Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*				R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*							
COST ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	42.474	57.054	46.763	-	46.763	64.477	57.436	50.596	53.373	Continuing	Continuing
296: *Close Combat Technology*	7.069	2.820	2.248	-	2.248	3.355	2.829	2.490	2.533	Continuing	Continuing
297: *Mun Survivability & Log*	7.985	12.783	9.572	-	9.572	15.511	14.979	10.489	10.665	Continuing	Continuing
857: *DOD EXPLOSIVES SAFETY STANDARDS*	1.675	2.171	2.268	-	2.268	2.248	2.280	2.311	2.350	Continuing	Continuing
858: *ARMY EXPLOSIVES SAFETY MANAGEMENT PROGRAM*	0.597	0.701	0.596	-	0.596	0.688	0.679	0.688	0.700	Continuing	Continuing
859: *LIFE CYCLE PILOT PROCESS*	4.385	5.018	3.562	-	3.562	5.770	5.528	4.996	5.080	Continuing	Continuing
862: *Indirect Fire and Fuze Technology*	2.944	4.614	2.554	-	2.554	4.435	4.271	4.369	4.443	Continuing	Continuing
F21: *Direct Fire Technology and NATO Ammo Evaluation*	3.365	12.965	9.782	-	9.782	18.256	12.647	9.306	9.462	Continuing	Continuing
F24: *CONVENTIONAL MUNITIONS DEMIL*	14.454	15.982	16.181	-	16.181	14.214	14.223	15.947	18.140	Continuing	Continuing

Note

FY 2011: $9.296 million Congressional decrement.

FY 2013: Funds realigned to other higher priority requirements.

A. Mission Description and Budget Item Justification

This Program Element supports continuing technology investigations. It provides a coordinated tri-service mechanism for the collection and free exchange of technical data on the performance and effectiveness of all non-nuclear conventional munitions and weapons systems in a realistic operational environment. It provides for NATO interchangeability testing (F21); Joint munition effectiveness manuals used by all services; development of standardization agreements (STANAGS) and associated Manuals of Proof and Inspection (MOPI); operation of the North American Regional Test Center (NARTC); evaluation of demilitarization methods for existing conventional ammunition (F24); evaluation of useful shelf life, safety, reliability and producibility of pyrotechnic munitions; and improvement of explosives safety criteria for DOD munitions via the DOD Explosives Safety Board (857). Pyrotechnic Reliability and Safety (296) supports pyrotechnic research, development and testing to identify, characterize and resolve reliability, safety, storage and manufacturing issues that impact production availability and field use of pyrotechnics. Project 296 will result in the development and demonstration of new, safe, reliable and environmentally acceptable munitions. Munitions Survivability and Logistics (297) will make

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Army units more survivable by applying technologies to reduce the sensitivity of munitions to unplanned stimuli (e.g. bullet impacts, fragment impacts, fast cook off, slow cook off, sympathetic detonation, shaped charge jets) and by testing and demonstrating munitions logistics system solutions that prevent or minimize catastrophic explosive events and accelerate ammunition resupply. Project 297 also supports the Army Insensitive Munitions (IM) Board's reviews. The Army Explosives Safety Management Program (858) was established in FY01. The U.S. Army Technical Center for Explosives Safety uses the funds in this project to evaluate current explosives safety standards and develop new, scientific and risk-based standards to meet U. S. Army explosives requirements. The Life Cycle Pilot Program (LCPP) (859) will assess production base capabilities and needs over the acquisition life cycle of various munitions and will address the producibility of ammunition including the transition to type classification and production, and the ability of the production base to cost effectively produce quality products on schedule. The Fuze Technology Integration program (862) will improve performance and lower the costs of existing proximity fuzes and enable new applications in submunitions and medium caliber fuzes, addressing advanced proximity fuze sensor technology, Micro-electromechanical Systems (MEMS), Safety and Arming (S&A) technology, and Electronic S&A (ESA) technology for smart munitions.

B. Program Change Summary ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	53.338	57.142	55.166	-	55.166
Current President's Budget	42.474	57.054	46.763	-	46.763
Total Adjustments	-10.864	-0.088	-8.403	-	-8.403
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.311	-			
• Adjustments to Budget Years	-	-	-8.403	-	-8.403
• Other Adjustments 1	-9.553	-0.088	-	-	-

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COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
296: *Close Combat Technology*	7.069	2.820	2.248	-	2.248	3.355	2.829	2.490	2.533	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This project will support research, development and testing to identify, characterize and resolve reliability, safety, storage and manufacturing issues that impact production availability and field use of demolitions, grenades, shoulder launched munitions, mines and mine clearing charges and pyrotechnics, including training realism. Project will result in the development and demonstration of new, safe, reliable and environmentally acceptable munitions.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Heavy Metal Mitigation in Illuminants	0.143	0.300	-
Articles:	0	0	
Description: Heavy metals (barium and/or perchlorate) have toxic effects on soldiers as well as workers in the manufacturing process. This project is to replace toxic oxidizers in green signals and reduce potential health hazards			
FY 2011 Accomplishments: Conduct component and system tests			
FY 2012 Plans: Complete tests and type classify			
Title: Nanoparticles for Pyro Items (LA14)	0.500	-	-
Articles:	0		
Description: .			
FY 2011 Accomplishments: Develop the technology to produce pyrophoric nanopawders of Iron and demonstrate production of pyrophoric foils using current technologies. This effort is to develop government owned technology for the M211 Infrared Countermeasure Flare.			
Title: Aircraft Countermeasure Improvements (LA14, LA15, MG62)	-	-	0.565
Description: This program covers the upgrade of Army aircraft countermeasures to maintain effectiveness against the ever evolving threat. It covers the M296, M211/M212 series of flares, the M839 chaff cartridge, and the M796/BBU-35 impulse cartridge. Goals are to increase overall decoy effectiveness, decrease observability, and optimize performance for the various rotory and fixed wing Army aircraft.			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY 2013 Plans: Develop chaff that will: 1) After dispense, lose its? RF component (RF ?half-life?); 2) disperse and bloom rapidly with minimal clumping and birdnesting even when used at low speeds from a hovering helicopter. Justification: the long persistence of Chaff causes interference with fire control and air traffic control radar. Impact: chaff will continue to interfere with control and tracking radar, limiting its use in the field and training.			
Title: Demolition Initiator Packaging - Skin Pack (MDI DODICS) ***Articles:*** ***Description:*** Current spool design is bulky, hard to conceal in urban environments and has potential for tangling. This project will develop a lighter, easily deployable and more reliable deployment method. It will have the added advantage of being compatible with Explosive Ordnance Disposal robotics. ***FY 2011 Accomplishments:*** Design and develop new packaging. ***FY 2012 Plans:*** Test and type classify new packaging.	1.187 0	0.650 0	-
Title: M10 Universal Destructor Capability Enhancement (M241) ***Articles:*** ***Description:*** . ***FY 2011 Accomplishments:*** Develop an infinitely variable adapter for the M10. Change explosive fill to an Insensitive Munitions type composition (PAX-46 or similar). Examine alternative initiator adapter designs. Develop lower cost packaging (replace custom fiber tube). Qualify any changes made through testing.	0.900 0	-	-
Title: Chaff Performance Improvements ***Articles:*** ***Description:*** Increase effectiveness against advanced missile threats. ***FY 2011 Accomplishments:*** Performance versus new threats. ***FY 2012 Plans:***	0.639 0	1.196 0	-

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Develop chaff cuts to improve effectiveness against current and new threats.			
Title: Low Observable Ignition for Counter Measure Flares (LA15) ***Articles:*** ***Description:*** Enhance aircraft survivability. ***FY 2011 Accomplishments:*** Safety enhanced aircraft survivability. ***FY 2012 Plans:*** Use low visibility ignition composition for M212 Countermeasure Flare.	0.710 0	0.424 0	-
Title: Environmentally Benign Smoke Hand Held Signals (L306, L307, L311, L312, L314) ***Description:*** This program will address the health concerns in the smoke HHS by leveraging smoke technology developed through Environmental Quality Testing and M18 smoke grenade. Current configuration has hazardous components in the smoke composition and cannot be procured. ***FY 2013 Plans:*** This program will address the health concerns in the smoke HHS by leveraging smoke technology developed through Environmental Quality Testing and M18 smoke grenade. Current configuration has hazardous components in the smoke composition and cannot be procured.	-	-	0.395
Title: M69 Practice Grenade Improvements ***Articles:*** ***Description:*** Increase time for training enable user to find expended M69 faster at end of each session. ***FY 2011 Accomplishments:*** Increase time for training enable user to find expended M69 faster at end of each session.	0.975 0	-	-
Title: Environmentally Benign Colored Smoke Formulations - M18 Red/Violet Smoke Grenades (G950/G955) ***Description:*** The project addresses AERTA requirement AERTA PP-3-02-4 and Environmentally Sustainable Energetics Workshop List of Concerns PGP-09-02 for the removal of sulfur and hazardous dyes from current formulations. New formulations will replace the sulfur based red and violet M18 formulations for all future production. Justification: AERTA requirement Impact: Without change to the formulation, User will continue to be exposed to potention inhalation hazard.	-	-	0.296

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY 2013 Plans: The project addresses AERTA requirement AERTA PP-3-02-4 and Environmentally Sustainable Energetics Workshop List of Concerns PGP-09-02 for the removal of sulfur and hazardous dyes from current formulations. New formulations will replace the sulfur based red and violet M18 formulations for all future production. Justification: AERTA requirement Impact: Without change to the formulation, User will continue to be exposed to potention inhalation hazard.			
Title: M84EI,M240EI,M102EI Qualification and TC of Army Owned Stun Grenade Design (GG09, GG18, GG19) ***Articles:*** ***Description:*** Qualify already developed Government owned design which will reduce hardware unit cost and will provide additional benefits with an environmentally friendly and enhanced safety design for the Tactical and Reloadable Practice Stun Hand Grenade. Impact: Future competitive contracting strategy using a performance specification will be pursued incurring a high risk of delayed award and considerable expense to qualify a different contractor owned design. Potential exsists for environmental hazards to continue to affect manufacturing training sites and theater. ***FY 2011 Accomplishments:*** Qualify already developed Government owned design which will reduce hardware unit cost and will provide additional benefits with an environmentally friendly and enhanced safety design for the Tactical and Reloadable Practice Stun Hand Grenade. Impact: Future competitive contracting strategy using a performance specification will be pursued incurring a high risk of delayed award and considerable expense to qualify a different contractor owned design. Potential exsists for environmental hazards to continue to affect manufacturing training sites and theater. ***FY 2012 Plans:*** Qualify already developed Government owned design which will reduce hardware unit cost and will provide additional benefits with an environmentally friendly and enhanced safety design for the Tactical and Reloadable Practice Stun Hand Grenade. Impact: Future competitive contracting strategy using a performance specification will be pursued incurring a high risk of delayed award and considerable expense to qualify a different contractor owned design. Potential exsists for environmental hazards to continue to affect manufacturing training sites and theater.	0.915 0	0.250 0	-
Title: Dual Payload M206 M206 Aircraft Countermeasure Flare/ Pyro (L410) ***Description:*** M206 countermeasure flare effectiveness will be improved by adding extended source (IR cloud) material. Benefit include increased effectiveness and doubling the countermeasure engagements that can respond to missile threat. ***FY 2013 Plans:***	-	-	0.676

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Add a extended source (IR Cloud) material to the M206 Flare. Justification: Test data has shown single flare effectiveness can be increased with the addition of an extended IR source. Impact: contunued reduced number of counetermeasure solutions.			
Title: MK3A2 Redesign Completion (Asbestos removal from Design/modernize design) (G911) ***Articles:*** ***Description:*** Allow the use of an alternate lethal greade to be used by Soliders when the use of an M67 may not be the best choice, enhancing their combat capabilites to perform assault roles. ***FY 2011 Accomplishments:*** Allow the use of an alternate lethal greade to be used by Soliders when the use of an M67 may not be the best choice, enhancing their combat capabilites to perform assault roles. ***FY 2013 Plans:*** Finalize the redesign of the MK3A2 grenade;perform residual tests to justify the ECPs required to update the TDPL; update associated documents (SDZ,FHC etc..); Justification: There is current funding to remove the existing safety hazard (asbestos) in the MK3A2. In addtion, the User has stated this capability is still required. Impact: If not funded, the MK3A2 redesign would not occur and the safety Hazard would still exist. In additon, no new MK3A2s would be allowed to be manufactured to the old TDP.	1.100 0	-	0.316
Accomplishments/Planned Programs Subtotals	7.069	2.820	2.248

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

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COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
297: *Mun Survivability & Log*	7.985	12.783	9.572	-	9.572	15.511	14.979	10.489	10.665	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This project supports the future force by making Army units more survivable through the investigation, testing and demonstration of munitions logistics system improvements that prevent or minimize catastrophic explosive events and accelerate ammunition resupply. Key thrusts are munitions storage area survivability, Insensitive Munitions (IM) technology integration and compliance, ammunition management and asset visibility, weapon system rearm, munitions configured load enablers and advanced packaging and distribution system enhancements. Within each thrust, a broad array of solutions will be identified, tested, and evaluated against developed system measures of effectiveness. Optimum, cost effective solutions that enable the rapid projection of lethal and survivable forces will be demonstrated. The early stages of force deployment are especially critical. Theater ammunition storage areas are vulnerable and present the enemy with lucrative targets. These areas and distribution nodes contain the only available munitions stocks in theater. Loss of these munitions could cripple the force, jeopardize the mission, and result in high loss of life. This project mitigates vulnerabilities and ensures a survivable fighting force.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Munitions Predictive Life	1.075	1.156	0.726
Articles:	0	0	

Description: This program will demonstrate technologies and algorithms that can help assess munitions serviceability based upon aggregate environmental exposures, system cycling and munition degradation models. This program will provide life cycle management tools for risk mitigation strategies, while reducing testing, inspection & surveillance required and improving weapon system reliability & and warfighter effectiveness.

FY 2011 Accomplishments:

Completed deployment of environmental monitoring systems that will record temperatures experienced by ammunition assets at the pallet, container, and item level while stored in open storage, in a 20 foot International Standards Organization (ISO) container, and in an earth covered magazine in order to develop models that will provide more accurate reliability forecasts. Integrated power sources and storage and sensor and memory storage components of a sensor device powered by vibration induced energy that will provide a history of unusual vibrations, impacts, and shocks that munitions have experienced in order to better determine reliability.

FY 2012 Plans:

Complete and validate models that will determine the correlation between simulated and actual temperatures experienced by ammunition at the pallet, container, and item level in open storage, ISO containers, and earth covered magazines. Demonstrate the shock/vibration sensor reliability device powered by vibration induced energy. Complete analysis of ammunition reliability

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
documentation in databases and identify reliability and risk threshold levels. Complete testing of a thin, low cost, passive, credit card sized device that can record and display the temperature exposure history of an ammunition item at the packaging, or pallet level. ***FY 2013 Plans:*** Complete algorithmic model validation developed to relate temperature conditions seen at the container and item level to those seen at the pallet level for improved reliability forecasting and more cost effective sensor placement. Based on reliability and risk threshold levels developed from ammunition database analysis, develop an algorithmic procedure that can be applied periodically to evaluate ammunition reliability and risk and determine functionality inspection requirements.			
Title: Munitions Containerization Program ***Articles:*** ***Description:*** This program will demonstrate next generation packaging, with standardized dimensions/interfaces, that considers unit of issue, permits easy reconfiguration and that is reusable, nestable, automation friendly, and survivable. This new packaging (Ammoblocks) will permit the safe packing and shipping of more and different types of ammo together in user tailored loads; facilitate rapid, less labor intensive reconfiguration and resupply; and facilitate automation upgrades of load/assemble/pack and battlefield resupply operations. ***FY 2011 Accomplishments:*** Completed preliminary design of container integrated locking mechanism that will permit the interlocking of individual containers to each other and a pallet base, analyze interface between ammunition container closure mechanisms and automated handling end effectors. Completed review of current ammunition packaging configurations and proposed distribution optimized configurations with Training and Doctrine Command Centers of Excellence. ***FY 2012 Plans:*** Complete analysis of life cycle logistics system impact of Ammoblocks, complete design of container integrated locking mechanism and incorporate into existing ammunition containers to assess feasibility. ***FY 2013 Plans:*** Complete testing of existing ammunition containers with integrated locking mechanisms, complete modeling and simulation of prototype rectangular and cylindrical Ammoblock containers for candidate ammunition items.	0.984 0	1.201 0	0.785
Title: Improved Munitions Packaging ***Articles:***	1.058 0	1.144 0	0.929

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Description: This program will demonstrate upgrades to existing packaging components and materials to improve legacy ammunition survivability. These upgrades will enhance ammunition survivability and reliability, improve field ammunition operations, and improve packaging producibility. ***FY 2011 Accomplishments:*** Completed test and evaluation of inkjet materials and methods and make recommendations for implementing inkjet printing for ammunition packaging. Fabricated and tested ammunition containers with prototype empty container identification mechanisms. Completed preliminary design and lab testing of low cost, lightweight High Density Polyethylene (HDPE) cylindrical ammunition containers. Completed design and preliminary testing of an improved security seal for rectangular ammunition containers. Completed a draft standard specification for pressure sensitive adhesive labels used on ammunition packaging. Conducted update of the military specification for wood ammunition pallets to further define acceptance criteria in order to improve quality and durability. ***FY 2012 Plans:*** Complete prototype fabrication, testing, and user evaluation of HDPE cylindrical containers as replacements for current 120mm tank and 120mm/81mm mortar packaging. Complete prototype fabrication and verification testing of an improved security seal for rectangular ammunition containers and transition. Conduct test and evaluation of pressure sensitive adhesive label samples and finalize standard specification and Technical Data Package for use on ammunition packaging. Complete design of low-cost ammunition bandoleers utilizing inexpensive synthetic non-woven materials. ***FY 2013 Plans:*** Conduct verification test and field demonstration of HDPE cylindrical containers as replacements for current 120mm tank and 120mm/81mm mortar packaging and transition. Fabricate prototypes, complete engineering tests, and conduct an operational demonstration of low cost ammunition bandoleers.			
Title: Insensitive Munitions (IM) Integration Program	3.049	7.527	5.371
Articles:	0	0	
Description: Demonstrate multiple IM technologies and integrate into end item(s) to improve munitions survivability and warfighter safety. IM Technologies, using State-of-the-Art materials, will be developed in the areas of warhead, propulsion and propellants, explosives, packaging, and barriers. In addition, modeling and simulation will be used to reduce development and testing costs. Efforts will increase the number of IM compliant ammunition items fielded to mitigate munitions reaction to unplanned stimuli such as fire, fragments, cook-off, bullets, adjacent munitions reaction (sympathetic detonation), and shape charge jet attacks. ***FY 2011 Accomplishments:***			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
A final down-selected formulation of an IM moldable explosive, to replace C-4 explosive in demolition charges, was successfully tested and transitioned for further development. Explosive detonation train designs for the initiation of IM explosives were completed and transitioned to PM Combat Ammunition Systems. Completed IM testing of IMX-104 IM explosive and pressed PAX-46 booster explosive and transitioned to the M2A4 and M1A3 mortar ammunition programs to replace the more sensitive Comp B explosive. Cartridge Case venting technologies for 25mm Ammunition were transitioned to the LW 30mm M789/M788 program. Warhead Venting technologies were finalized for the 40mm M430A1 HEDP Cartridge and will be transitioned to the 40mm M430A1 Multiple IM Technology integration program. ***FY 2012 Plans:*** Complete full scale IM testing for a Flexible Explosives (Flex-X) formulation for demolition ammunition which meets the performance specifications of Pentaerythritol tetranitrate, while also providing improved IM response. A melt-phase main fill explosive will be developed to replace Composition H6 explosive in the 40 lb Cratering Charge. Complete initiation testing of a less expensive pressed IMX-104 explosive to replace PBXW-14 auxiliary charge that is currently being used in the 81mm, 120mm, and 60mm mortars loaded with IMX-104. The 40mm Multiple IM Technology Integration program will integrate IM technologies in the area of explosives, warhead, packaging, and cartridge case and finalize IM testing for 40mm M430 High Explosive Dual Purpose Cartridge in order to provide a system level IM solution. Propulsion and warhead venting technology will be validated and transitioned for the 120mm M934 HE Mortar in order to pass the SCO and FCO IM tests. Multiple prototypes of the selected designs will be manufactured, assembled and tested. The final concepts, of the propulsion and warhead venting technology, will be selected and full IM tests performed. Complete IM testing of the Sealed Seam (SS) container venting technology for the Modular Artillery Charge System PA161 and PA103A2 containers. ***FY 2013 Plans:*** Multiple IM explosives will be developed and demonstrated to IM enhance current detonation trains. Spray drying technology will be used to created high energy IM explosives and specific energetics will be demonstrated to replace Comp B explosive in the M67 Grenade and N-5 explosive in LW 30mm ammunition. In addition, Packaging, warhead venting (WV), barrier, and propulsion technology will be developed for the 105mm Artillery, M67 Grenade, LW 30mm ammunition, and 120mm Illumination mortar.			
Title: Ammo Provider ***Articles:*** ***Description:*** This program demonstrates technologies that will assure a survivable munitions logistics system by increasing distribution velocity and protecting ammo storage areas. Technologies areas to be investigated include ammunition asset visibility (including environmental sensors, marking technologies, and supply chain modeling), ammunition management (including improvements in stockpile surveillance and condition based management), sustainment (including pre-configured loads (soldier to unit size), field ammo reconfiguration capability, robotic handling, and improved load building capability), and force protection (including site planning software and field storage protection)	1.819 0	1.755 0	1.761

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY 2011 Accomplishments: Refined design of a JMIC with a forklift actuated interlocking mechanism. Incorporate optimal storage configuration, stock re-warehousing, and stock rotation planning functions into ammo igloo storage optimization software tool. Designed and fabricated an interface plate that will be attached to Container Roll-on roll-Off Platforms (CROP) and ISO Flat racks to allow the locking and restraint of JMICs without the use of tie down strapping. Completed design, modeling, and fabrication of a CROP with locking restraint mechanisms incorporated into its deck to secure JMICs without tie down strapping. ***FY 2012 Plans:*** Complete integration of transportation asset load planning capability with the ammunition igloo storage optimization software tool. Complete testing of the JMIC interface plate for CROP and the CROP with integrated JMIC restraint system. Complete design and fabrication of a low-cost one-time use disposable air delivery pallet that will alleviate the problem of the loss of many Air Force 463L pallets during tactical logistics operations. Design, fabricate, and test a robust delivery speedbag that will permit the quick and efficient delivery of small, un-damaged, easily portable bundles of supplies down a rope from a hovering helicopter. Complete testing and evaluation of a dunnage on demand system that will provide inner pack cushioning materials for the repack and retrograde of ammunition on the battlefield. Down-select an ammunition compatible robotic manipulator, integrate with a robotic arm and demonstrate capability to robotically open and close containers in a tactical environment as part of a human augmentation system for field ammunition operations. ***FY 2013 Plans:*** Complete testing and air delivery certification of a low-cost one-time use disposable air delivery pallet that will alleviate the problem of the loss of many Air Force 463L pallets during tactical logistics operations. Add rewarehousing plan generation capability to the ammunition igloo storage optimization software tool and integrate the system with the Logistics Management Program for data feed of inventory assets.			
Accomplishments/Planned Programs Subtotals	7.985	12.783	9.572

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

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COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
857: *DOD EXPLOSIVES SAFETY STANDARDS*	1.675	2.171	2.268	-	2.268	2.248	2.280	2.311	2.350	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This program supports the Research, Development, Test, and Evaluation efforts of the DoD Explosive Safety Standards Board. It supports explosive safety effects research and testing to quantify hazards and to develop techniques to mitigate those hazards in all DoD manufacturing, testing, transportation, maintenance, storage, disposal of ammunition and explosives operations, and also to develop risk based explosives safety standards. Results are essential to the development and improvement of quantity-distance standards, hazard classification procedures, cost effective explosion-resistant facility design procedures, and personnel hazard/ protection criteria.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: TM-51300	0.340	0.375	0.380
Articles:	0	0	
Description: Funding is provided for the following effort			
FY 2011 Accomplishments: Developed improved tri-service design procedures and improved computer codes for explosion-resistant structures. Initiated preparation of revised tri-service manual TM-51300.			
FY 2012 Plans: Develop improved tri-service design procedures and improved computer codes for explosion-resistant structures. Initiate preparation of revised tri-service manual TM-51300.			
FY 2013 Plans: Will develop improved tri-service design procedures and improved computer codes for explosion-resistant structures. Will initiate preparation of revised tri-service manual TM-51300.			
Title: Collect and analyze	0.266	0.275	0.279
Articles:	0	0	
Description: Funding is provided for the following effort			
FY 2011 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Collected and analyzed airblast/fragment/thermal data for revising DoD, NATO hazard classification. ***FY 2012 Plans:*** Collect and analyze airblast/fragment/thermal data for revising DoD, NATO hazard classification. ***FY 2013 Plans:*** Will collect and analyze airblast/fragment/thermal data for revising DoD, NATO hazard classification.			
Title: Explosive and Munitions Tests ***Articles:*** ***Description:*** Funding is provided for the following effort ***FY 2011 Accomplishments:*** Developed improved explosives and munitions tests and characterization data. Specifically, developed improved gap tests for rocket motors. ***FY 2012 Plans:*** Develop improved explosives and munitions tests and characterization data. Specifically, develop improved gap tests for rocket motors. ***FY 2013 Plans:*** Will develop improved explosives and munitions tests and characterization data. Specifically, will develop improved gap tests for rocket motors.	0.344 0	0.485 0	0.491
Title: Safety Guidelines ***Articles:*** ***Description:*** Funding is provided for the following effort ***FY 2011 Accomplishments:*** Developed improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepared revised Dod 6055.9-STD and 4145.26M. ***FY 2012 Plans:*** Develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepared revised Dod 6055.9-STD and 4145.26M. ***FY 2013 Plans:***	0.230 0	0.275 0	0.279

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Will develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepared revised Dod 6055.9-STD and 4145.26M.			
Title: Explosive Safety Database	0.270	0.425	0.430
Articles:	0	0	
Description: Funding is provided for the following effort ***FY 2011 Accomplishments:*** Conducted other hazards analyses and expand/automate explosives safety databases. Developed improved Explosives Safety Mishap Analysis Module with links to accident reports. ***FY 2012 Plans:*** Conduct other hazards analyses and expand/automate explosives safety databases. Develop improved Explosives Safety Mishap Analysis Module with links to accident reports. ***FY 2013 Plans:*** Will conduct other hazards analyses and expand/automate explosives safety databases. Will develop improved Explosives Safety Mishap Analysis Module with links to accident reports.			
Title: Analysis Tools	0.225	0.336	0.409
Articles:	0	0	
Description: Funding is provided for the following effort ***FY 2011 Accomplishments:*** Developed and improve risk based analysis tools for explosives safety. Developed sequence of operations prototype. ***FY 2012 Plans:*** Develop and improve risk based analysis tools for explosives safety. Develop sequence of operations prototype. ***FY 2013 Plans:*** Will develop and improve risk based analysis tools for explosives safety. Will develop sequence of operations prototype.			
Accomplishments/Planned Programs Subtotals	1.675	2.171	2.268

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT 857: *DOD EXPLOSIVES SAFETY STANDARDS*

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT 858: *ARMY EXPLOSIVES SAFETY MANAGEMENT PROGRAM*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
858: *ARMY EXPLOSIVES SAFETY MANAGEMENT PROGRAM*	0.597	0.701	0.596	-	0.596	0.688	0.679	0.688	0.700	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This projects purpose is to establish, validate or modify explosives safety requirements. This project promotes RDT&E of new and innovative explosives safety technologies that improve the survivability of Army personnel, facilities, and equipment as well as improve the health, safety, and welfare of the general public. It is an Army requirement as defined in AR 385-64.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Risk based explosive safety criteria	0.143	0.164	0.142
Articles:	0	0	
Description: Development of risk based explosives safety criteria that will aid commanders and safety personnel in the transition from regulation to risk management.			
FY 2011 Accomplishments: Continued support of hazard research and exposure consequences.			
FY 2012 Plans: Continue support of hazard research and exposure consequences.			
FY 2013 Plans: Continue support of hazard research and exposure consequences.			
Title: Development of enhanced protective structure designs	0.223	0.264	0.212
Articles:	0	0	
Description: Develop enhanced protective structure designs that improve the survivability of Army personnel, facilities, and equipment.			
FY 2011 Accomplishments: Continued support of barricade development.			
FY 2012 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Continue support of barricade development. ***FY 2013 Plans:*** Continue support of barricade development.			
Title: Development of explosive safety tools	0.231	0.273	0.242
Articles:	0	0	
Description: Develop explosive safety tools for use by Army personnel. Explosive safety tools allow commanders and safety personnel to make explosive safety decisions using risk management rather than regulations. ***FY 2011 Accomplishments:*** Continued development of new methods for risk assessment. ***FY 2012 Plans:*** Continue development of new methods for risk assessment. ***FY 2013 Plans:*** Continue development of new methods for risk assessment.			
Accomplishments/Planned Programs Subtotals	0.597	0.701	0.596

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT 859: *LIFE CYCLE PILOT PROCESS*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
859: *LIFE CYCLE PILOT PROCESS*	4.385	5.018	3.562	-	3.562	5.770	5.528	4.996	5.080	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This project supports the implementation of the Single Manager for Conventional Ammunition (SMCA) Industrial Base Strategic Plan through technology investigations, model based process controls, pilot prototyping, and industrial assessments. It will assess life cycle production capabilities required for all ammunition families, address design for manufacturability to facilitate economical production, identify industrial and technology requirements, and address the ability of the production base to rapidly and cost effectively produce quality products. Cost Reduction is an important part of the Life Cycle Pilot Process (LCPP). LCPP provides the resources to prototype critical technologies and develop the knowledge base to establish cost effective, environmentally safe and modern production processes in support of the Munitions Industrial Base transformation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Product Cost Thrust Area	0.675	0.810	1.050
Articles:	0	0	
Description: This thrust area seeks out new opportunities to reduce overall manufacturing costs of ammunition and ammunition components. RDTE efforts will review and analyze legacy manufacturing processing for opportunities to integrate new technology and lean manufacturing processes to reduce cost. ***FY 2011 Accomplishments:*** Planned programs include the following: initiate testing on prototype configuration of smoke mix with m-terphenyl. Complete chemical predictive model for propellant performance. Implement an automated in-process weigh station cutter for demolition munitions. Development of a pilot scale ultrasound melt cast inspection process for mortar munitions. ***FY 2012 Plans:*** Programs include the following: complete ultrasound melt cast inspection process for mortars and reducing residual solvents in propellants. Initiate application of Advanced Cluster Energetics (ACE) Fluid Energy Mill (FEM) on High Melt Explosives (HMX) based CXM formulations and Environmentally Benign Colored Smoke. ***FY 2013 Plans:*** Evaluate new technology for legacy processes to reduce overall production costs for the Army.			
Title: Single Point Failures	3.035	3.380	1.469
Articles:	0	0	

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Description: Project thrust area efforts will employ manufacturing technologies to address Single Point Failures (SPFs). These projects are part of the overall strategy to reduce the number of SPFs in the National Technology Industrial Base (NTIB). Additionally, thrust area efforts address ammunition manufacturing capability shortfalls. This area leverages RDTE accomplishments and product knowledgement to satisfy manufacturing requirements. ***FY 2011 Accomplishments:*** Planned programs include the following: evaluate manufacturing capabilities for potential SPF solutions. Initiate qualification test plans for mitigation of the adhesive SPF group. Evaluate potential environmentally-friendly replacement materials and processes for several energetic SPFs. Develop pilot scale manufacturing processes for SPFs. Test and characterize samples received from sources of densified magnesium carbonate. Continue RDTE efforts on transition of RD1333 lead azide process to private industry. Initiate lab scale process for development of spheroidal propellant. ***FY 2012 Plans:*** Programs include continued work on pilot scale production of energetic SPFs, transition of RD1333 lead azide process to industry and lab scale process for spherodial propellant. Initiate analysis of the plastic, rubber and non-energetic powders SPF group. Investigate boron powder and Akardite SPFs and develop risk mitigation plans. ***FY 2013 Plans:*** Continue development of manufacturing technology and processes for SPFs. Efforts will address source of supply problems within the NTIB.			
Title: Manufacturing Technology for Industrial Base Transformation	0.675	0.828	1.043
Articles:	0	0	
Description: Project thrust area identifies and develops technologies that can be utilized at multiple government and private ammunition manufacturing locations to transform the NTIB. ***FY 2011 Accomplishments:*** Planned programs include the following: develop mathematical model for nitration process of nitrocellulose to reduce variation of the process parameters. Initiate transition of ultrasonic probe technology to industry. Initiate assessment of manufacturing technology for high precision components. Develop pilot scale manufacturing capability for armor piericing penetrators for small and medium caliber munitions. ***FY 2012 Plans:*** Programs include completion of manufacturing technology for high precision components. Initiate projects on application of metal casting technology to improve explosive casting quality, use of ultrasound analyzer for process control in explosives			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
manufacturing, Surface-Enhanced Raman Spectroscopy technology for sensing explosives in waste streams and bi-metal reactor for treating insensitive munitions waste streams. ***FY 2013 Plans:*** Investigate potential technologies to transform key manufacturing processes in the NTIB. Continue investigations, develop and document manufacturing technology for transition to the NTIB.			
Accomplishments/Planned Programs Subtotals	4.385	5.018	3.562

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT 862: *Indirect Fire and Fuze Technology*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
862: *Indirect Fire and Fuze Technology*	2.944	4.614	2.554	-	2.554	4.435	4.271	4.369	4.443	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This program investigates maturing technologies and seeks potential candidates for integration on current fuzing and safe and arm devices. This program will implement these technologies into fuzing systems to preclude obsolescence and enhance performance of existing munitions. The program addresses two major areas: (1) risk mitigation and (2) block upgrades. Risk mitigation efforts will evaluate and demonstrate second sources for fuzing systems that may reduce cost by providing competition, and maintain production when sources or parts are no longer available. It will also allow for the performance enhancement of current ammunition items by conducting studies of major fuze components to detect and identify latent defects. The second major area is block upgrades, which will evaluate and perform studies on improvements to fuzes; increase commonality of fuze components and requirements across all hand grenade programs; determine feasibility of common training fuze for 60, 81, and 120mm mortar rounds; determine feasibility of common mortar safe and arm device components for M734A1, M783 Fuzes; improve M759 fuze sensitivity of 30mm munition. Block upgrades will enable the introduction of the latest technologies into fuzing, keep the fuzing design current to avoid obsolescence issues, and add capabilities.

Replacement of DPA Stabilizer in Ball Powder Propellants significantly reduces stabilizer depletion rate and increases propellant shelf-life with replacement of Diphenylamine (DPA) which is incompatible with Nitroglycerin (NG). Proposed replacement Akardite-2 is compatible with NG and is the least toxic of all stabilizers. IMX104 as Comp B explosive fill replacement for 81mm HE reduces risk of accidental/fratricidal incidents to the Warfighter in theater through incorporation of insensitive munitions. It also improves transport and stockpile survivability. 155mm Extended Range Base Bleed System Maturation & Risk Reduction addresses maturation of base bleed grain formulation and igniter reliability to achieve extended range on base bleed projectiles using the current weapon platform and existing propulsion systems. Efforts include test and validation of improved dual igniter and boat-tail cavity that will house a modern, cost effective and producible base bleed grain.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Indirect Fire & Fuze ARDEC Support.	1.935	1.159	0.955
Articles:	0	0	
Description: Risk Mitigation: Evaluating second source for Digital Signal Processor for the M734A1 fuze, evaluating new battery and electronics sources for current inventory fuzes. Evaluate Micro Electro-mechanical Systems (MEMS) component alternatives to increase sources of supply and lower cost; affects 40mm HEPD grenade munitions. Block Upgrades: Successfully demonstrated Zig-Zag safety design for Common Mortar training fuze for 60, 81, and 120mm mortars, and forwarded the design to Office of the Program Manager for Combat Ammunition Systems (PM CAS) to qualify the design. Determined that Proximity Sensor can fit analytically in existing 30mm HEDP M789 round and continuing to fabricate fuze components. Successfully			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT 862: *Indirect Fire and Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
demonstrated increased sensitivity of 30mm M759 fuze, and performing engineering test. Investigate drop in proximity upgrades for current airburst fuzing for mortar, artillery and other munitions. Evaluate proximity sensor upgrades for M734A1. Prototyping a mortar common Safe and Arm device for M734A1 and M783 rounds. Performing a study on commonality of fuze components and requirements across all hand grenades (M67, M84, and M18). ***FY 2011 Accomplishments:*** Indirect Fire & Fuze ARDEC Support. ***FY 2012 Plans:*** Indirect Fire & Fuze ARDEC Support. ***FY 2013 Plans:*** Indirect Fire & Fuze ARDEC Support.			
Title: Indirect fire & Fuze PM CAS Support ***Articles:*** ***Description:*** Indirect Fire: Completion of demonstration of IMX104 as Comp B explosive fill replacement for 81mm & 60mm HE. Activities include ballistic testing including firing tables, safety, reliability and performance. Completion of Replacement of Diphenylamine (DPA) Stabilizer by Akardite-2 in Ball Powder® Propellants. Activities include completion of long term stability study and transition to production qualification testing. ***FY 2011 Accomplishments:*** Indirect fire & Fuze PM CAS Support ***FY 2012 Plans:*** Indirect fire & Fuze PM CAS Support	1.009 0	1.006 0	-
Title: 155mm Extended Range Base Bleed Sys Maturation/Risk Reduction ***Articles:*** ***Description:*** Indirect Fire: Maturation & Risk Reduction of 155mm Extended Range Base Bleed System with a maximum range of 30km when fired from a 39 caliber 155mm cannon. The ignition of the base bleed system is critical to the performance of the system and maturation of the ignition system will improve the existing stockpile of extended range artillery projectiles. Activities will include developing an engineering baseline of the currently fielded base bleed system, improvements to the base bleed grain formulation and boat tail shape, optimization of the igniter system with the improved grain formulation and the test and validation of completely modern, cost effective and producible base bleed system to validate improvements in reliability, accuracy and overall performance and corresponding integration planning to transition these improvements into 155mm programs of record.	-	2.449 0	1.599

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY 2012 Plans: 155mm Extended Range Base Bleed System Maturation & Risk Reduction ***FY 2013 Plans:*** 155mm Extended Range Base Bleed System Maturation & Risk Reduction			
Accomplishments/Planned Programs Subtotals	2.944	4.614	2.554

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT F21: *Direct Fire Technology and NATO Ammo Evaluation*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
F21: *Direct Fire Technology and NATO Ammo Evaluation*	3.365	12.965	9.782	-	9.782	18.256	12.647	9.306	9.462	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

This program assures complete interchangeability of small caliber and automated cannon-caliber ammunition and weapons among all NATO countries with all of the associated logistic, strategic and tactical advantages. Project involves development and testing compliance of NATO standardization agreements (STANAGS) and staffing of the NATO North American Regional Test Center (NARTC). The program also includes warhead improvements and capability insertions to enhance lethality and effectiveness of existing cartridges.

FY 2013 funds will continue to maintain the NARTC and support NATO standardization of small and medium caliber ammunition for battlefield interchangeability. Additionally, this funding will be used to support small caliber ammunition, 40mm grenade and medium caliber cannon ammunition effectiveness, survivability, accuracy and general improvements. Improvements in target practice technology such as spotter technology will be incorporated into training ammunition.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Lead Free Ammo - Propellant Optimization	-	1.000	1.500
Articles:		0	
Description: Develop optimized Ball Powder (c) for reduced muzzle signature, fouling and chamber pressure. Optimized propellant will have equivalent or superior performance at higher degree of reliability. Cartridges containing alternate flash suppressants and deterrents will be manufactured and tested to determine optimum propellant composition.			
FY 2012 Plans: Prepare for and execute task order award with propellant manufacturer to investigate improvements in flash suppression technology, fouling, short barrel applications, temperature stability, and potential Diphenylamine replacements.			
FY 2013 Plans: Complete contractor and government analysis & optimized propellant testing of improved flash suppression technology, 5.56 mm optimization study and testing of temperature stability technology.			
Title: Low Observable Traced Projectiles	0.300	2.392	-
Articles:	0	0	

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Description: Tracers have a number of drawbacks; largely they give away the position of the shooter during firing. Advancement in technology has improved tracer technology which eliminates, mitigates short falls of current tracers and improves safety and soldier survivability. ***FY 2011 Accomplishments:*** Baseline material testing and intial producability analysis. ***FY 2012 Plans:*** Initial engineering prototype, manufacturing, development and testing.			
Title: Lightweight Ammunition ***Articles:*** ***Description:*** Investigate alternate cartridge case materials for cost and weight savings over conventional brass cartridge cases. ***FY 2011 Accomplishments:*** Developing multiple lightweight cartridge cases with cost effective manufacturing processes that support high volume production. ***FY 2012 Plans:*** Improve producibility to manufacturing equipment and continue to test alternate designs and processes for lightweight cartridge cases and refine implementation cost. ***FY 2013 Plans:*** Down select alternative lightweight cartridge case technology.	0.489 0	3.880 0	1.000
Title: New Ammo Design Qualification & NATO Mission Support ***Articles:*** ***Description:*** This program assures complete interchangeability of small caliber and automated cannon-caliber ammunition and weapons among all NATO countries with all of the associated logistic, strategic and tactical advantages. ***FY 2011 Accomplishments:*** Support NARTC Test operations. ***FY 2012 Plans:*** Support NARTC Test operations. ***FY 2013 Plans:***	0.500 0	0.500 0	0.400

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Support NARTC Test operations			
Title: M433 Warhead Improvement	0.750	2.500	2.691
Articles:	0	0	
Description: 40mm: Improve lethality (fragmentation) of the M433 grenade. ***FY 2011 Accomplishments:*** Fabricating warhead tooling, manufacturing warhead bodies and conduct static lethality testing of new warhead design. ***FY 2012 Plans:*** Complete optimization and testing of integrated M433 with new warhead design. Increase manufacturing readiness. ***FY 2013 Plans:*** Qualification of improved M433 cartridge.			
Title: Target Practice Spotter Technology Insertion	0.500	1.500	1.991
Articles:	0	0	
Description: Training Cartridge with impact initiated spotting charge. Goal is visible signature upon impact under all conditions. ***FY 2011 Accomplishments:*** Extended range testing and producibility assessments. Optimization of design and extended range testing of optimized design. ***FY 2012 Plans:*** Integration of optimized design and conduct design evaluation test. ***FY 2013 Plans:*** Qualification testing and approval for use.			
Title: Improved M789 Lethality, Warhead fragmentation improvement	0.826	0.250	1.000
Articles:	0	0	
Description: Improve M789 warhead fragmentation for lethality by utilizing fragmentation sleeves, scoring or other technologies within the warhead to promote more efficient fragmentation. ***FY 2011 Accomplishments:*** Design and evaluate alternative designs. ***FY 2012 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Improve M789 warhead for increased fragmentation lethality by utilizing fragmentation sleeves within the warhead to promote designed fragmentation. ***FY 2013 Plans:*** Integration of improved shear liner, increase in manufacturing readiness, and conduct integrated ballistic test.			
Title: DBX-1 Lead free replacement for Lead Azide ***Articles:*** ***Description:*** Integrate environmentally friendly lead free primary explosives into M789. Demonstration in this form factor will enable transition to other munitions of larger size. ***FY 2012 Plans:*** Evaluate DBX-1 performance through explosive train testing, explosive sensitivity testing and energetic output testing which leads to the go forward decision. ***FY 2013 Plans:*** Integrate environmentally friendly lead free primary explosives into M789.	-	0.443 0	0.600
Title: Metastable Intermolecular Composite (MIC) Primer, Lead free primer ***Articles:*** ***Description:*** Integrate environmentally friendly lead free primary explosives within the primer of the M789, remove lead Styphnate. ***FY 2012 Plans:*** Explosive material qualification and primer functionality testing to ensure cartridge and propulsion functionality are ready for integration.	-	0.500 0	-
Title: .50 Caliber Improvement ***Description:*** Determine if one single .50 caliber armor piercing cartridge can replace the five currently fielded .50 caliber cartridges. ***FY 2013 Plans:*** Study optimal combination of current .50 caliber armor piercing cartridges.	-	-	0.100
Title: Improved Sniper Ammunition	-	-	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT F21: *Direct Fire Technology and NATO Ammo Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Description: Integrate newly developed cartridge technologies into sniper ammunition offering a cartridge optimized for sniper operations. ***FY 2013 Plans:*** Optimize cartridge component technologies for inclusion in sniper ammunition.			
Accomplishments/Planned Programs Subtotals	3.365	12.965	9.782

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: PB 2013 Army			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605805A: *Munitions Standardization, Effectiveness and Safety*	PROJECT F24: *CONVENTIONAL MUNITIONS DEMIL*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
F24: *CONVENTIONAL MUNITIONS DEMIL*	14.454	15.982	16.181	-	16.181	14.214	14.223	15.947	18.140	Continuing	Continuing
Quantity of RDT&E Articles											

A. Mission Description and Budget Item Justification

Under the leadership and oversight of the Product Manager (PM) for Demilitarization (Demil), this project supports a continuing technology evaluation of demil methods for all types of conventional ammunition in development, production, and storage. Project F24 will complete the development, demonstration, and integration of new, safe, and environmentally acceptable alternatives to open burning/open detonation (OB/OD), including resource, recovery and recycling (R3) equipment, and processes to reduce the extremely large demil stockpile. This effort employs the highly matured technology base in the Department of Defense Service Laboratories and Technical Centers, the Department of Energy (DOE) national laboratories, industry, and academia. The program is integrated through the leadership of the PM for Demil and the Joint Ordnance Commanders Group Munitions Demil/Disposal Subgroup leveraging support from the Environmental Security Technology Certification Program, the Strategic Environmental Research and Development Program and the Joint DOD/DOE Munitions Technology Program. The program supports an annual global demil symposium for technical review and data evaluation from ongoing projects and advanced demonstrations. The PM Demil R&D Integrated Process Team utilizes a systematic approach for project prioritization.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Advanced Destruction	6.738	6.629	8.422
Articles:	0	0	

Description: This effort focuses on destruction of munitions.

FY 2011 Accomplishments:

Continued support of the Ammonium Perchlorate Rocket Motor Destruction at Letterkenny Munitions Center. Initiated assessment of Bull Pup Liquid Fuel Motors. Designed and installed Munitions Cryofracture Demil Facility improvements prior to Low Rate Initial Production (LRIP). Began facility prove-out for Cryo Plasma Arc Demil System. Initiated Mobile Plasma Treatment System (MPTS) prove-out process. Initiated Other Service Missile Demil Process Modernization. Initiated the concept design of Cryofracture adaptation to Demil of Rockeye Munitions. Conducted firing tests for open burn of engine Starter Cartridges.

FY 2012 Plans:

Complete Munitions Cryofracture Demil Facility support for LRIP. Continue support of the Ammonium Perchlorate Rocket Motor Destruction at Letterkenny Munitions Center with Rocket Motor Segmenting Design. Initiate Design for Static Detonation Chamber. Complete Plasma Ordnance Disposal System layaway. Install Mobile Plasma Treatment System upgrade

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
components. Conduct Mobile Plasma Treatment System demonstration/ validation and LRIP. Initiate Study on Universal Closed Disposal for Shaped Charges Study. Test and proveout the design of Cryofracture adaptation to Demil of Rockeye Munitions. ***FY 2013 Plans:*** Continue Static Detonation Chamber project, conduct prototype design and fabrication. Conduct Phase I Technology assessment for Ammonium Perchlorate Rocket Motor Destruction and complete rocket motor segmenting.			
Title: Resource Recovery and Recycling (R3) ***Articles:*** ***Description:*** This effort focuses on enhancing existing methods of munitions R3. ***FY 2011 Accomplishments:*** Conducted integration testing of M42/M46/M77 Cluster Munitions (ICM) R3 and initiated facilitization. Initiated study into Autoclave improvements in removing Insensitive Munition Explosives. Conducted Nitro-Guanidine (NQ) installation and integration. Initiated Magnesium Recovery demonstration and validation. ***FY 2012 Plans:*** Complete facilitization of Improved Conventional Munitions (ICM) R3 and conduct demonstration/validation. Complete Magnesium recovery Low Rate Initial Production. Design and fabricate improvements for Autoclave Insensitive Munition Explosives. Complete Demil by Induction Heating Meltout System (DIHMES) demonstration and validation. Begin LRIP. Initiate a design for removal of Welded Rotating Bands. Initiate Design of Grenade Download Workcell for ICM transfer to R3 line. ***FY 2013 Plans:*** Conduct LRIP of M42/M46/M77 ICM R3. Evaluate prototype for removal of Welded Rotating Bands. Complete fabrication of Grenade Download Workcell for ICM R3 line.	3.793 0	2.712 0	2.920
Title: Advanced Removal ***Articles:*** ***Description:*** This effort develops technology to remove propellant and energetics. ***FY 2011 Accomplishments:*** Conducted downselect and detail design of High Pressure Water Washout at Hawthorne Army Depot. Initiated design and down select technologies for removal of Insensitive Munitions (IM). Completed Safety Assesment of Bullpup motor de-tanking process. ***FY 2012 Plans:***	0.978 0	0.230 0	-

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Initiate pilot phase of Removal of Cast-Cured IM Explosives. Initiate design of an IM Large Bomb Demil Process.			
Title: Advanced Waste Stream Treatment	0.981	3.013	2.325
Articles:	0	0	
Description: This effort focuses on handling waste streams from munitions items. ***FY 2011 Accomplishments:*** Initiated Red Phosphorous Disposal study. Completed Acid Digestion Bench Scale Phase. ***FY 2012 Plans:*** Initiate study for Rotary Kiln Productivity Improvement. ***FY 2013 Plans:*** Install upgraded Pollution Abatement System for Rotary Kilns from Improvement program.			
Title: Advanced Munitions Disassembly	1.964	3.398	2.514
Articles:	0	0	
Description: Funding is provided for the following efforts: ***FY 2011 Accomplishments:*** Initiated process study on Family of Scatterable Mines (FASCAM) demil. Fabricated components for Acid Digestion. Initiated the design of Bomb Loaded Unit (BLU) Cryofracture. ***FY 2012 Plans:*** Develop process for FASCAM Demil. Complete prototype detail design of BLU-97 disassembly process at Hawthorne Army Depot. Complete DIHMES LRIP. Continue with the design, fabrication, and testing of BLU Cryofracture. Complete study for solvent based recovery of Hexachloroethane from munitions. Develop a kit for Flexible Munitions Residue Inspection System to add 120mm Mortar Cartridges. ***FY 2013 Plans:*** Continue support of FASCAM demil. Complete fabrication and installation of BLU-97 disassembly process. Initiate assessment of solvent based recovery of Hexachloroethane from munitions.			
Accomplishments/Planned Programs Subtotals	14.454	15.982	16.181

C. Other Program Funding Summary ($ in Millions)

N/A

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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.