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Exhibit R-2, PB 2011 Army RDT&E Budget Item Justification									DATE: February 2010		
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 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	106.253	144.864	42.645	0.000	42.645	39.459	39.802	43.140	47.223	0	506.031
H18: Weapons & Munitions Technologies	13.363	17.190	19.300	0.000	19.300	18.198	15.881	17.688	19.282	Continuing	Continuing
H19: ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES	7.091	12.196	11.781	0.000	11.781	9.524	11.043	12.347	13.576	Continuing	Continuing
H1A: WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE	74.853	103.994	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
H28: WARHEADS/ ENERGETICS TECHNOLOGIES	10.946	11.484	11.564	0.000	11.564	11.737	12.878	13.105	14.365	Continuing	Continuing
A. Mission Description and Budget Item Justification											
<p>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.</p>											

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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 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	102.339	41.085	42.589	0.000	42.589
Current President's Budget	106.253	144.864	42.645	0.000	42.645
Total Adjustments	3.914	103.779	0.056	0.000	0.056
• Congressional General Reductions		-0.761			
• Congressional Directed Reductions					
• Congressional Rescissions		0.000			
• Congressional Adds		104.540			
• Congressional Directed Transfers					
• Reprogrammings	6.401	0.000			
• SBIR/STTR Transfer	-2.487	0.000			
• Adjustments to Budget Years	0.000	0.000	0.056	0.000	0.056
Change Summary Explanation					
FY10 Congressionally directed increases.					

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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
H18: Weapons & Munitions Technologies	13.363	17.190	19.300	0.000	19.300	18.198	15.881	17.688	19.282	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 and provide increased lethality 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 Program (\$ in Millions)											
							FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Insensitive Munitions (IM) Technologies Initiatives:This effort focuses on identifying, maturing, and applying technologies that reduce unplanned, accidental, and/or sympathetic detonation of munitions in order to meet IM requirements. In FY09, completed sympathetic detonation (SD)/bullet impact (BI) modeling of the Precision Attack Missile (PAM) warhead after IM techniques had been added to the rounds. In FY10, the funding for this effort has been moved to PE 0602624A/Project H28. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010							0.249	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 #2 High Power Microwave (HPM) - Anti-Materiel Munitions: This effort designs and develops HPM technology for use in non-lethal (NL) munitions. In FY09, began integration of individual components; performed analysis of the system's ability to generate power while in flight and operated in a gun launch environment; and began laboratory effects testing of an integrated laboratory demonstrator against relevant simulated targets. In FY10, develop non-fragment producing materials for carriers to achieve NL effects; develop, test and integrate demonstrator technology to obtain higher energy density, high voltage, nano-second discharge times, and solid state switches for nano-second discharge rates; identify 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. In FY11, will develop, test and integrate frequency adjusting technology components for graduated effects on multiple targets. In addition, target set frequency vulnerabilities will be bounded through use of susceptibility analysis and modeling to enable optimization of antenna, radio frequency source, power conditioning, and prime power; will explore ability to create graduated target effects through geometry variations, dielectric and magnetic material choices, and antenna gain design; and will integrate components to determine performance improvements and insure repeatable results. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010		6.730	3.802	3.247	0.000	3.247

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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 #3 Novel Propulsion Technology for the Future: This effort develops propellant technologies for advanced gun launch and thrusters including those that deliver a broad spectrum of effects. In FY09, fabricated novel igniters and demonstrated them against current baseline igniters; optimized propulsion technologies at the component level for integration into scalable and adaptive response munitions; and developed modeling and simulation (M&S) tools for scalable and adaptive propulsion prediction capabilities across the full range of munition applications. In FY10, fabricate and test propellants and igniters in component tests; begin integration with the objective munition designs (30mm medium caliber cartridge and 105mm artillery shell); develop, verify, and utilize M&S to predict performance in components. In FY11, will fabricate more propellant for objective demonstrations and will complete integration with objective munition designs; will characterize performance in live fire tests; will 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 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		2.019	1.850	1.658	0.000	1.658

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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 #4 Advanced Munition Components: This effort designs and develops individual components in the firing chain for gun launched munitions. In FY10, focus on designing and developing scalable adaptable munition components; evaluate various munition components and determine options to modify components to support scalable munition development; evaluate performance through M&S tools and select a caliber to design the initial scalable munition round and initiate design. In FY11, will complete design of scalable adaptable munition and will begin fabrication of the laboratory demonstrators; will test and evaluate the performance of laboratory demonstrator munitions in selected system configurations against a spectrum of targets to determine performance and effectiveness. 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	2.576	3.568	0.000	3.568
Program #5 Pulsed Laser technologies: This effort investigates directed energy (DE) technologies such as the laser induced plasma channel (LIPC) to generate a cavity in the air in which high powered microwaves (HPM) are channeled to produce tailored effects on targets. In FY09, performed LIPC M&S to define the optimum filament geometries	2.965	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
for effective energy transmission; investigated the interaction of radio frequency fields in custom waveguides for HPM applications; conducted verification tests for components of a laser induced channel coupled with HPM waveforms that provided insight to expected increase in performance when compared to standard waveguide transmission. Efforts described here are consolidated in FY10 into PE 0602624A/Project H19 and are coordinated and complimentary to related efforts in PE 0603004A/Project 232. 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 #6 Fuze Technology: This effort was funded through a mid-year reprogramming action to investigate several advanced fuze technologies. This effort establishes initial design concepts for a high reliability fuze architecture for gun-fired cluster munitions that conforms to the June 2008 Secretary of Defense policy. In FY09, evaluated microelectromechanical (MEMS), conventional electro-mechanical and miniature electronic safe and arming device (ESAD) concepts; evaluated potential safety environments for arming; evaluated initial target sensing (proximity, impact) mechanisms; independently reviewed reliability and safety architecture; and developed initial power budget and identified candidate architecture. Analysis determined that a wafer-level packaging approach is essential to realize low costs for higher volumes of MEMS-based fuzes; designed and integrated MEMS fuze	1.400	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
components into wafer-level packaging; applied packaging processing technologies to MEMS fuze chips; and integrated MEMS fuze with master/slave fuzing approach in laboratory prototype. 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 #7 Advanced Munition Payloads: This effort develops novel payloads and related components for integration into gun-fired munitions and missiles. In FY10, assess advanced fuze technologies capable of either detonating or deflagrating submunitions such as Dual-Purpose Improved Conventional Munitions (DPICM) in selected environments; conduct 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. In FY11, will develop and validate M&S tools for deflagrating munitions; will perform trade studies to evaluate submunition component technologies; and will conduct initial tests to verify deflagration models. Efforts described here are coordinated and complimentary to related efforts in PE 0603004A/Project 232. FY 2009 Accomplishments: FY 2009		0.000	4.682	5.205	0.000	5.205

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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 #8 Advanced Weapons Technology: This effort investigates innovative weapon technologies for future medium caliber direct fire systems that provide similar or greater lethality than current systems. In FY10, assess detailed designs of distributive technologies for new weapon delivery effects; conduct 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 develop critical design factors for launch survivability, component reliability, and recoil energy management. In FY11, will 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 will optimize selected technologies based on their ability to defeat the widest variety of targets. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base		0.000	3.085	3.608	0.000	3.608

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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 #9 Affordable Precision Technology: This effort develops and incorporates technologies to provide affordable precision to the full spectrum of gun calibers. In FY10, identify technologies that can potentially increase delivery accuracy and lethal performance of weapons. In FY11, will sort most promising technologies by applicable caliber size and will prioritize by greatest capability increase and cost to implement; and will 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. 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	0.890	2.014	0.000	2.014
Program #10 Small Business Innovative Research/Small Business Technology Transfer Programs FY 2009 Accomplishments: FY 2009	0.000	0.305	0.000	0.000	0.000

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>									
					FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO									
Accomplishments/Planned Programs Subtotals					13.363	17.190	19.300	0.000	19.300
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A									
<u>D. Acquisition Strategy</u> N/A									
<u>E. Performance Metrics</u> 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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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 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
H19: ASYMMETRIC & COUNTER MEASURE TECHNOLOGIES	7.091	12.196	11.781	0.000	11.781	9.524	11.043	12.347	13.576	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 Program (\$ in Millions)											
							FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1							1.985	0.000	0.000	0.000	0.000
Near Autonomous Unmanned Systems (NAUS): This effort designs and evaluates a remote weapon station optimized for high-reliability on an unmanned vehicle and addresses the safe operation of weapons on robotic vehicles. In FY09, fabricated and integrated critical sub-systems; and conducted baseline system level tests. Efforts described here are coordinated and complimentary to related efforts in PE 0602601A/Project H91; PE 0602618A/Project H03; PE 0602120A/Project H16; and PE 0603005A/Project 515.											
FY 2009 Accomplishments: FY 2009											
FY 2010 Plans: FY 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						
Program #2 Pulsed Laser Component Technologies: This effort develops and miniaturizes key DE technology components to enable a LIPC capability. The LIPC effect uses a short pulse laser to generate a cavity in the air in which high powered microwaves (HPM) and/or high voltage bursts are channeled to defeat different targets at stand-off. In FY09, characterized and optimized high voltage discharges and HPM waveforms to produce multiple target effects on buried or surface threats. In FY10, mature model of critical components of LIPC system for optimal interaction of laser induced channel and high voltage waveforms; conduct studies of LIPC subsystems parameters to enhance transmission of the high voltage waveform required for desired range and target effects; and initiate design of advanced high quality critical subcomponents for a LIPC system. In FY11, will develop LIPC system design based upon results of parametric studies and modeling efforts; and will continue to mature and integrate subsystem components towards fieldable requirements, i.e. volume, weight, ruggedness. Efforts are coordinated and complimentary to related efforts in PE 0602624A/Project H18 and PE 0603004A/Project 232.		2.062	3.801	3.615	0.000	3.615
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 #3 Ground Based Munitions Technologies: This effort optimizes smart ground based munitions for the urban and complex fight. In FY09, evaluated urban technologies for ground based munitions for use with the intelligent munitions system (IMS) (PE 0654808A/D016); optimized a set of sensor suites for the urban environment and evaluated merging sensor modalities; and evaluated target engagement approaches from a ground based munition that can engage both personnel and light vehicles while minimizing collateral damage. Efforts described here are coordinated and complimentary to related efforts in PE 0603004A/Project 232, and PE 0603606A/Project 683. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	3.044	0.000	0.000	0.000	0.000
Program #4 Novel Battlefield Effectors: 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. In FY10, select 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)	0.000	3.780	2.073	0.000	2.073

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
missions; develop the technologies into a breadboard system and begin target effectiveness studies; and conduct trade studies to determine the proper power, size, and weight to achieve required lethal effects on various targets. In FY11, will complete full target effectiveness testing with the bread board system and will design a brassboard to demonstrate novel battlefield effects for direct and indirect fire platforms. 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 #5 Active Denial Technologies: This effort develops compact non-lethal, counter-personnel DE technologies. In FY11, will complete design of brassboard to determine scalability for different platforms; will 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 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010		0.000	0.000	2.500	0.000	2.500

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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 #6 Counter Countermeasure (CCM) Technologies for weapons and munitions: 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. Technology areas being investigated include reducing radar cross section of gun-fired rounds and increasing performance of warheads. In FY10, conduct systems effectiveness analysis to determine which weapons/rounds are most susceptible to countermeasures; investigate potential counter-countermeasure techniques/technologies and identify the most promising that reduce the effectiveness of threat countermeasure technologies. In FY11, will prioritize and down select CCM technologies and will begin design and fabrication of breadboard components to demonstrate superior counter-countermeasure technologies with respect to current 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		0.000	4.315	3.593	0.000	3.593

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #7 Small Business Innovative Research/Small Business Technology Transfer Programs <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO	0.000	0.300	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	7.091	12.196	11.781	0.000	11.781
<u>C. Other Program Funding Summary (\$ in Millions)</u>					
N/A					
<u>D. Acquisition Strategy</u>					
N/A					
<u>E. Performance Metrics</u>					
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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Exhibit R-2A, PB 2011 Army RDT&E Project Justification								DATE: February 2010			
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 2: <i>Applied Research</i>				R-1 ITEM NOMENCLATURE PE 0602624A: <i>Weapons and Munitions Technology</i>				PROJECT H1A: <i>WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE</i>			
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
H1A: <i>WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE</i>	74.853	103.994	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
<u>A. Mission Description and Budget Item Justification</u> Congressional Interest Item funding for Weapons and Munitions Technology applied research.											
<u>B. Accomplishments/Planned Program (\$ in Millions)</u>											
						FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011	
Program #1 Green Armaments/Range Safe. This Congressional Interest Item developed environmentally compatible products and processes to ensure environmental compliance while supporting our troops during training and other battlefield operations. <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO						2.392	1.592	0.000	0.000	0.000	
Program #2						2.392	3.183	0.000	0.000	0.000	

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Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010		
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 Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Advanced Materials & Process for Armament Structures (AMPAS). This Congressional Interest Item supported the development of technologies in atmospheric furnace control, material handling, titanium chip processing, and rolling in order to improve titanium productivity. 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 Armament System Engineering and Integration Initiative (ASEI2). This Congressional Interest Item developed technology advancements for systems engineering for acquisition programs. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base	3.189	1.592	0.000	0.000	0.000

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Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010		
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 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 Electroconversion of Energetic Materials. This Congressional Interest Item explored the feasibility of direct conversion of energetics to electrical energy in fuel cells using the advancements made in nanotechnology. 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 #5 Army Center of Excellence in Acoustics: This Congressional Interest Item provided acoustics technology to support specific applications such as acoustic sensors for aerostats deployed near the Baghdad airport, improved algorithms for sniper and mortar detection, and fielded machine guns on Humvees which automatically swiveled towards gunfire based acoustics. FY 2009 Accomplishments: FY 2009	4.386	3.979	0.000	0.000	0.000

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Exhibit R-2A, PB 2011 Army RDT&E Project Justification			DATE: February 2010		
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 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 Developmental Mission Integration: This Congressional Interest Item built upon ARDEC's extensive technology development efforts and network of strategic partnerships and provided the necessary flexibility to identify and mature armaments and munitions technologies. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	3.987	5.571	0.000	0.000	0.000
Program #7	4.984	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
Remotely Operated Weapons and Sensor Technology: This Congressional Interest Item accelerated the development and fielding of critical Remotely Operated Weapon Systems technologies on DOD platforms. 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 Electrolytic Super-Capacitor: This Congressional Interest Item developed devices capable of power delivery rates significantly faster than standard supercapacitors. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base	0.797	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 #9 Ripsaw Unmanned Ground Vehicle Weaponization: In FY09 this Congressional Interest Item integrated Remote Weapon Systems Armaments onto the Ripsaw Unmanned Ground Vehicle. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	1.195	1.990	0.000	0.000	0.000
Program #10 Advanced Rarefaction Weapon Engineered System : This Congressional Interest Item developed rarefaction wave gun technology. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	2.392	3.183	0.000	0.000	0.000

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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						
Program #11 Hospital Emergency Planning and Integration (HEPI) Letterkenny Army Depot and Chambersburg Hospital: This Congressional Interest Item developed a coordinated approach in the event of a need for a Federal/DOD response involving a requirement for emergency response healthcare. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO		0.797	0.000	0.000	0.000	0.000
Program #12 Effects Based Operations Decision Support Services (EBODSS) : 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.		7.974	1.592	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 #13 Mitigation of Energetics Single Point Failures: This Congressional Interest Item investigated potential Single Point Failures (SPFs) within the Munitions Industrial Base in order to understand the key performance factors, physical and chemical properties and manufacturing process parameters, quality acceptance requirements as well as safety and potential environmental impact and then developed/evaluated/proposed effective mitigation strategies. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base	2.392	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 #14 Rapid Response Force Protection System (Remote Weapons Platform). This Congressional Interest Item integrated 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. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	2.392	1.592	0.000	0.000	0.000
Program #15 Center for Borane Technology: This Congressional Interest Item established a Borane Technology Center at the University of Missouri-Columbia which synthesized and tested materials based on polyhedral borane chemistry for use in highly energetic explosives and propellants. FY 2009 Accomplishments: FY 2009	1.994	1.990	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 #16 Exploding Foils Initiators with Nanomaterial-based Circuits: 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. 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	2.387	0.000	0.000	0.000
Program #17	2.492	2.387	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
Research for Army Cannon Systems: This Congressional Interest Item supported a simulated stress loading/ ballistic environment to produce the initial fatigue cracking which could result in time and cost savings when testing the next generation of Army cannon 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 #18 Wyoming Valley Integrated Command Operations Program (ICOP)): This Congressional Interest Item enabled ICOP to support Homeland Defense and Civil Support by establishing a flexible Command and Control architecture at the lower tiers of the response hierarchy, which was tied to the Project National Shield Emergency Operations Center at US Army ARDEC where the Army C2 architectures were available to rapidly provide intelligence between all entities. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010		1.595	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 #19 MATRIC- Project National Shield Integration Center : This Congressional Interest Item established 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. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO		1.994	1.194	0.000	0.000	0.000
Program #20 Specialized Compact Automated Mechanical Clearance Platform: This Congressional Interest Item developed technology to avoid many of the pitfalls of previous de-mining machinery by utilizing an innovation called		1.595	3.183	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
"Reactive Ground Pressure" that increases the effectiveness of pressure-based de-mining systems while simultaneously reducing their weight. 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 #21 Kinetic Energy Enhanced Lethality and Protection Materials: This Congressional Interest Item investigated ways to translate the leading approaches studied into actual testing and evaluation in order to determine whether tungsten could be a viable alternative or should depleted uranium (DU) be removed from kinetic energy penetrators in response to growing international concerns. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	1.994	1.990	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 #22 Regional Integrated Command Center (RICC)): This Congressional Interest Item supported RICC, a Homeland Defense and Security program that demonstrated interoperable communications and the ability to quickly assess and mobilize assets, while establishing situational awareness, which are all essential aspects of mitigating incidents and conducting proactive defensive operations. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	0.797	0.000	0.000	0.000	0.000
Program #23 Advanced Technologies Energy and Manufacturing Science: This Congressional Interest Item developed enabling technologies to support the US Army ARDEC Core Competencies of Energetics, Advanced Materials and Manufacturing Sciences, and Laser Vulnerability against Weapons and Munition Systems.	4.984	6.963	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 #24 Northern Ohio Integrated Command Operations Program: This Congressional Interest Item supported Ohio Homeland Defense, and established a flexible Command and Control (C2) architecture at the lower tiers of the response hierarchy, which in turn was tied to the Project National Shield Emergency Operations Center at US Army ARDEC where the Army C2 architectures were available to rapidly provide intelligence between all entities. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base	1.595	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 #25 Threat Detection and Neutralization Project: This Congressional Interest Item designed and implemented a comprehensive threat detection and neutralization system for autonomous air, water, and ground devices. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO		3.189	3.183	0.000	0.000	0.000
Program #26 Heavy Metals Total Life-Cycle Initiative: This Congressional Interest Item researched environmental issues associated with testing and deploying ammunition made from heavy metals such as depleted uranium, tungsten, and lead. FY 2009 Accomplishments: FY 2009		0.797	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 #27 Munitions Evaluation for Composite Electric Armor: This Congressional Interest Item developed Composite Electric Armor (utilizing explosives that are safe (inert) until activated by an electrical pulse) for defeat of rocket propelled grenades and improvised explosive devices. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	1.195	0.000	0.000	0.000	0.000
Program #28	0.000	0.796	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
Defense Support for Civil Authorities (DSCA) for Key Resource Protection. 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						
Program #29 SLEUTH Tungsten Heavy Alloy Pen/Warhead Dev. 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

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #30 Acoustic Gun Detection System for Tracked Combat 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	1.592	0.000	0.000	0.000
Program #31 Building a Unified Information Framework. 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

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #32 Multifunctional Nanomaterials for Homeland Defense, Counter-Terrorism and Dual-Use Applications. 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	1.990	0.000	0.000	0.000
Program #33 Highly Integrated Production for Expediting RESET. 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	1.990	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 #34 Laser-Guided Energy (LGE) Demonstrator. 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	2.228	0.000	0.000	0.000
Program #35 Air Drop Mortar Guided Munition for the Tactical UAV. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010		0.000	2.387	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 #36 Rare Earth Mining Separation and Metal Production. This is a Congressional Interest Item.	0.000	2.387	0.000	0.000	0.000
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 #37 Projectile Unmanned Aerial Systems. This is a Congressional Interest Item.	0.000	2.387	0.000	0.000	0.000
FY 2009 Accomplishments: FY 2009					

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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 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 #38 Armaments Academy. 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	2.984	0.000	0.000	0.000
Program #39 Mortar Anti-Personnell/Anti-Materiel Technology. This is a Congressional Interest Item.	0.000	3.183	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 #40 Highly Integrated Lethality Systems Development. This is a Congressional Interest Item.	0.000	3.970	0.000	0.000	0.000
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 #41	0.000	3.979	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
Scaleable Efficient Power for Armament Systems and Vehicles Dual Use. 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					
Program #42 Perimeter Security Systems. 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	4.479	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
Program #43 Reliability and Affordability Enhancement for Precision Guided Munition Systems. 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	4.775	0.000	0.000	0.000
Program #44 Tamper Proof Organic Packaging as Applied to Remote Armament Systems. 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	4.775	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 #45 Nanotechnology Enterprise Consortium (NTEC). 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	4.977	0.000	0.000	0.000
Program #46 SOCOM Lightweight Unmanned Ground Robot. This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010		1.595	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 #47 Ink-based Desktop Electronic Material Technology. 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	1.595	0.000	0.000	0.000	0.000
Program #48 Titanium Extraction Mining and Process Engineering Research (TEMPER). This is a Congressional Interest Item. FY 2009 Accomplishments: FY 2009	2.990	4.778	0.000	0.000	0.000

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO						
Accomplishments/Planned Programs Subtotals		74.853	103.994	0.000	0.000	0.000
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A						
<u>D. Acquisition Strategy</u> N/A						
<u>E. Performance Metrics</u> 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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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 2: <i>Applied Research</i>				R-1 ITEM NOMENCLATURE PE 0602624A: <i>Weapons and Munitions Technology</i>				PROJECT H28: <i>WARHEADS/ ENERGETICS TECHNOLOGIES</i>			
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
H28: <i>WARHEADS/ ENERGETICS TECHNOLOGIES</i>	10.946	11.484	11.564	0.000	11.564	11.737	12.878	13.105	14.365	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 Program (\$ in Millions)

	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
Program #1 Future Force Gun and Munition Technology (Nanotechnologies for Future Force Armaments & Munitions): This effort is investigating nanoscale and nanostructured multifunctional materials for armament applications. In FY09, optimized process parameters to fabricate large quantities of nanostructured and nano-scale tungsten powders; developed wet milling technology to fabricate nano-scale/nanostructured tungsten powders and compared results to those powders obtained using dry milling technology; developed powder consolidation technology to fabricate nanostructured bulk materials; and conducted metallurgical characterization/mechanical property evaluations of bulk nanostructured materials. <i>FY 2009 Accomplishments:</i> FY 2009	2.543	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
FY 2010 Plans: FY 2010					
Base FY 2011 Plans: FY 2011 Base					
OCO FY 2011 Plans: FY 2011 OCO					
Program #2 Kinetic Energy Active Protection System (KEAPS) Warhead: This effort investigates and validates a warhead designed by the Army Research Laboratory (ARL) for use in an active protection system (APS) designed to defeat tank-fired rounds. In FY09, finalized design of warhead/fuze safe and arm (S&A) demonstrator integrated with the KEAPS interceptor; evaluated warhead and fuze S&A demonstrator against the primary threat class and used modeling and simulation (M&S) to evaluate performance against remaining classes of threats. Efforts described here are coordinated and complimentary to related efforts in PE 0603004A/Project 232 and are developed and collaborated with efforts in PE 0603005A/Project 221 and PE 0603313A/Project 550.	3.755	0.000	0.000	0.000	0.000
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 #3 G-Hardened Sensors Technology for Munitions: This effort develops ground sensors hardened to resist the forces of gun-launch and ground impact. In FY09, refined integrated design approach and G-hardened packaging; investigated survivability of individual and integrated component technologies in > 30kG environment and investigated (through live fire of munitions) the remote deployment of fully integrated sensors packaged into mortars and 40mm grenades; and implemented an architecture for distributed, power efficient decentralized network fusion of data from multiple G-hardened sensor nodes to enable target localization. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010 Base FY 2011 Plans: FY 2011 Base OCO FY 2011 Plans: FY 2011 OCO	1.899	0.000	0.000	0.000	0.000
Program #4 Scalable Warhead Technology: 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. In FY09, conducted M&S studies of warhead concepts for baseline performance against multiple target set configurations. In FY10, design and develop enhanced fragmentation,	2.749	7.570	8.016	0.000	8.016

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
reactive materials technologies, multipurpose explosives, and initiation trains for warheads and scalable and adaptive munitions; compare performance of designs against predictive models, simulations, and baselines; and fabricate, test and evaluate component technologies in static munition tests. In FY11, will fabricate and investigate scalable and adaptive munitions; and will test and evaluate warheads and munitions to determine characteristics and performance. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/ Project H18 and PE 0603004A/Project 232. 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 #5 Energetic Materials and Warheads: This effort designs energetic materials with controlled energy release for precision munition and counter-munition applications. In FY10, investigate 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-select promising ingredient materials for fabrication and characterization studies; and fabricate ingredient materials. In FY11, will verify/validate model predications of the pyrotechnic formulations with the selected ingredient materials; will conduct fabrication studies for integrating promising formulations into high efficiency energetic materials; will fabricate energetic formulations for laboratory scale testing and model validation; and will model use of energetic	0.000	3.180	2.898	0.000	2.898

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
promising formulations in enhanced warheads. Efforts described here are coordinated and complimentary to related efforts in PE 0602624A/Project H18 and PE 0603004A/Project 232 and PE 0602618A/Project H80. 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 #6 Insensitive Munitions Multi-Scale Reactive Modeling (IM-MSRM): The IM-MSRM effort designs and develops new M&S tools for the design and development of insensitive munitions. In FY10, evaluate the structure and density predictions for insensitive energetic materials resulting from the M&S analysis. In FY11, will design models of detonation products based on predictions obtained at the insensitive energetic material atomic and micro levels. FY 2009 Accomplishments: FY 2009 FY 2010 Plans: FY 2010	0.000	0.587	0.650	0.000	0.650

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<u>B. Accomplishments/Planned Program (\$ in Millions)</u>						
		FY 2009	FY 2010	Base FY 2011	OCO FY 2011	Total FY 2011
<i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO						
Program #7 Small Business Innovative Research/Small Business Technology Transfer Programs <i>FY 2009 Accomplishments:</i> FY 2009 <i>FY 2010 Plans:</i> FY 2010 <i>Base FY 2011 Plans:</i> FY 2011 Base <i>OCO FY 2011 Plans:</i> FY 2011 OCO		0.000	0.147	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals		10.946	11.484	11.564	0.000	11.564
<u>C. Other Program Funding Summary (\$ in Millions)</u> N/A						
<u>D. Acquisition Strategy</u> N/A						

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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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