Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	77.171	76.702	63.951						Continuing	Continuing
G03: Area Defense Advanced Technology	1.919	1.978	1.998						Continuing	Continuing
NA6: Missile and Rocket Initiatives (CA)	16.812	12.917	.000						Continuing	Continuing
206: MISSILE SIMULATION	3.366	3.522	3.518						Continuing	Continuing
263: FUTURE MSL TECH INTEGR(FMTI)	32.093	36.805	42.492						Continuing	Continuing
550: COUNTER ACTIVE PROTECTION	14.891	15.351	8.127						Continuing	Continuing
704: Advanced Missile Demo	8.090	6.129	7.816						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates advanced missile technologies to enhance weapon system lethality, survivability, agility, deployability, and affordability. The emphasis in this PE is on smaller, lighter weight, more affordable missiles. This PE supports high fidelity simulations including real-time Hardware-in-the-Loop (HWIL) for the design, demonstration and testing of advanced tactical missiles and interceptors (project 206); the maturation and demonstration of missile components with capabilities for locating targets in clutter, precision guidance, high speed missile flight, and missile communications, command, and control (project 263); development of a guided interceptor to work with the active protection system (APS) being developed for Future Combat Systems (FCS) (project 550); maturation and demonstration of tracking and fire control radar technologies against rocket, artillery, and mortar threats (project 704); and the maturation and demonstration of technologies required for force protection against Unmanned Aerial Vehicles and rotary wing aircraft (project G03). Project NA6 funds congressional special interest items.

Work in this PE is related to, and fully coordinated with, with PE 0602303A (Missile Technology), PE 0603003A (Aviation Advanced Technology), PE 0603270A (Electronic Warfare Technology), PE 0602624A (Weapons and Munitions Technology), PE 0603004A (Weapons and Munitions Advanced Technology), and PE 0603005A (Combat Vehicle and Automotive 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.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603313A Missile and Rocket Advanced Technology

Work in this PE is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC) and Space and Missile Defense Command (SMDC) located at Huntsville, AL.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	77.259	63.998	70.767	
Current BES/President's Budget	77.171	76.702	63.951	
Total Adjustments	-.088	12.704	-6.816	
Congressional Program Reductions	.000	-.256		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	12.960		
Total Reprogrammings	2.027	.000		
SBIR/STTR Transfer	-2.115	.000		

Change Summary Explanation

FY09 increase is due to congressional adds.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					PROJECT NUMBER G03	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
G03: Area Defense Advanced Technology	1.919	1.978	1.998						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates Air Defense Missile technology to support brigade force protection capability against the following potential threats: Unmanned Aerial Vehicles, rotary wing aircraft and Large Caliber Rockets, Cruise Missiles, etc. and to expand the protection envelope to a division/corps area.

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

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.053	.000	
Air Defense Advanced Technology: This effort matures and demonstrates missile technology to provide capability for warfighter force protection against low and slow flying air vehicle threats in all environments without increasing the force structure. In FY08, established system requirements and performance goals for a missile capable of being launched from existing platforms to provide a force protection capability against slow flying airborne surveillance threats including unmanned air vehicles and rotary wing aircraft. Identified potential missile concepts to meet the requirements and noted critical technologies required to meet performance goals. In FY09, continue to perform trade studies and lethality analysis through modeling and simulation of concepts, select the most favorable concepts for further development and begin maturation and demonstration of associated underlying critical component technologies.	1.919	1.925	1.998	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER G03

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will mature and develop critical components for an air defense capability, perform component testing in a laboratory environment, and develop high fidelity simulations. This effort leverages activities from PE 0602303A, project 214 and PE 0603313A, project 263.				
Total	1.919	1.978	1.998	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					PROJECT NUMBER NA6	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
NA6: Missile and Rocket Initiatives (CA)	16.812	12.917	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Missile and Rocket advanced technology development.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Smart Energetics Architecture for Missile Systems	1.545	.000	.000	
Waterside Wide Area Tactical Coverage & Homing (WaterWATCH)	2.898	.000	.000	
Rapid Response System for Protection of Air and Ground Vehicles	3.866	4.030	.000	
High Fidelity Virtual Smulation and Analysis (HFVSA)	.966	1.550	.000	
Army Virtual Emergency Testbed (AVERT)	2.319	.000	.000	
Perimeter & Maritime Sensor Network	2.319	.000	.000	
Software Engineering Enhancements	2.899	.000	.000	
Heavy Fuel High Efficiency Turbine Engine	.000	1.938	.000	
Long Range Hypersonic Interceptor	.000	.775	.000	
Advanced Commercial Technology Insertion for Aviation & Missile Research, Development, & Engineering	.000	2.325	.000	
Army Responsive Tactical Space System Exerciser (ARTSSE)	.000	1.937	.000	
SBIR/STTR	.000	.362	.000	
Total	16.812	12.917	.000	

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER NA6

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					PROJECT NUMBER 206	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
206: MISSILE SIMULATION	3.366	3.522	3.518						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates modeling and simulation tools for missile design and analysis and improved Hardware-in-the-Loop (HWIL) simulation capabilities. Evaluation of missile technology by means of HWIL provides a cost-effective method that supports missile maturation throughout weapon system life cycles and permits a reduction in the number of flight tests required, as well as improving the confidence of flight test readiness and probability of flight test success.

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

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center, (AMRDEC) Huntsville, AL.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.093	.000	
Missile Simulation: This effort matures and demonstrates simulation technologies to support missile design, analysis and test. In FY08, defined architecture and interface requirements for reusable and standardized Hardware-in-the-Loop (HWIL) common prototype modules to provide more cost effective HWIL simulation systems. Developed standardized interfaces, internal components and created a core data network to realize these goals. In FY09, continue the common HWIL framework development by testing standard high bandwidth interfaces for an infrared (IR) seeker, 6-degree-of-freedom (6-DOF) simulation and facility modules (clock, signal injection, and software). Investigate and develop passive IR projector with polarization capability to evaluate polarized infrared sensors ability to acquire and discriminate targets. Continue development of millimeter wave (MMW) synthetic aperture radar (SAR) integration and signal processing techniques for high-resolution characterization and validation database development from FY07.	3.366	3.429	3.518	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER 206

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will integrate and test the following prototype components: common HWIL capabilities including PC based scene generation, short-wave IR projector, facility monitor, 6-DOF simulation, signal injection system, and prototype seeker hardware. Develop a prototype interface for the HWIL laser radar (LADAR) projection system. Will transition new IR solar source developed under PE 0602303A to analyze solar implications on missile system performance. Develop a collaborative visualization environment in order to evaluate art-of-the-possible missile component capabilities.				
Total	3.366	3.522	3.518	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					PROJECT NUMBER 263	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
263: FUTURE MSL TECH INTEGR(FMTI)	32.093	36.805	42.492						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates advanced tactical missile technologies such as seekers, controllable thrust motors (gels, pintle-controlled solids, and air breathing) for propulsion, airframes, and guidance and controls for tactical missiles. The project goal is to reduce the cost per kill of precision guided missiles. The project matures the technologies developed and funded under PE 062303A and directly supports systems managed by the Program Executive Officer for Missiles and Space.

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

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	1.005	.000	
Technology for Non-Line-of-Sight Launch System (NLOS-LS) Variants: This effort focuses on demonstrating technologies that leverage the NLOS-LS Container Launch Unit (CLU) to provide a versatile mix of fires and fused effects capabilities for defeat of conventional and asymmetrical threats in all environments. In FY10, will design and develop critical components to support concept refinement and prototype fabrication of an NLOS-LS variant missile capable of rapid, precision deployment of lethal and non-lethal payloads. Will perform subsystem and system-level testing and evaluation in a laboratory environment. Will perform an evaluation of payload delivery feasibility through proof-of-principle flight tests and high fidelity simulations. Will investigate, identify and coordinate design interfaces for selected high payoff payload candidates and evaluate and mature the most promising interfaces to enable integration into NLOS-LS variant. This effort leverages technology development activities from PE602303A.	.000	.000	4.440	
Advanced Propulsion and Warheads: This effort matures propulsion and warhead technology for the Non-Line-of-Sight Launch System (NLOS-LS).	5.807	1.923	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology			PROJECT NUMBER 263	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
In FY08, investigated enhanced NLOS-LS technologies, including the high efficiency turbo-engine (HETE) technology for potential NLOS-LS variants. Performed bench testing of prototype hardware components and wind tunnel testing of variant concept designs. In FY09, perform integrated prototype system concept demonstrations and evaluations of an NLOS-LS cargo variant for rapid, precision deployment of submunitions.					
Close Combat Networking of Weapons and Sensors: This effort matures and demonstrates enabling technology to provide network lethality capability for transition to Javelin and Tube-launched, Optically-tracked, Wire-guided (TOW) missile systems that will increase warfighter lethality, survivability, and situational awareness. In FY08, completed technical specifications of a digital link to current and future tactical network radios for the TOW Improved Target Acquisition System (ITAS), and Javelin Command Launch Unit (CLU). Conducted networked lethality force effectiveness study to quantify force-multiplying battlefield effects of networked TOW and Javelin, including the capability to transmit standard Variable Message Format (VMF) messages to fielded infantry battle command systems. Conducted mission software design and development, and component-level trade studies and design for CLU strap-on Far Target Locator (FTL) and network interface. In FY09, continue maturation of prototype mission software; conduct prototype strap-on FTL and network interface card development; integrate and demonstrate system level future force (Soldier Radio Waveform) radio interoperability; perform integration and testing with the Javelin CLU. Conduct planning for a networked lethality demonstration employing current and future tactical radios. In FY10, will complete and fully integrate all mission application enhancements with prototype networked ITAS and networked CLU with strap-on FTL and perform system-level tests, followed by Command Launch Unit and ITAS network integration. Will conduct cooperative networked TOW ITAS and Javelin Command Launch Unit capability demonstration.		3.837	4.809	5.576	
Modeling/Simulation and System Performance Evaluation: This effort matures Modeling and Simulation technology for the Non-Line-of-Sight Launch System (NLOS-LS).		2.898	.962	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER 263

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY08, supported few-on-few simulations and demonstrations of NLOS-LS Precision Attack Missile (PAM). Performed trade studies and generated detailed simulation models to evaluate PAM propulsion and multi-mode seeker technology insertion. Modeled manufacturing and affordability (M&A) issues in preliminary design phase of NLOS-LS variants. In FY09, perform many-on-many system trade studies and generate detailed simulation models for evaluation of NLOS-LS variants and PAM upgrades. Continue to address manufacturing and affordability issues. Conduct excursions to expand the envelope of simulation evaluated conditions.				
Multi-Mission/Multi-Purpose Single Missile Propulsion: This effort matures and demonstrates enhanced capability missile propulsion that provide longer ranges, closer inner boundaries increasing mission flexibility, and shorter flight times while increasing system insensitive munitions capability and mission robustness in air-to-ground, ground-to-ground, and ground-to-air roles for transition to PEO Missiles & Space. In FY08, performed system-level trade studies and concept designs of gelled bi-propellants, pintle-controlled solids, and hybrids. Successfully tested two low cost pintle materials in reduced smoke propellant which offer significant cost and weight advantages. Successfully demonstrated a throttleable vortex engine using gel fuel. In FY09, complete concept designs for the best candidate motor and fabricate critical components (including propellants, engine, expulsion systems, and controls) for variable propulsion motors. Begin validation of critical components of these designs. In FY10, will complete testing of missile motor critical components, select best technical approach and begin design, analysis and fabrication of flight-ready motor hardware for static testing.	1.287	2.318	4.885	
Enhanced Precision Interceptor Technology: This effort develops and demonstrates interceptor technology, concepts and prototype hardware to defeat rocket, artillery, and mortar threats in flight at extended ranges. This effort is in collaboration with PE 0603313A Vertical Launch Technology and PE 0603313A Technical Fire Control Technology.	.000	.000	8.045	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER 263

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10 will complete final designs of prototype interceptor components and fabricate and perform bench and field testing of all components. Will also integrate interceptor components and conduct system level Hardware-in-the-Loop (HWIL) testing and evaluation. Update the interceptor designs and simulations based on the test results.				
Technical Fire Control Technology: This effort develops and demonstrates technical fire control technology and prototype hardware and software to determine a firing solution and launch and command an interceptor to defeat rocket, artillery, and mortar threats in flight at extended ranges. This effort is in collaboration with PE 0603313A Enhanced Precision Interceptor Technology and PE 0603313A Vertical Launch Technology. In FY10 will complete final designs of prototype technical fire control components and software, will fabricate and complete bench level testing of all components and software. These technical fire control components will be integrated with the interceptor components developed under PE 0603313A Enhanced Precision Interceptor Technology to support system level Hardware-in-the-Loop (HWIL) testing and evaluation. Update the technical fire control design and software and update simulations based on the test results.	.000	.000	7.040	
Enhanced Seeker Development: This effort matures seeker technology for the Non-Line-of-Sight Launch System (NLOS-LS). In FY08, integrated PAM (Precision Attack Missile) seeker and electronics together and performed tower and captive flight testing of the PAM seeker. In FY09, perform two captive flight tests and continue evaluation and maturation of seeker technology, aided target acquisition (ATA), and electronics. Transition to PEO Missiles & Space as a spiral upgrade to NLOS-LS System Development and Demonstration (SDD) program.	2.898	.962	.000	
Applied Smaller, Lighter, and Cheaper (SLC) Missile Components: Matures and demonstrates technology developed in PE602303A that focuses on developing increasingly smaller, lighter, and cheaper missile components to enhance current system capabilities against asymmetric threats for transition to the next generation small precision munitions. Mature technologies will transition to PM Close Combat Weapon Systems. In FY08, completed and down-selected final multipurpose warhead (MPW) design, performed initial lethality assessments, and warhead pre-qualification tests in conjunction with Armaments Research Development Engineering	5.180	7.489	7.463	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology			PROJECT NUMBER 263	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Center, PE602624A. Completed design and conducted captive flight tests (CFT) of uncooled non-gimbaled infrared (IR) seeker reducing size and cost. In FY09, conduct requirements analysis and trade studies for small, low cost electronics and seeker/sensor systems including height of burst sensor (HOBS) and high-reliability TOW rate sensor, and common electronic safe and arm device (ESAD) for small lightweight precision missiles. Leverage latest in nanotechnology and electronics packaging to achieve small, light, missile form factors to meet urban and emerging threats. Integrate MPW with Javelin and conduct tandem/Insensitive Munition tests. In FY10, will mature latest in nano/advanced technology composites for use in lightweight missile structures improving thermal dissipation; complete image-based stabilization/people tracking subsystems; conduct static/dynamic ESAD testing and; down-select and flight test TOW rate sensor package for missile guidance.					
Defense against Rockets, Artillery, and Mortars (RAM): This effort transitions activities from Defense against RAM Interceptor efforts in PE 0602303A to demonstrate an integrated system to counter multiple simultaneous RAM threats. This effort is in collaboration with PE 0603313A Enhanced Precision Interceptor Technology and PE 0603313A Technical Fire Control Technology. In FY08, developed and demonstrated component technologies and initiated and completed preliminary designs of prototype interceptor, launcher, and fire control components capable of intercepting and defeating RAM threats. In FY09, initiate final designs of prototype interceptor, launcher, and fire control components and begin fabrication and bench and field testing of supporting brassboard component technologies. Update and verify system-level RAM Interceptor simulations based on test results. In FY10 will complete final designs of prototype vertical launch, pitch-over components, and integration of system components. Fabricate and complete bench level testing of all components and software. The launch and pitch-over, interceptor and the technical fire control components will be integrated for system level Hardware-in-the-Loop (HWIL) testing and evaluation. Update the vertical launch and pitch-over designs and software and update simulations based on the test results.		10.186	17.337	5.043	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER 263

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Total	32.093	36.805	42.492	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					PROJECT NUMBER 550	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
550: COUNTER ACTIVE PROTECTION	14.891	15.351	8.127						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates integrated survivability technologies and techniques for lightweight combat platforms including light armored vehicles, tactical wheeled vehicles, and helicopters. Efforts include the development of guided interceptors for active protection systems (APS) capable of defeating tank-fired large caliber anti-armor threats, anti-tank guided missiles and long range rocket propelled grenades (RPGs). Work in this project on APS is in collaboration with PE 0602624A (Weapons and Munitions Technologies), project H28, and PE 0603005A (Combat Vehicle and Automotive Advanced Technology), project 221. This project complements work done on adaptive infrared suppressor and acoustic signature technologies matured in the PE 0603003A (Aviation Advanced Technology), project 313. This effort is building on the expertise developed in support of rockets, missile, sensors, and active control to develop innovative solutions survivability.

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

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.411	.000	
Kinetic Energy Active Protection System (KEAPS) Guided Interceptor: This effort develops and demonstrates an interceptor to defeat threats to vehicle survivability focusing on tank fired kinetic energy threats to combat vehicles. In FY08, completed development of components and began integration into hardware-in-the-loop (HWIL) simulation facility for subsystem testing. Conducted three ballistic flight tests to evaluate interceptor kinematic and aerodynamic performance. Conducted one pre-programmed control flight tests to evaluate control authority, IMU performance, and aerodynamic response to control. In FY09, complete integration of interceptor components and conduct three control flight tests guiding the interceptor through preprogrammed maneuvers. Complete field testing of the seeker; test it in HWIL to evaluate seeker dynamic	14.891	14.940	8.127	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER 550

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
performance. Demonstrate up to five guided flight tests to evaluate guidance accuracy against live threats under increasing degrees of launch error. Integrate seeker, target detection device (TDD) and electronic safe and arm device (ESAD) into guided interceptor for flight testing. Begin fabrication of guided interceptors for integrated system-level demonstration. In FY10, conduct up to two guided flight tests against live threats to evaluate TDD and ESAD performance. Integrate pop-up-pitch-over (PUPO) apparatus into interceptor for flight tests and complete integration on a combat platform for a fire-on-the-move demonstration. Conduct two flight tests with launch canister and PUPO against live threats. Integrate warhead into interceptor and conduct two full end-to-end flight tests from PUPO to threat defeat. This effort is in collaboration with PE 0602624A (Artillery and Combat Support Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0602618A (Ballistics Technology, Robotics Technology), PE 0603004 (Advanced Munitions Demonstration).				
Total	14.891	15.351	8.127	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology					PROJECT NUMBER 704	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
704: Advanced Missile Demo	8.090	6.129	7.816						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures advanced state-of-the-art missile system concepts and related hardware to enhance weapon system lethality, survivability, agility, versatility, deployability, and affordability for defense against the future force air and ground, armored and non-armored threats.

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

Work in this project is performed by the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Small Business Innovative Research/Small Business Technology Transfer Program	.000	.174	.000	
Advanced Multi-Mission Precision Guided Munition (AMMPGM) for air platforms: This effort demonstrates alternate Hydra-70 rocket aft end configurations for low cost accuracy improvements to transition to PEO Missiles & Space. In FY08, completed fabrication and demonstration of alternate Hydra-70 rocket configurations through hardware-in-the-loop, bench, and live-fire testing.	3.295	.000	.000	
Counter Rockets, Artillery, Mortars (CRAM) Tracking and Fire Control: This effort matures and demonstrates radar technology to provide 360 degree, near hemispherical coverage for track and command intercept of RAM threats. This task supports Defense Against Rocket, Artillery, and Mortar, PE0603313A Project 263 to perform system-level demonstration. In FY08, transitioned short-range surveillance and fire control sensor technology from PE 0603004A. Fabricated prototype short-range surveillance sensors capable of acquiring and tracking RAM threats under realistic operational conditions. Began fabrication of prototype fire control sensor capable of providing required accuracy for intercepting and defeating RAM threats. Initiated and completed preliminary design of a fire control sensor and demonstrated through test capable of providing range resolution required by the interceptor being developed under PE 0603313A Project 263.	4.795	5.955	7.816	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603313A Missile and Rocket Advanced Technology	PROJECT NUMBER 704

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY09, complete the fabrication and integration of a prototype surveillance sensor. Test the integrate prototype surveillance sensor in an open air environment to verify technology can acquire and track small mortar and rocket targets with very low radar cross sections. Complete final design and begin fabrication and integration of fire control sensor components. In FY10, will complete fire control sensor assembly fabrication and begin to integrate with the other system components developed under Defense Against Rocket, Artillery, and Mortars. Will conduct system-level live-fire testing demonstrating the fire control sensor can track RAM targets with the required accuracy.				
Total	8.090	6.129	7.816	

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.