Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army										DATE: February 2012	
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 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	41.368	54.727	35.218	-	35.218	33.613	34.124	34.884	34.198	Continuing	Continuing
H18: *Weapons & Munitions Technologies*	18.728	11.945	16.596	-	16.596	12.700	13.011	12.671	12.795	Continuing	Continuing
H19: *ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES*	11.386	16.207	7.762	-	7.762	9.049	8.989	8.819	8.886	Continuing	Continuing
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*	-	14.976	-	-	-	-	-	-	-	Continuing	Continuing
H28: *WARHEADS/ ENERGETICS TECHNOLOGIES*	11.254	11.599	10.860	-	10.860	11.864	12.124	13.394	12.517	Continuing	Continuing

Note

FY12 funding increase is a congressional add.

A. Mission Description and Budget Item Justification

This program element (PE) investigates, designs and evaluates enabling technology to develop lethal and nonlethal weapons and munitions with increased performance and the potential for lower weight, reduced size, and improved affordability. Project H18 focuses on weapons and munitions development. Project 19 researches technologies to maintain the lethality of US weapons as well as directed energy (DE) capabilities and subsystems to support the weaponization of high power microwave (HPM), and short pulse lasers. Project H28 evaluatesH28 evaluates munition components such as fuzes, power, warheads with tailorable effects, and insensitive munition compliant energetic materials.

Work in this PE is related to, and fully coordinated with, PE 0602303A (Aviation Advanced Technology), 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602772A (Advanced Tactical Computer Science and Sensor Technology), PE 0602782A (Command, Control, Communications Technology), PE 0603004A (Weapons and Munitions Advanced Technology), and, PE 0603008A (Electronic Warfare Advanced Technology). The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering science and technology priority focus areas and the Army Modernization Strategy.

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 2013 Army					DATE: February 2012
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 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**
Previous President's Budget	42.645	39.813	37.740	-	37.740
Current President's Budget	41.368	54.727	35.218	-	35.218
Total Adjustments	-1.277	14.914	-2.522	-	-2.522
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	15.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.825	-			
• Adjustments to Budget Years	-	-	-2.522	-	-2.522
• Other Adjustments 1	-0.452	-0.086	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
H18: *Weapons & Munitions Technologies*	18.728	11.945	16.596	-	16.596	12.700	13.011	12.671	12.795	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project designs, investigates, and evaluates component technologies to enable affordable precision munitions as well as provide increased lethality and performance with reduced logistics and advanced direct/indirect fire capabilities.

This project sustains Army science and technology efforts supporting the Ground portfolio.

Work in this project is related to, and fully coordinated with efforts in projects H19 and H28 (also in PE 0602624A), PE 0602105A (Materials Technology), PE 0602303A (Aviation Advanced Technology), PE 0602618A (Ballistics Technology), PE 0602782A (Command Control, Communication Technology), project 232 in PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603008A (Electronic Warfare Advanced Technology), and PE 0603772A (Advanced Tactical Computer Science and Sensor Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy

Work in this project is performed by the Armament Research, Development, and Engineering Center (ARDEC), at Picatinny Arsenal, NJ in collaboration with a the Army Research Laboratory (ARL), Aberdeen Proving Ground, MD; the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL; and the Communications-Electronics Research, Development, and Engineering Center (CERDEC), Fort Belvoir, VA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: High Power Microwave (HPM) - Anti-Materiel Munitions	3.150	-	-
Description: This effort designs, fabricates and evaluates HPM technologies such as antenna, power sources, and radio frequency sources for use in non-lethal (NL) munitions.			
FY 2011 Accomplishments: Developed, tested and integrated 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; explored ability to create graduated target effects			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
through geometry variations, dielectric and magnetic material choices, and antenna gain design; and integrated components to determine performance improvements and insure repeatable results.			
Title: Novel Propulsion Technology for the Future ***Description:*** This effort explores propellant technologies such as powder coextrusion and grain coatings, while retaining insensitive properties, for employment in gunin gun launch environments as well as directional thrusters including those that deliver a broad spectrum of effects. ***FY 2011 Accomplishments:*** Fabricated more propellant for objective demonstrations and completed integration with objective munition designs; characterized performance in live fire tests; continued 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:*** 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; formulate promising propellants and evaluate them for performance and insensitivity. ***FY 2013 Plans:*** Will investigate new propulsion ingredients for scale up of formulations to provide extended range; design and fabricate and evaluate new charge systems using coextrusion of multiple materials as well as coatings for burn rate modification.	1.608	3.029	4.035
Title: Advanced Munition Components ***Description:*** This effort designs and investigates individual components in the firing chain for gun launched munitions. ***FY 2011 Accomplishments:*** Completed design of scalable adaptable munition and began fabrication of the laboratory demonstrators; tested and evaluated the performance of laboratory demonstrator munitions in selected system configurations against a spectrum of targets to determine performance and effectiveness.	3.461	-	-
Title: Advanced Munition Payloads ***Description:*** This effort investigates novel payloads and related components for integration into gun-fired munitions and missiles to enable DoD cluster munition replacement policy. ***FY 2011 Accomplishments:***	5.056	3.502	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Developed and validated M&S tools for deflagrating munitions; performed trade studies to evaluate submunition component technologies; and conducted initial tests to verify deflagration models. Efforts described here are coordinated and complimentary to related efforts in PE 0603004A/Project 232. ***FY 2012 Plans:*** Investigate environments that will provide useful data for the development of components- setback, expulsion and impact; 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 such as recoil energy mitigation, affordable precision, extended range/guided technologies, and advanced propelling for future medium caliber direct fire systems that could provide similar or greater lethality than current systems. ***FY 2011 Accomplishments:*** Selected the most promising weapon technologies to develop breadboard components and began target effectiveness tests to determine optimum size, weight, and power required to defeat various targets; and optimized selected technologies based on their ability to defeat the widest variety of targets. ***FY 2012 Plans:*** Continue to mature most promising weapon technologies and evaluate for transition to advanced development; conduct additional small scale research into multiple novel weapon system candidate technologies. ***FY 2013 Plans:*** Will continue to mature hydrogen propellant ignition and remote automated gun firing in medium caliber weapons for transition to advanced development; conduct additional small scale research into multiple novel weapon system candidate technologies; develop precision technologies for extended/guided range applications.	3.500	2.214	3.178
Title: Affordable Precision Technology ***Description:*** This effort investigates and incorporates technologies like actuators and magnetic navigation to provide affordable precision to the full spectrum of gun calibers. ***FY 2011 Accomplishments:***	1.953	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Sorted most promising technologies by applicable caliber size and prioritize by greatest capability increase and cost to implement; and chose and initiated 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 designs and develops networked fire control hardware and software that can be integrated with existing command and control architectures. ***FY 2012 Plans:*** 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. ***FY 2013 Plans:*** Will design and investigate target data and weapon effects for improved mission planning planning; design and investigate weapon placement coordination; design weapons and effects database; investigate small unit fire control hardware; conduct experiments to validate design efforts.	-	1.120	2.300
Title: Line-of-Sight (LOS) Course Correction Munition Technology ***Description:*** This effort investigates and evaluates technologies such as small thrusters fired to the side of the round to correct trajectory and to improve precision and lower collateral damage in munitions. ***FY 2012 Plans:*** Design and develop components for line-of-sight (LOS) course correction munitions, i.e. warhead, sensor, communication link and guidance/Control; investigate performance enhancements of a LOS Course correction munitions. ***FY 2013 Plans:*** Will integrate line-of-sight (LOS) course correction subsystem for ballistic testing; measure both structure and function of LOS course correction subsystem integrated into surrogate munition for performance and success.	-	2.080	2.800
Title: Precision Munition Technologies ***Description:*** This effort designs and investigates scalable and modular enabling technologies such as novel decelerators, advanced explosive detonators, and advanced control actuators for gun-launched munitions. ***FY 2013 Plans:***	-	-	4.283

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Will investigate sensor targeting algorithm solutions for all-weather operations (to include experiments with semi-active laser sensors and other suitable options); investigate and mature affordable control actuation system components; conduct high-g survivability experiments.			
Accomplishments/Planned Programs Subtotals	18.728	11.945	16.596

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
H19: *ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES*	11.386	16.207	7.762	-	7.762	9.049	8.989	8.819	8.886	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 2011	FY 2012	FY 2013
Title: Pulsed Laser Component Technologies	3.492	-	-
Description: This effort investigates 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.			
FY 2011 Accomplishments: Developed LIPC system design based upon results of parametric studies and modeling efforts; and continued to mature and integrate subsystem components towards fieldable requirements, i.e. volume, weight, ruggedness.			
Title: Novel Battlefield Effectors	2.003	1.970	0.800
Description: This effort investigates 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.			
FY 2011 Accomplishments: Completed full target effectiveness testing with the bread board system and designed a brassboard to demonstrate novel battlefield effects for direct and indirect fire platforms.			
FY 2012 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Continue to develop most promising effector technologies and evaluate for transition to advanced development; conduct additional research into multiple novel battlefield effector candidate technologies. ***FY 2013 Plans:*** Will continue to investigate most promising effector technologies and evaluate for transition to advanced development; conduct additional research into multiple novel battlefield effector candidate technologies.			
Title: Active Denial Technologies ***Description:*** This effort develops non-lethal, counter-personnel directed energy (DE) technology that can repel personnel up to 100 meters. . ***FY 2011 Accomplishments:*** This effort investigated compact non-lethal, counter-personnel DE technologies such as thermal management, beam optimization to achieve an operational effective level of personnel incapacitation. ***FY 2012 Plans:*** Complete design and build of a palletized system to validate that solid state active denial technology can achieve desired range (100 meters); conduct experiments to determine personnel incapacitation or repel effects are achievable. ***FY 2013 Plans:*** Will complete integration and conduct experiments of the solid state active denial technology system to achieve the desired range of 100 meters.	2.415	3.360	1.761
Title: Counter Countermeasure (CCM) Technologies for weapons and munitions ***Description:*** This effort investigates guidance signal reduction, inertial measurement unit, and antenna design technologies 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 2011 Accomplishments:*** Prioritized and down selected CCM technologies and began design and fabrication of breadboard components to demonstrate superior counter-countermeasure technologies with respect to current systems. ***FY 2012 Plans:***	3.476	4.522	2.241

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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 2011	FY 2012	FY 2013
Continue to develop most promising CCM technologies and evaluate for transition to advanced development; conduct additional small scale research into multiple counter countermeasure candidate technologies. ***FY 2013 Plans:*** Will continue to investigate most promising CCM technologies and evaluate for transition to advanced development; conduct additional small scale research into multiple counter countermeasure candidate technologies; conduct various experiments to determine effectiveness against future threats.			
Title: Novel Penetrator Designs ***Description:*** This effort provides novel direct fire capabilities against advanced heavy armor threats by investigating several projectile configurations and non depleted uranium materials to achieve flight stability and effectiveness against new armored targets ***FY 2012 Plans:*** Design and develop novel penetrator designs concepts and conduct penetration experiments against range targets. ***FY 2013 Plans:*** Will down select to one penetrator design based on FY12 penetrator experiments and integrate into projectile cartridge for functional testing; execute a ballistic test to validate range and penetration requirements that support system performance and lethality goals.	-	3.015	2.960
Title: Directed Energy (DE) Standoff Enabler ***Description:*** This effort investigates the capability for stand-off neutralization technology of improvised explosive devices (IED) utilizing high power, DE sources. ***FY 2012 Plans:*** Design and develop DE standoff improvised explosive device (IED) neutralization technology; conduct research on high voltage and RF coupling to laser induced plasma filaments; mature components required to achieve multi-mode anti-materiel DE effects	-	3.340	-
Accomplishments/Planned Programs Subtotals	11.386	16.207	7.762

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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*

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE*	-	14.976	-	-	-	-	-	-	-	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 2011	FY 2012	FY 2013
Title: Program Increase	-	14.976	-
Description: This is a Congressional Interest Item.			
FY 2012 Plans: Congressional add funding.			
Accomplishments/Planned Programs Subtotals	-	14.976	-

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 2013 Army			DATE: February 2012
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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
H28: *WARHEADS/ ENERGETICS TECHNOLOGIES*	11.254	11.599	10.860	-	10.860	11.864	12.124	13.394	12.517	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project investigates and designs 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.

This project sustains Army science and technology efforts supporting the Ground portfolio.

Work in this project is related to, and fully coordinated with efforts in projects H18 and H19 in this PE, PE 0602303 (Aviation Advanced Technology), PE 0602618A (Ballistics Technology), and project 232 in PE 0603004A (Weapons and Munitions Advanced Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy

This work is performed by the U.S. Army Armament Research, Development, and Engineering Center (ARDEC), at Picatinny Arsenal, NJ in collaboration with the Army Research Laboratory (ARL) at Aberdeen Proving Ground, MD; and the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Title: Scalable Warhead Technology	7.800	4.451	4.210
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.			
FY 2011 Accomplishments: Fabricated and investigated scalable and adaptive munitions; and tested and evaluated warheads and munitions to determine characteristics and performance.			
FY 2012 Plans: Mature scalable and adaptive technology components for small to medium caliber munitions; determine levels of reduced collateral damage using scalable and adaptive technologies.			
FY 2013 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Will design and test brassboard designs for shaped charge and explosively formed penetrator (EFP) with scaled up lethality; determine through modeling and simulation the range of lethal to less than lethal effects for scalable warheads.			
Title: Energetic Materials and Warheads ***Description:*** This effort designs energetic materials with controlled energy release for precision munition and counter-munition applications. ***FY 2011 Accomplishments:*** Verified/validated model predications of the pyrotechnic formulations with the selected ingredient materials; conducted fabrication studies for integrating promising formulations into high efficiency energetic materials; fabricated energetic formulations for laboratory scale testing and model validation; and modelled use of energetic promising formulations in enhanced warheads. ***FY 2012 Plans:*** Conduct scaled-up experiments with new pyrotechnic formulations, high efficiency energetics formulations and warheads with novel energetic material; validate the performance enhancements of new pyrotechnics, energetics and warheads. Also, 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. ***FY 2013 Plans:*** Will continue to investigate most promising technologies like structural energetics, solventless propellants, and nanoinsensitive nitramines and evaluate them for transition to advanced development; conduct additional small scale research into multiple energetic materials and warheads candidate technologies for medium and large cal ammunition.	2.804	1.784	1.950
Title: Insensitive Munitions Multi-Scale Reactive Modeling (IM-MSRM) ***Description:*** The IM-MSRM effort designs and investigates new M&S tools for the design and development of insensitive munitions. ***FY 2011 Accomplishments:*** Designed models of detonation products based on predictions obtained at the insensitive energetic material atomic and micro levels. ***FY 2012 Plans:*** Investigate and mature continuum models of thermal kinetics ignition based on meso and molecular/atomic level predictions. ***FY 2013 Plans:***	0.650	0.700	0.700

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
Will continue to investigate and develop atom level computer code modifications to create material models; will develop mixed mode (blast/fragmentation) analytical capability and detonation shock dynamics to improve the representations of physics and chemistry in explosives and provide more accurate supercomputer design tools for the U.S. insensitive munitions design community.			
Title: Explosives Research ***Description:*** This effort develops high energy/high performance, multi-purpose insensitive munitions (IM) explosives. ***FY 2012 Plans:*** Design and develop new insensitive formulations using IM MSRM modeling and simulation tools; begin to validate the models with experiments of new insensitive energetics ingredients; and investigate different caliber munitions for the application of the new energetics. ***FY 2013 Plans:*** Will begin optimization and scale-up of promising ingredients formulations and tailored explosives for mixed-mode and combined effects; conduct baseline design and testing of novel components as well as structures based on nano-energetics, energetic fibers and reactive alloys, explosive inks, multipoint initiation.	-	4.664	4.000
Accomplishments/Planned Programs Subtotals	11.254	11.599	10.860

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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