate tactical deployment concepts; and will revise baseline tank main gun kinetic energy cartridge system designs to incorporate these novel penetrator configurations. Efforts described here are coordinated and complementary to the FY10 Advanced Lethality Demonstration in PE0603004A/Project L94. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.000	3.685	0.000	3.685
Program #13	0.000	0.000	3.487	0.000	3.487

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Dual-Use Improved Conventional Munitions (DPICM) Replacement Acceleration: 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. In FY11, will mature and demonstrate enabling components and subsystems that provide: ultra high reliability through exploitation of novel power sources and redundant fuze architecture; enhanced lethal effects against armored targets via optimization of high velocity penetrators and explosives; increased area coverage through demonstration of innovative munitions dispense systems; and UXO compliance via improved self-destruct/self-neutralization features. 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 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #14 Medium Caliber Weapon Systems: This effort matures and demonstrates advanced medium caliber rounds, weapon and ammunition systems optimized for remote applications which address 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	0.000	0.000	5.086	0.000	5.086

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
non-lethal to highly lethal to provide escalation of force capability in one system. In FY11, will mature and demonstrate designs and components for alternative lethality mechanisms; will develop demonstration system mature controls and software; will initiate system engineering analyses and testing; will explore remote armament designs and build demonstrators. Efforts described here are coordinated and complimentary to the FY10 Advanced Lethality Demonstration in PE 0603004A/Project L94. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #15 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	0.000	0.562	0.000	0.000	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	37.182	30.198	43.573	0.000	43.573

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 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total 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*	43.226	29.266	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	1.595	0.000	0.000	0.000	0.000
RAMAN Chemical Identification System: In FY09, this Congressional Interest Item supported development of a handheld device (under 8 oz.) that could identify unknown explosives, chemical warfare agents, toxic industrial chemicals, narcotics, and other hazardous materials. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2	2.392	1.591	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Rapid Insertion of Developmental Technology: In FY09, this Congressional Interest Item supported fielding of developmental technologies through spiral development into existing and future systems. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #3 Lightweight Cannon Recoil Reduction: In FY09, this Congressional Interest Item supported the design, modeling, simulation and engineering of new innovative low recoil and lightweight cannon components that lower the weight of current and emerging weapon systems. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	1.913	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #4 Lightweight Munitions and Surveillance System (LMSS) for Unmanned Air & Ground Vehicles: In FY09, this Congressional Interest Item supported development of an unmanned vehicle turret with a common mechanical interface capable of mounting various machine guns as well as rocket launchers, and various sensors. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.791	3.819	0.000	0.000	0.000
Program #5 Micro Electrical Mechanical Systems (MEMS) Application for Armor and Munitions: In FY09, this Congressional Interest Item addressed the need of incorporating nanotechnologies and MEMS into smart munitions. *FY 2009 Accomplishments:* FY 2009	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #6 Nanotechnology Fuze-on-a-Chip: In FY09, this Congressional Interest Item applied micromachining methods to munition fuzes, in order to integrate all fuze components into a single chip. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.791	1.591	0.000	0.000	0.000
Program #7	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Development of Truck-Deployed Explosive Containment Vessel: In FY09, this Congressional Interest Item supported a truck deployed explosive containment vessel; design, test, and verify fabrication procedures and evaluate experimental data. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #8 Advanced Prototyping with Non-Traditional Suppliers: In FY09, this Congressional Interest Item developed a strategy to design rapid prototypes that combined and leveraged Army requirements, resources, and assets with non traditional suppliers' technologies/resources. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	3.189	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #9 Nanotechnology Manufacturing Center: In FY09, this Congressional Interest Item enhanced the capabilities of the National Nanotechnology Manufacturing Center and effectively engaged partners under the Nanotechnology Consortium to rapidly develop nanotechnology, and create production capabilities to meet military demand. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	1.993	0.000	0.000	0.000	0.000
Program #10 Precision Molding Manufacturing Technology for Infrared Aspheric Optics: In FY09, this Congressional Interest Item matured a process to reduce the cost to produce lightweight, high performance, aspheric glass optics through glass molding rather than the current process of grinding and polishing.	2.312	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #11 Lens-Less Micro Seeker System for Small Steerable Projectiles: In FY09, this Congressional Interest Item supported the continued development of lens-less micro-scale seeker architectures for conformal-mounting on gun-launched small steerable projectiles. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	1.595	1.990	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #12 Advanced Lightweight Gunner Protection Kit: In FY09, this Congressional Interest Item add developed new ballistic armor that integrates high-strength glass and plastic materials. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	1.196	0.796	0.000	0.000	0.000
Program #13 Enhanced Jamming Resistant Technology for INS/GPS Precision Guided Munitions: In FY09, this Congressional Interest Item demonstrated a high jamming resistant INS/GPS approach used for gun-fired munitions in jamming environments which was achieved by focusing on improving the inertial segment of the technology. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	1.595	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #14 Advanced Medium Caliber Tungsten Penetrators: In FY09, this Congressional Interest Item investigated the use of advanced tungsten alloys that achieve near equivalent performance of current depleted uranium (DU) penetrators. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	1.595	0.000	0.000	0.000	0.000
Program #15 Titanium Powder Advanced Forged Parts Program: In FY09, this Congressional Interest Item developed the technologies to reduce the cost and increase the supply of specialty titanium parts made from entirely US supplied titanium powder.	1.595	3.024	0.000	0.000	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #16 Advanced Fuzing Technologies: In FY09, this Congressional Interest Item supported development of advanced fuze designs needed to support next generation Army tank ammunition (105mm and 120mm) programs. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	3.588	0.000	0.000	0.000	0.000
Program #17	3.987	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Novel Guidance Kit - Phase 2 (NGK2) for M864 Projectile: In FY09, this Congressional Interest Item advanced the novel guidance kit concept for 105mm projectile compatibility with a better than 30-m circular error probability and verified the structural integrity and gun hardened the electronics. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #18 Micro Inertial Navigation Unit Technology. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	0.000	1.194	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #19 Soldier Protection through Unmanned Ground Vehicles. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	1.194	0.000	0.000	0.000
Program #20 Advanced Robot and Sensor Technology for Surveillance and Energy Efficiency Applications. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	0.000	1.194	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #21 Next Generation Machining Technology and Equipment. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	1.592	0.000	0.000	0.000
Program #22 Lightweight Reliable Materials for Military Systems. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009	0.000	2.785	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2010 Plans: FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #23 Biosensor, Communicator and Controller System. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	3.482	0.000	0.000	0.000
Program #24 Technology Development at the Quad Cities Manufactury Laboratory. This is a Congressional Interest Item.	0.000	5.014	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #25 National Nuclear Security Administration (NNSA) Metals Declassification for Reuse by DoD Armaments. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	2.720	0.000	0.000	0.000	0.000
Program #26	3.189	0.000	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 43A: *ADV WEAPONRY TECH DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Rapid Prototyping for Special Projects. This is a Congressional Interest Item. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	43.226	29.266	0.000	0.000	0.000

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.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
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 L94: *ELECTRIC GUN SYS DEMO*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total 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*	11.273	6.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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 Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	11.273	0.216	0.000	0.000	0.000
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 FY09, conducted composite material analyses and structural validation tests of the rotor banding process and reassessed Pulse Power Supply (PPS) performance; commenced manufacture and verification testing of the major rotating machine components; assembled a switch converter stack that demonstrated requisite functional criteria; and test fired an integrated launch package with a high explosive, fuzed warhead from a laboratory EM gun. 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. In FY10, execute scope reduction and contract completion activities to terminate the program to develop a vehicle-mounted EM gun; provide Army stewardship of the pulsed power technology for future work; conduct the inventory and disposition of hardware, document and preserve the intellectual property, and disassemble, package, and ship EM gun launcher and mount from Yuma Proving Ground to ARDEC.					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 L94: *ELECTRIC GUN SYS DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 Advanced Lethality Demonstration: 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. In FY10, evaluate alternative penetrator designs at conventional to hypervelocity for tank main guns; evaluate components for alternative lethal mechanisms against advanced armor and area targets; and mature and evaluate conventional and advanced weapon propulsion alternatives for their potential to attain increased velocities and performance. Beginning in FY11, this effort will be documented in PE0603004/Project 232. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base	0.000	5.865	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 L94: *ELECTRIC GUN SYS DEMO*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
OCO FY 2011 Plans: FY 2011 OCO					
Program #3 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.118	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	11.273	6.199	0.000	0.000	0.000

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.

Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010
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 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total 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*	19.869	23.191	19.868	0.000	19.868	20.808	24.992	29.406	37.713	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, 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 Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	19.869	22.556	19.868	0.000	19.868
High Energy Laser Technology Demonstrator (HEL TD): This effort matures and integrates SSL components and subsystems on a mobile platform to demonstrate a mobile 100 kW class solid state HEL TD. In FY09, continued HEL TD system engineering efforts; completed the Beam Control System (BCS) design; and began the fabrication and assembly of the BCS components, to include optics, beam director, alignment and tracking assemblies, gimbals, platform and Warfighter machine interfaces, and electronics racks; due to manufacturing and coating challenges, delayed fabrication of the primary mirror. In FY10, continue the fabrication and assembly of the BCS components; begin coating process for primary mirror; conduct software verification and validation					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
and conduct BCS alignment test as preparation for low power range laser testing; and continue the system-level preliminary design of the integrated HEL mobile demonstrator. In FY11, will complete the fabrication, assembly, and functional testing of the BCS; will complete coating process for primary mirror; will explore integration issues of subsystems onto a tactical vehicle platform; will conduct low power HEL testing to demonstrate target acquisition, tracking, and aim point selection; will evaluate performance from low power testing and will make necessary changes; will purchase test targets; and will design and fabricate hardware and will develop software interfaces to integrate the BCS and the 100 kW SSL located at the High Energy Laser Systems Test Facility. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010	0.000	0.635	0.000	0.000	0.000

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Accomplishments/Planned Programs Subtotals	19.869	23.191	19.868	0.000	19.868

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 2011 Army RDT&E Project Justification			DATE: February 2010
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 2009 Actual	FY 2010 Estimate	Base FY 2011 Estimate	OCO FY 2011 Estimate	Total 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*	0.994	1.007	0.997	0.000	0.997	4.459	2.468	3.712	4.949	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 Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1	0.994	0.979	0.997	0.000	0.997
Obscurant Enabling Technologies: This effort demonstrates the dissemination of advanced infra-red (IR) obscurants. In FY09, evaluated dissemination methods and conducted modeling and analysis of advanced IR obscurants for artillery and mortar applications. In FY10, design bi-spectral obscurant prototypes for initial dissemination evaluations. In FY11, will mature, fabricate, and test grenade concept for bi-spectral obscuration and effective dissemination patterns.					
FY 2009 Accomplishments: FY 2009					
FY 2010 Plans: FY 2010					

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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 Program ($ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Base FY 2011 Plans: FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO					
Program #2 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *Base FY 2011 Plans:* FY 2011 Base *OCO FY 2011 Plans:* FY 2011 OCO	0.000	0.028	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	0.994	1.007	0.997	0.000	0.997

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, PB 2011 Army RDT&E Project Justification		DATE: February 2010
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*

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.