Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Army										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions 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	140.727	42.645	39.813	-	39.813	37.740	35.705	35.355	34.285	Continuing	Continuing
H18: *Weapons & Munitions Technologies*	16.814	19.300	11.964	-	11.964	12.618	12.738	13.127	12.918	Continuing	Continuing
H19: *ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES*	11.830	11.781	16.232	-	16.232	13.151	11.090	10.527	8.782	Continuing	Continuing
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*	100.813	-	-	-	-	-	-	-	-	Continuing	Continuing
H28: *WARHEADS/ ENERGETICS TECHNOLOGIES*	11.270	11.564	11.617	-	11.617	11.971	11.877	11.701	12.585	Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this program element (PE) is to design and develop enabling technology for improved lethal and nonlethal weapons and munitions with increased performance and the potential for lower weight, reduced size, and improved affordability. This PE supports weapons and munitions development (project H18); technologies to maintain the lethality of US weapons and directed energy (DE) technologies and subsystems to support the weaponization of high power microwave (HPM), and short pulse lasers (project H19) and development of munition components such as fuzes, power, warheads with tailorable effects, and insensitive munition compliant energetic materials (project H28). Project H1A funds congressional special interest items.

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

Work in this PE is primarily performed by the Armament Research, Development, and Engineering Center (ARDEC) at Picatinny Arsenal, NJ, in cooperation with the Army Research Laboratory (ARL) at Aberdeen Proving Ground, MD, the Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA, the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI, and the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), 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 2: *Applied Research*		R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*			
B. Program Change Summary ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**
Previous President's Budget	144.864	42.645	39.459	-	39.459
Current President's Budget	140.727	42.645	39.813	-	39.813
Total Adjustments	-4.137	-	0.354	-	0.354
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-3.219	-			
• SBIR/STTR Transfer	-0.918	-			
• Adjustments to Budget Years	-	-	0.354	-	0.354

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H18: *Weapons & Munitions Technologies*	

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
H18: *Weapons & Munitions Technologies*	16.814	19.300	11.964	-	11.964	12.618	12.738	13.127	12.918	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project designs and develops component technologies to enable affordable smart munitions that can be launched from multiple platforms as well as provide increased lethality and performance with reduced logistics and advanced direct/indirect fire capabilities.

Work in project H18 is related to, and fully coordinated with, efforts in projects H19 and H28 (also in PE 0602624A), PE 0602618A (Ballistics Technology), and projects 232 and L94 in PE 0603004A (Weapons and Munitions 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.

The work in this project is performed by the Armament Research, Development, and Engineering Center (ARDEC), at Picatinny Arsenal, NJ, and the Army Research Laboratory (ARL) at Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: High Power Microwave (HPM) - Anti-Materiel Munitions	3.753	3.247	-
Description: This effort designs and develops HPM technology for use in non-lethal (NL) munitions. ***FY 2010 Accomplishments:*** Developed non-fragment producing materials for carriers to achieve NL effects; developed, tested and integrated HPM technology to obtain higher energy density, high voltage, nano-second discharge times, and solid state switches for nano-second discharge rates; identified components that provide the greatest ability to tune the system to get the desired effects; and test components integrated into a system to characterize defeat mechanisms for target sets. ***FY 2011 Plans:*** Develop, test and integrate frequency adjusting technology components for graduated effects on multiple targets. In addition, bound target set frequency vulnerabilities through use of susceptibility analysis and modeling to enable optimization of weapon antenna, radio frequency source, power conditioning, and prime power; explore ability to create graduated target effects through geometry variations, dielectric and magnetic material choices, and antenna gain design; and integrate components to determine performance improvements and insure repeatable results.			
Title: Novel Propulsion Technology for the Future	1.850	1.658	3.029

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Description: This effort develops propellant technologies for advanced gun launch and directional thrusters including those that deliver a broad spectrum of effects. ***FY 2010 Accomplishments:*** Fabricated and tested propellants and igniters in component tests; began integration with the objective munition designs (30mm medium caliber cartridge and 105mm artillery shell); developed, verified, and utilized M&S to predict performance in components. ***FY 2011 Plans:*** Fabricate more propellant for objective demonstrations and complete integration with objective munition designs; characterize performance in live fire tests; continue to develop, verify, and refine M&S to predict performance in an integrated munition. Efforts described here are coordinated and complimentary to related Scaleable Effect efforts in PE 0602624A/Project H28 and PE 0603004A/Project 232. ***FY 2012 Plans:*** Will model propulsion systems and conduct trade studies for candidate conventional and new chemical ingredients, formulations, and configurations to maximize the performance of chemical propellants while improving their insensitivity to unplanned stimuli; will formulate promising propellants and evaluate them for performance and insensitivity.			
Title: Advanced Munition Components ***Description:*** This effort designs and develops individual components in the firing chain for gun launched munitions. ***FY 2010 Accomplishments:*** Focused on designing and developing scalable adaptable munition components; evaluated various munition components and determined options to modify components to support scalable munition development; evaluated performance through M&S tools and selected a caliber to design the initial scalable munition round and initiated design. ***FY 2011 Plans:*** Complete design of scalable adaptable munition and begin fabrication of the laboratory demonstrators; test and evaluate the performance of laboratory demonstrator munitions in selected system configurations against a spectrum of targets to determine performance and effectiveness.	2.576	3.568	-
Title: Advanced Munition Payloads ***Description:*** This effort develops novel payloads and related components for integration into gun-fired munitions and missiles. ***FY 2010 Accomplishments:***	4.679	5.205	3.512

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H18: *Weapons & Munitions Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Assessed advanced fuze technologies capable of either detonating or deflagrating submunitions such as Dual-Purpose Improved Conventional Munitions (DPICM) in selected environments; conducted study concepts of extremely insensitive energetics and sensor-fuzed munitions to determine optimal design configurations that reduce and eliminate unexploded ordnance (UXO) on the battlefield while retaining area denial capability. ***FY 2011 Plans:*** Develop and validate M&S tools for deflagrating munitions; perform trade studies to evaluate submunition component technologies; and conduct initial tests to verify deflagration models. Efforts described here are coordinated and complimentary to related efforts in PE 0603004A/Project 232. ***FY 2012 Plans:*** Will investigate environments that will provide useful data for the development of components- setback, expulsion and impact; will mature components and validate effectiveness and reliability through component and bench level testing. Efforts described here are coordinated and complimentary to related efforts in PE 0603004A/Project 232.			
Title: Advanced Weapons Technology ***Description:*** This effort investigates innovative weapon technologies for future medium caliber direct fire systems that provide similar or greater lethality than current systems. ***FY 2010 Accomplishments:*** Assessed detailed designs of distributive technologies for new weapon delivery effects; conducted detailed analysis to select novel weapon schemes for use in recoilless medium caliber weapons such as rarefactory wave gun and novel light gas guns; and developed critical design factors for launch survivability, component reliability, and recoil energy management. ***FY 2011 Plans:*** Select the most promising weapon technologies to develop breadboard components and begin target effectiveness tests to determine optimum size, weight, and power required to defeat various targets; and optimize selected technologies based on their ability to defeat the widest variety of targets. ***FY 2012 Plans:*** Will continue to mature most promising weapon technologies and evaluate for transition to advanced development; will conduct additional small scale research into multiple novel weapon system candidate technologies.	3.085	3.608	2.214
Title: Affordable Precision Technology ***Description:*** This effort develops and incorporates technologies to provide affordable precision to the full spectrum of gun calibers.	0.871	2.014	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602624A: *Weapons and Munitions Technology*	**PROJECT** H18: *Weapons & Munitions Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: Identified technologies that can potentially increase delivery accuracy and lethal performance of weapons. ***FY 2011 Plans:*** Sort most promising technologies by applicable caliber size and prioritize by greatest capability increase and cost to implement; and choose and initiate development of the most promising/most affordable efforts to enhance weapon precision. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H19.			
Title: Fire Control Target Recognition ***Description:*** This effort investigates innovative fire control and target recognition technologies to improve the effectiveness of small, medium, and large caliber weapon systems. ***FY 2012 Plans:*** Will model fire control hardware and fire control and target recognition algorithms and conduct trade studies for candidate technologies to maximize the performance of weapon systems while maintaining commonality for future application to multiple weapon system calibers and configurations.	-	-	1.120
Title: Line-of-Sight (LOS) Course Correction Munition Technology ***Description:*** This effort develops and evaluates technologies to improve precision and lower collateral damage in munitions with in-flight adjustment capabilities. ***FY 2012 Plans:*** Will design and develop components for line-of-sight (LOS) course correction munitions, i.e. warhead, sensor, communication link and guidance/Control; will investigate performance enhancements of a LOS Course correction munitions.	-	-	2.089
Accomplishments/Planned Programs Subtotals	16.814	19.300	11.964

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 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H19: *ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES*	

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
H19: *ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES*	11.830	11.781	16.232	-	16.232	13.151	11.090	10.527	8.782	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project designs and develops technologies to support asymmetric countermeasures such as radio frequency and ultra-short pulse directed energy and efforts to maintain the lethality and overmatch of US weapons. Work in this project is related to, and fully coordinated with, efforts in projects H18 and H28 (also in PE 0602624A), PE 0602618A (Ballistics Technology), and projects 232 and L94 in PE 0603004A (Weapons and Munitions 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.

This work is performed by the Armament Research, Development, and Engineering Center (ARDEC), at Picatinny Arsenal, NJ, and the Army Research Laboratory (ARL) at Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Pulsed Laser Component Technologies	3.783	3.615	-
Description: This effort develops and miniaturizes key Directed Energy technology components to enable a Laser Induced Plasma Channel (LIPC) capability. The LIPC effect uses a short pulse laser to generate a conductive path in the air in which high powered microwaves (HPM) and/or high voltage bursts are channeled to defeat different targets at stand-off. Related work continues in 0602624A/Project H19 in FY12 under title DE Standoff Enabler. ***FY 2010 Accomplishments:*** Matured model of critical components of LIPC system for optimal interaction of laser induced channel and high voltage waveforms; conducted studies of LIPC subsystems parameters to enhance transmission of the high voltage waveform required for desired range and target effects; and initiated design of advanced high quality critical subcomponents for a LIPC system. ***FY 2011 Plans:*** Develop LIPC system design based upon results of parametric studies and modeling efforts; and continue to mature and integrate subsystem components towards fieldable requirements, i.e. volume, weight, ruggedness.			
Title: Novel Battlefield Effectors	3.764	2.073	1.970
Description: This effort develops unique weapon and munitions enabling technologies to achieve tunable effects on targets and that are capable of providing a full range of effects from non-lethal to highly lethal via a single weapon or munition			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H19: *ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: Selected the most promising munitions/weapons to achieve the projection of tunable effects for line-of-sight (LOS), beyond-line-of sight (BLOS), and non-line-of-sight (NLOS) missions; developed the technologies into a breadboard system and begin target effectiveness studies; and conducted trade studies to determine the proper power, size, and weight to achieve required lethal effects on various targets. ***FY 2011 Plans:*** Complete full target effectiveness testing with the bread board system and design a brassboard to demonstrate novel battlefield effects for direct and indirect fire platforms. ***FY 2012 Plans:*** Will continue to develop most promising effector technologies and evaluate for transition to advanced development; will conduct additional research into multiple novel battlefield effector candidate technologies.			
Title: Active Denial Technologies ***Description:*** This effort develops compact non-lethal, counter-personnel DE technologies. . ***FY 2011 Plans:*** Complete design of brassboard to determine scalability for different platforms; investigate different technologies to mature components in terms of weight, input and output power, effective range beam formation, characterization, control, operational environment, and thermal management. ***FY 2012 Plans:*** Will complete design and build of a palletized system to validate that solid state active denial technology can achieve desired range (100 meters); will conduct experiments to determine personnel incapacitation or repel effects are achievable.	-	2.500	3.400
Title: Counter Countermeasure (CCM) Technologies for weapons and munitions ***Description:*** This effort develops technology to enable continued effectiveness of US weapon systems against enemy countermeasures including Active Protection Systems (APS), Global Positioning System (GPS) jamming, and active seeker jamming. ***FY 2010 Accomplishments:*** Conducted systems effectiveness analysis to determine which weapons/rounds are most susceptible to countermeasures; investigated potential counter-countermeasure techniques/technologies and identify the most promising that reduce the	4.283	3.593	4.564

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
effectiveness of threat countermeasure technologies. Efforts are coordinated and complimentary to related efforts in PE 0603004A/Project 232. ***FY 2011 Plans:*** Prioritize and down select CCM technologies and begin design and fabrication of breadboard components to demonstrate superior counter-countermeasure technologies with respect to current systems. ***FY 2012 Plans:*** Will continue to develop most promising CCM technologies and evaluate for transition to advanced development; will conduct additional small scale research into multiple counter countermeasure candidate technologies.			
Title: Novel Penetrator Designs ***Description:*** This effort provides novel direct fire capabilities against advanced heavy armor threats. ***FY 2012 Plans:*** Will design and develop novel penetrator designs concepts and conduct penetration experiments against range targets.	-	-	2.984
Title: Directed Energy (DE) Standoff Enabler ***Description:*** This effort develops the capability for stand-off neutralization technology utilizing high power, directed energy (DE) sources. ***FY 2012 Plans:*** Will design and develop DE standoff improvised explosive device (IED) neutralization technology; will conduct research on high voltage and RF coupling to laser induced plasma filaments; will mature components required to achieve multi-mode anti-materiel DE effects	-	-	3.314
Accomplishments/Planned Programs Subtotals	11.830	11.781	16.232

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 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*	

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
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*	100.813	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Weapons and Munitions Technology applied research.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Green Armaments/Range Safe ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item developed innovative technologies to reduce the environmental impact of Army armaments, munitions and operations on natural resources.	1.592	-	-
Title: Advanced Materials & Process for Armament Structures (AMPAS) ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item implemented pilot-scale research, with capital equipment, using native Ohio titanium production facilities for low-cost titanium products used in U.S. Army applications.	3.183	-	-
Title: Armament System Engineering and Integration Initiative (ASEI2) ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item implemented pilot-scale research, with capital equipment, using native Ohio titanium production facilities for low-cost titanium products used in U.S. Army applications.	1.592	-	-
Title: Army Center of Excellence in Acoustics ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:***	3.979	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
This Congressional Interest Item developed acoustic sensor systems for aerostats and unmanned aerial vehicle platforms for various targeting, detection/tracking, and collision avoidance scenarios.			
Title: Developmental Mission Integration ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported a dedicated effort that matured, updated, prototyped and spun out armament and munitions technologies needed by the warfighter in the near term (6 to 12 months).	5.572	-	-
Title: Ripsaw Unmanned Ground Vehicle Weaponization ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported integration of the ARDEC Remote Weapon Systems Armaments onto the Ripsaw unmanned ground vehicle, Specifically, the add finished the testing phase of the Ripsaw platform and acquired an essential safety Released from the US Army.	1.990	-	-
Title: Advanced Rarefaction Weapon Engineered System ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported development of next generation rarefaction wave gun technology which aims to achieve significant improvements in performance, lethality, survivability, and economy.	3.183	-	-
Title: Effects Based Operations Decision Support Services (EBODSS) ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item researched, developed and tested probabilistic reasoning intelligent agents within a commercial Service Oriented Architecture environment to provide decision support services to targeting personnel	1.592	-	-
Title: Rapid Response Force Protection System (Remote Weapons Platform) ***Description:*** This is a Congressional Interest Item.	1.592	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: This Congressional Interest Item supported integration of Tactical Autonomous Combat-Chassis (TAC-C) robotic vehicles with mortars and Remote Armament Systems (RAS) mission packages to give soldiers increased stand-off protection against ambushes and provide a rapid response means to significantly enhance force protection.			
Title: Center for Borane Technology ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item applied nanotechnology research to develop explosive and gun propellants for applications in miniature and lightweight weapons systems.	1.990	-	-
Title: Exploding Foils Initiators with Nanomaterial-based Circuits ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item researched ways to reduce the cost of exploding Foils Initiators (which can save numerous lives by reducing unintended detonation) by 2 orders of magnitude, from hundreds of dollars to several dollars.	2.387	-	-
Title: Research for Army Cannon Systems ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item developed analytical and testing systems for composite cannon barrels.	2.387	-	-
Title: MATRIC- Project National Shield Integration Center ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported establishment of an integration center capability for Project National Shield (PNS), a System of Systems Security integration program. PNS is managed by the U.S. Army ARDEC and is focused on shielding the United States from all potential disasters, man-made or natural, by providing an integrated surveillance, warning, response and recovery capability.	1.194	-	-
Title: Specialized Compact Automated Mechanical Clearance Platform	3.183	-	-

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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:*** This Congressional Interest Item supported development of technology to make mine clearance faster, cheaper and more effective.			
Title: Kinetic Energy Enhanced Lethality and Protection Materials ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported analysis, testing and demonstration of four leading possibilities for using tungsten as a depleted uranium replacement in Army ammunition: Layered Long Rod Composite; Nanostructures for Severe Plastic Deformation; Steel Jacketed Tungsten Penetrators; and, Infiltrated Solid State Sintered Penetrators.	1.990	-	-
Title: Advanced Technologies Energy and Manufacturing Science ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item identified solutions to meet a wide array of diverse challenges including energetics and insensitive munitions (IM) development, directed energy & laser vulnerability of weapons and munition systems, armaments power and energy, and advanced materials manufacturing processes.	6.964	-	-
Title: Threat Detection and Neutralization Project ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported the design and implementation of a comprehensive threat detection and neutralization system for autonomous air, water, and ground devices.	3.183	-	-
Title: Defense Support for Civil Authorities (DSCA) for Key Resource Protection ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:***	0.796	-	-

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
This is a Congressional Interest Item supported efforts to combine and harmonize a number of Homeland Defense and Homeland Security programs under the umbrella of Project National Shield (PNS); the program developed processes and protocols to improve the ability to communicate with Federal, State and local jurisdictions as it relates to local first responders.			
Title: SLEUTH Tungsten Heavy Alloy Pen/Warhead Dev. ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item researched development of 1) a non-cobalt containing tungsten alloy can replace depleted uranium (DU) in medium and large cal armor piercing rounds and 2) development of an improved 30mm/40mm airburst warhead and 40mm grenade body through the use of tungsten based materials containing no cobalt while incorporating special production processes that improve stability and increase lethality.	1.194	-	-
Title: Acoustic Gun Detection System for Tracked Combat Vehicles ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item incorporated novel acoustic techniques to detect and locate the sources of hostile small arms fire	1.592	-	-
Title: Building a Unified Information Framework ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported development of a unified information framework that will improve the integration of local, regional and military systems, in Gloucester County, NJ.	1.592	-	-
Title: Multifunctional Nanomaterials for Homeland Defense, Counter-Terrorism and Dual-Use Applications ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item established a research and development partnership between Rutgers University and U.S. Army ARDEC at Picatinny Arsenal to develop critical nano-based technologies for homeland defense, counter-terrorism, and dual-use (energy) Applications.	1.990	-	-
Title: Highly Integrated Production for Expediting RESET.	1.990	-	-

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
Description: This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported utilization of laser scanning technology at Anniston Army Depot to (1) quickly determine battle damaged and/or defective parts that need replacing, avoiding the need to replace good parts, and 2) rapidly determine if a part is non-conforming before it is inserted into a weapon (and subsequently has to be replaced).			
Title: Laser-Guided Energy (LGE) Demonstrator. ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported development of a laser guided energy (LGE) demonstrator mounted on an Army tactical vehicle capable of firing to tactical ranges.	2.228	-	-
Title: Air Drop Mortar Guided Munition for the Tactical UAV ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item will supported qualification rapid fielding of a miniature (11 lb) guided munition for tactical UAV weaponization.	2.387	-	-
Title: Rare Earth Mining Separation and Metal Production. ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item accelerated engineering and demonstration scale implementation of rare earth mining separation and metal production.	2.387	-	-
Title: Projectile Unmanned Aerial Systems. ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This is a Congressional Interest Item supported development and testing of a hybrid unmanned aerial systems projectile.	2.387	-	-
Title: Armaments Academy	2.984	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Description: This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported establishment of an Armaments Academy at Picatinny Arsenal for training and certifying armament engineers and scientists.			
Title: Highly Integrated Lethality Systems Development ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported research on ways to increase combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization.	3.970	-	-
Title: Scaleable Efficient Power for Armament Systems and Vehicles Dual Use ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported a high power, high energy power system project to accelerate and demonstrate scalability and manufacturability elements of emerging dual use power supply technology offering advanced performance for armaments including scaleability, safety, planar packaging and resistance to mechanical shock and vibration.	3.979	-	-
Title: Perimeter Security Systems ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item. supported establishment of a 150 acre military compound as a live, virtual and constructive test bed for hardware, software and technology which will provide a testing platform to conduct research and development of technology to enhance situational awareness that will help establish a layered defense model.	4.479	-	-
Title: Reliability and Affordability Enhancement for Precision Guided Munition Systems. ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:***	4.775	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
This Congressional Interest Item provides technology solutions for joint warfighter with a focus on precision, safety, lethality and survivability demands for precision munitions and armaments.			
Title: Tamper Proof Organic Packaging as Applied to Remote Armament Systems ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported development of concepts that provided module/SiP designs with a packaging approach that included embedded mission independent features which enabled varying levels of hardware/software tamper proofing and detection, monitoring/tracking manufacturing processes, new and secure test methodologies and in-situ functional detection/monitoring.	4.775	-	-
Title: Nanotechnology Enterprise Consortium (NTEC) ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item supported research developed within the Nanotechnology Enterprise Consortium (NTEC) in Columbia, Missouri, with multiple industry members throughout the state.	4.977	-	-
Title: Titanium Extraction Mining and Process Engineering Research (TEMPER) ***Description:*** This is a Congressional Interest Item. ***FY 2010 Accomplishments:*** This Congressional Interest Item researched a revolutionary new process to extract titanium and manufacture titanium alloys from various types of titanium ore (which will ultimately deliver lightweight weapons at an affordable cost to for DOD, enhancing lethality and performance while reducing cost.)	4.778	-	-
Accomplishments/Planned Programs Subtotals	100.813	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2012 Army		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602624A: *Weapons and Munitions Technology*	**PROJECT** H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*

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 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602624A: *Weapons and Munitions Technology*	PROJECT H28: *WARHEADS/ ENERGETICS TECHNOLOGIES*	

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
H28: *WARHEADS/ ENERGETICS TECHNOLOGIES*	11.270	11.564	11.617	-	11.617	11.971	11.877	11.701	12.585	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project designs and develops enabling warhead and energetic technologies such as novel warhead architectures, new propellant techniques, and high-density explosives to produce smaller, lighter, more effective, multi-role warheads. Work in project H28 is related to, and fully coordinated with, efforts in projects H18 and H19 in this PE, PE 0602618A (Ballistics Technology), and projects 232 and L94 in PE 0603004A (Weapons and Munitions 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.

This work is performed by the U.S. Army Armament Research, Development, and Engineering Center (ARDEC), at Picatinny Arsenal, NJ, and the Army Research Laboratory (ARL) at Aberdeen Proving Ground, MD. The active protection system (APS) countermunition efforts are developed in collaboration with the Tank Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI, PE 0603005A and the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL, PE 0603313A.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Scalable Warhead Technology	7.570	8.016	4.433
Description: This effort designs scalable and adaptive explosives and reactive materials technology for either gun or missile-launched weapons and munitions that can deliver a broad spectrum of effects with reduced collateral damage. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H18, PE 0603004A/Project 232 as well as PE 0602303/Project 214.			
FY 2010 Accomplishments: Designed and developed enhanced fragmentation, reactive materials technologies, multipurpose explosives, and initiation trains for warheads and scalable and adaptive munitions; compared performance of designs against predictive models, simulations, and baselines; and fabricated, tested and evaluated component technologies in static munition tests.			
FY 2011 Plans: Fabricate and investigate scalable and adaptive munitions; and test and evaluate warheads and munitions to determine characteristics and performance.			
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 mature scalable and adaptive technology components for small to medium caliber munitions; will determine levels of reduced collateral damage using scalable and adaptive technologies.			
Title: Energetic Materials and Warheads ***Description:*** This effort designs energetic materials with controlled energy release for precision munition and counter-munition applications. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H18 and PE 0603004A/Project 232, PE 0602618A/Project H80 as well as PE 0602303/Project 214. ***FY 2010 Accomplishments:*** Investigated the use of exotic ingredient materials, including nano-scale oxidizers and fuels, in high fidelity models for the design of extremely high energy, low sensitivity initiation, propulsion, explosive and pyrotechnic formulations; down-selected promising ingredient materials for fabrication and characterization studies; and fabricated ingredient materials. ***FY 2011 Plans:*** Verify/validate model predications of the pyrotechnic formulations with the selected ingredient materials; conduct fabrication studies for integrating promising formulations into high efficiency energetic materials; fabricate energetic formulations for laboratory scale testing and model validation; and model use of energetic promising formulations in enhanced warheads. ***FY 2012 Plans:*** Will conduct scaled-up experiments with new pyrotechnic formulations, high efficiency energetics formulations and warheads with novel energetic material; will validate the performance enhancements of new pyrotechnics, energetics and warheads. Also, will model structural materials which exhibit potential for explosive characteristics and conduct trade studies for candidate conventional and new chemical ingredients, formulations, and configurations to maximize the performance of structural materials while improving their insensitivity to unplanned stimuli.	3.113	2.898	1.784
Title: Insensitive Munitions Multi-Scale Reactive Modeling (IM-MSRM) ***Description:*** The IM-MSRM effort designs and develops new M&S tools for the design and development of insensitive munitions. ***FY 2010 Accomplishments:*** Evaluated the structure and density predictions for insensitive energetic materials resulting from the M&S analysis. ***FY 2011 Plans:*** Design models of detonation products based on predictions obtained at the insensitive energetic material atomic and micro levels. ***FY 2012 Plans:***	0.587	0.650	0.700

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Will investigate and mature continuum models of thermal kinetics ignition based on meso and molecular/atomic level predictions.			
Title: Explosives Research ***Description:*** This effort uses the new M&S tools developed under the IM-MSRM effort to formulate new IM explosives. ***FY 2012 Plans:*** Will design and develop new insensitive formulations using IM MSRM modeling and simulation tools; will begin to validate the models with experiments of new insensitive energetics ingredients; and will investigate different caliber munitions for the application of the new energetics.	-	-	4.700
Accomplishments/Planned Programs Subtotals	11.270	11.564	11.617

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.