Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army											Date: February 2016	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	-	62.168	64.604	40.545	-	40.545	40.204	41.034	43.867	39.227	-	-
296: *Close Combat Technology*	-	4.537	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
297: *Mun Survivability & Log*	-	13.279	7.544	15.149	-	15.149	15.035	15.168	14.602	13.902	-	-
857: *DoD Explosives Safety Standards*	-	1.766	1.826	1.607	-	1.607	1.603	1.649	1.675	1.706	-	-
858: *Army Explosives Safety Management Program*	-	0.526	0.542	0.633	-	0.633	0.645	0.671	1.172	1.170	-	-
859: *Life Cycle Pilot Process*	-	19.433	22.101	4.863	-	4.863	5.243	5.343	5.438	5.568	-	-
862: *Indirect Fire And Fuze Technology*	-	7.594	15.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
F21: *Direct Fire Technology and NATO Ammo Eval*	-	6.607	0.000	0.650	-	0.650	0.665	0.680	0.675	0.000	-	-
F24: *Conventional Munitions Demil*	-	8.426	17.591	17.643	-	17.643	17.013	17.523	20.305	16.881	-	-

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 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). Munitions Survivability and Logistics (297) will make 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army	Date: February 2016
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*

The F21 Direct Fire Technology and North Atlantic Treaty Organization (NATO) Ammunition Evaluation program funding is used to support small caliber ammunition, 40mm grenade munitions, medium caliber cannon ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements. In addition, this program assures interchangeability of direct fire ammunition and weapons among all the NATO countries with all of the associated logistic, strategic and tactical advantages of the alliance. Project involves development and testing compliance of NATO standardization agreements (STANAGS) and staffing of the North American Regional Test Center (NARTC).

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	64.027	32.604	24.915	-	24.915
Current President's Budget	62.168	64.604	40.545	-	40.545
Total Adjustments	-1.859	32.000	15.630	-	15.630
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	32.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.859	-			
• Adjustments to Budget Years	-	-	15.630	-	15.630

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: 296: *Close Combat Technology*		
Congressional Add: *Radio Frequency (RF) Remote Activation Munitions (RAM)*	0.722	-
Congressional Add Subtotals for Project: 296	0.722	-
Project: 859: *Life Cycle Pilot Process*		
Congressional Add: *FY 2015 Congressional Add*	15.000	-
Congressional Add: *FY 2016 Congressional Add*	-	17.000
Congressional Add Subtotals for Project: 859	15.000	17.000
Project: 862: *Indirect Fire And Fuze Technology*		
Congressional Add: *Hybird Projectile Technology*	-	15.000
Congressional Add Subtotals for Project: 862	-	15.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army	Date: February 2016
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605805A *I Munitions Standardization, Effectiveness and Safety*

Congressional Add Details ($ in Millions, and Includes General Reductions)

	FY 2015	FY 2016
Congressional Add Totals for all Projects	15.722	32.000

Change Summary Explanation

FY 2017 increase attributed to additional funding for Munitions Logistics System Improvements and DEMIL Research and Development efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) 296 / *Close Combat Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
296: *Close Combat Technology*	-	4.537	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project 296 Close Combat Technology transferred to PE 0607131A - Weapons and Munitions Product Improvement Programs, Project ER2 in FY 2016.

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)	FY 2015	FY 2016	FY 2017
Title: Grenade Fuze Sychronization Effort ***Description:*** Program effort to adapt a M201 Fuze body with an interchangable Pyrotechnic delay cartridge that can be utilized as an M228, M208 or M213 Fuze. Program is a product effeciency which would significantly reduce manufacturing cost of fuzes, logistic burden, and engineering support cost while reducing critical inspections and pull force requirements across all grenades. ***FY 2015 Accomplishments:*** One Fuze across multiple grenades at a much lower cost. Preliminary design and drawings are available from the FTI (Fuze Technology Integration) and this would be a follow on effort to verify the production readiness and grenade integration impacts across multiple programs.	0.150	-	-
Title: Dual Payload (M206) ***Description:*** Add an extended source (Infrared Cloud) material to the M206 Flare. Justification: Test data has shown single flare effectiveness can be increased with the addition of an extended IR (Infrared) source. Impact: increased number of countermeasure dispenses and reduce logistical burden. ***FY 2015 Accomplishments:*** M206 countermeasure flare effectiveness will be improved by adding Special Material. Performance - Increased effectiveness by doubling the countermeasure engagements that can respond to missile threat. Performance & Efficiency - Increases mission flight profiles.	1.012	-	-
Title: Degradable Chaff & Low Frequency Chaff (M1/M839)	0.817	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 296 / *Close Combat Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Develop chaff that will: 1) After dispense, lose its RF (Radio Frequency) component. 2) Disperse and bloom rapidly with minimal clumping and birdnesting even when used at low speeds from a hovering helicopter. 3) Enhance coverage in the low frequency range. 4) Type classify RR170 Chaff for Army use. 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. ***FY 2015 Accomplishments:*** The operationally degradable chaff will address operational and training issues with chaff persistence. Performance - Increase frequency coverage where current Chaff lacks. Performance - Reduction of clumping and birdnesting will make the chaff more effective. Safety - Reduce interference with Traffic Control radars and aircraft radar systems. Environmental - Mitigates impact to farm animals that eat active dipoles after chaff deployment.			
Title: MK3A2 Replacement, Concussion Grenade Optimization Effort ***Description:*** This effort incorporates modern materials and insensitive explosives to provide a safer, producible concussion grenade. Use of the MK3A2 offensive grenade has been suspended due to age and safety issues. The current MK3A2 can expose the Soldier to toxic levels of asbestos. War fighters cannot safely employ the offensive grenade. Alternate munitions such as the M84 do not satisfy User needs for incapacitation of the enemy. ***FY 2015 Accomplishments:*** 1) Fabrication of Multi Cavity Die and proveout. 2) Fuze and Packaging procurement. 3) Injection molding of 250 grenades. 4) LAP and Marking of grenades. 5) Engineering level testing.	1.320	-	-
Title: Claymore Force-on-Force TADSS Trainer ***Description:*** Claymore Force-on-Force TADSS Trainer ***FY 2015 Accomplishments:*** Develop an improved Claymore Force-on-Force Trainer. While the Claymore is one of the most popular items used by the soldier, the system does not have a TADSS trainer with sight, sound & MILES capability. Development of an improved Claymore trainer will allow Claymore to be trained at CTCs and will provide more realistic and effective training for the user when they are training Claymore as an end item and when training Claymore as initiated by Spider.	0.516	-	-
Accomplishments/Planned Programs Subtotals	3.815	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 296 / *Close Combat Technology*

	FY 2015	FY 2016
Congressional Add: Radio Frequency (RF) Remote Activation Munitions (RAM)	0.722	-
FY 2015 Accomplishments: A low cost reusable RF-RAMS MK16 receiver will be re-designed with state of the art controller and safety circuitry to reduce its size, cost and enhance safety. The current RF-RAMS receiver contract cost is approximately $3,000 in quantities above 930. The goal of this effort is to update the existing receiver design and implement improved manufacturing processes to reduce the cost. The low cost MK16 receiver will integrate several manufacturing and producibility improvements to reduce production costs from approximately $3,000 to a production unit cost goal of less than $1,000.		
Congressional Adds Subtotals	0.722	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) 297 / *Mun Survivability & Log*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
297: *Mun Survivability & Log*	-	13.279	7.544	15.149	-	15.149	15.035	15.168	14.602	13.902	-	-
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 and efficient 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)	FY 2015	FY 2016	FY 2017
Title: Munitions Predictive Life	1.472	1.059	1.916

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. The 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 2015 Accomplishments:

Completed all ISO container thermal data collection and coordinated with the Munitions History Program to incorporate temperature exposure algorithmic models of munitions that accurately estimate the temperature exposure of munitions based on location, storage area type, and munition type. Conducted validation testing of ammunition database analysis based reliability and risk evaluation algorithmic procedures that can be applied periodically to evaluate reliability and risk and determine functionality inspection requirements for the .50 caliber ammunition family and began development of threshold levels for 5.56mm and 7.62mm caliber ammunition families. Completed calibration of an embedded propellant reliability sensor device that enables real-time monitoring of the effects of environmental exposure on ammunition propellant stability/reliability. Developed imaging based application to increase the fidelity of the estimation of ammunition time/temperature exposure for Therm-E-Log passive temperature sensor.

FY 2016 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 297 / *Mun Survivability & Log*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Complete validation of temperature exposure algorithmic models of munitions for inclusion in the Munitions History Program. Develop reliability and risk evaluation algorithms and conduct validation testing for 5.56mm and 7.62mm caliber ammunition families and develop threshold levels for hand grenades and 40mm caliber ammunition families. Integrate chemical based propellant reliability sensor into ammunition packaging and conduct demonstration. Conduct long term propellant validation testing for a resistance based reliability sensor. Complete prototype design of next generation ammunition container based temperature/humidity exposure reliability sensor. Conduct market survey of passive Radio Frequency Identification and low cost active environmental sensors for munitions, select viable candidates, and test. ***FY 2017 Plans:*** Complete integration of temperature exposure algorithmic models of munitions into the Munitions History Program. Develop ammunition database analysis based reliability and risk evaluation algorithms and conduct validation testing for grenade ammunition families. Conduct a trade-off analysis between brilliant green and resistance based propellant sensors to identify specific use cases for each. Conduct long term operational evaluation of next generation ammunition container based temperature/humidity exposure reliability sensor. Conduct market survey of passive Radio Frequency Identification and low cost active environmental sensors for munitions, select viable candidates, and test. Conduct correlation testing on the passive time/ temperature exposure sensor with legacy ammunition items and integrate.			
Title: Insensitive Munitions (IM) Integration Program ***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 2015 Accomplishments:*** Transitioned to the Project Manager (PM) optimized IMX-101 loading parameters and methods for M795 Artillery rounds. Finalized and performed Insensitive Munition (IM) and engineering performance test of pressed IMX-104 explosive and transitioned pressed IMX-104 for use in M795 IM Precision Guidance Kit (PGK) compatible projectiles. Successfully tested a fully IM-compliant 105mm M1 artillery cartridge system. Down selected the two most optimal formulations for medium caliber propellants. Finalized the first phase to prove out a propellant high shear mixing process to enhance the shock response in propellants for medium caliber. Developed methods and equipment modifications to produce eutectic components for IM munitions requiring eutectic venting technology. Developed, for the 30mm M789, IM enhanced internal packaging dunnage and performed engineering and IM tests. Demonstrated cook-off mitigation through less expensive container venting techniques for multiple systems. Finalized the design of the packaging container catch cage enclosure for Hand Held Signals, and transitioned the program to the PM. Conducted	7.984	3.379	5.666

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 297 / *Mun Survivability & Log*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
engineering level testing on 30mm cartridge case vent plugs and warhead fuze adapters to separate fuze from projectile body. Performed integrated testing of all IM solutions for the 40mm M430A1 grenades. ***FY 2016 Plans:*** Finalize pallet barrier design and perform rough handling for the IM enhanced 105mm M1. Transition all 105mm IM Technologies to the PM to include pallet barriers, vented cylindrical containers and cartridge case spacer to produce an IM compliant 105mm M1 round. Finalize propellant lab scale methodologies and testing hardware. Transition processing methodologies and IM propellants to medium and large caliber ammo programs. Transition to PMs and base process and methodologies to produce affordable eutectic components, and transition eutectic producibility methodologies to the PMs. Prove out a reduced shock sensitivity high explosive formulation (MDNT) and transition to applicable munitions requiring small critical diameter explosives. Scale-up in-house operations to produce 20lbs of non-energetic DAMT, a precursor material for making MDNT. Demonstrate the performance of MDNT in small diameter munitions. Demonstrate the reduced shock response of propellants manufactured with high shear mixing. Transition a reduced-sensitivity flexible explosive to the PM. Develop sub-scale slow cook off (SCO) and fast cook off (FCO) tests for the evaluation of propellants. ***FY 2017 Plans:*** Conduct integration testing of all 30mm M788/M789 IM technologies and transition to the PM. Select candidate materials for thermal mitigation and conduct 40mm M430A1 integration testing and transition to the PM technologies for packaging and warhead venting. Continue development of IM propellants for medium and large caliber munitions. Finalize in-house evaluation tools for sub-scale SCO and FCO for propellants. Develop venting technologies and propellants for base bleed projectiles. Continue development of high energy aluminized energetics for use in multipurpose warheads. Leverage technologies from the M430A1 grenade to develop liner release and warhead venting solutions to mitigate cook off.			
Title: Improved Munitions Packaging ***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 2015 Accomplishments:*** Conducted engineering testing of HDPE cylindrical containers as lighter, less expensive replacements for current 120mm tank and 120mm/81mm mortar packaging and completed design modifications. Developed a preliminary design of a plastic polymer container for 5.56mm ammunition containers to be used in conjunction with plastic sealed ammunition pouches to reduce packaging weight and production costs. Developed updates to military and commercial standards and specifications for alternative Environmental Protection Agency registered preservatives for wood ammunition packaging materials. Researched into stockpile reports and past tests as well as conducted several in-house tests to validate proposed potential changes to ammunition	2.272	1.502	2.947

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 297 / *Mun Survivability & Log*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
packaging test requirements/specifications. Performed a market research study on readily available Eco-Friendly packaging solutions in industry as well as technologies in development for potential application to ammunition packaging. ***FY 2016 Plans:*** Conduct sequential rough handling testing of redesigned advanced lightweight cylindrical ammunition container packaging. Complete prototype design and fabrication of a plastic polymer container for 5.56mm ammunition containers to reduce packaging weight and production costs. Design and perform engineering and environmental testing of plastic sealed ammunition pouch for 5.56mm clipped ammunition to be used with or without a point protector box. Coordinate the review and approval of updates to military and commercial standards and specifications for alternative Environmental Protection Agency registered preservatives for wood ammunition packaging materials. Implement ammunition packaging test requirement changes that eliminate redundancies while continuing to research the feasibility of changing more technically complex physical characteristic requirements. Perform a phase II study of Eco-Friendly packaging solutions that will include a characterization study as well as performance testing on candidate products that may be incorporated into ammunition end item container component designs. Complete prototype design and conduct engineering testing on an enhanced fiber tube innerpack that improves protection and handling for 120mm mortar munitions. Perform unit load and transportation testing of enhanced ammunition pallet retention system that is lighter and provides easier access, complete design drawings and transition. ***FY 2017 Plans:*** Complete prototype verification testing (Unit Load, Insensitive Munitions, Electromagnetic Environmental Effects) for HDPE cylindrical containers. Optimize design and perform verification testing of plastic polymer rectangular container for legacy 5.56mm ammunition. Optimize design for plastic sealed ammunition pouches and perform validation testing with 5.56mm ammunition items. Fabricate packaging components using selected eco-friendly materials and conduct performance testing. Complete design modifications for an enhanced fiber tube innerpack for 120mm mortar munitions and conduct verification testing. Complete modeling and simulation of a small caliber ammunition bulk packaging container for improved distribution and retrograde efficiency.			
Title: Ammo Provider ***Description:*** This program demonstrates technologies that will assure a survivable munitions logistics system by increasing distribution velocity and protecting ammo storage areas. Technology 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). ***FY 2015 Accomplishments:***	1.551	1.604	4.620

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 297 / *Mun Survivability & Log*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Completed design and testing of a centrifugal clutch braking mechanism for the helicopter delivered emergency resupply speedbag that will expand its use for heavier payloads, higher drop heights, and variable impact velocities. Conducted bullet impact testing for best and worst case scenario reactions and began developing guidelines for configuring more survivable tactical ammunition delivery loads. Completed performance and user testing and evaluation of commercial airbags for use as a replacement for wood dunnage in ammunition shipping containers. Evaluated the feasibility of utilizing Raman spectroscopy to determine the remaining useful life of ammunition propellants and significantly reduce the cost of surveillance testing. ***FY 2016 Plans:*** Complete rope cutter design and integrate into centrifugal clutch mechanism of enhanced speedbag system and conduct safety testing. Conduct fragment impact testing on containerized small caliber ammunition to determine the feasibility of using these containers as an outer barrier to reduce the reaction levels of palletized ammunition. Develop design and conduct modeling and simulation of a unitization solution for tactical partial pallet ammunition loads to improve handling and transportation efficiency. Complete market survey of technologies for manufacturing ammunition inner packing material at the field level. Develop an integration architecture for incorporating automated Material Handling Equipment into the Automated Supply Point – Scalable (ASP-S) planning and control software system that will streamline supply point operations. Complete requirements development and concept evaluation for an Ammunition Quality Decision Tool (AQDT) that will improve stockpile management and reliability. Assess interface concepts and off the shelf solutions that provide similar capabilities to the Joint Modular Intermodal Container (JMIC) at lower cost. ***FY 2017 Plans:*** Complete design of a partial/mixed pallet tactical ammunition load unitization solution and fabricate prototypes. Complete evaluation of technologies for manufacturing ammunition inner packing material at the field level and develop recommendations. Continue integration of automated MHE into ASP-S and conduct Phase 1 demonstration. Build a graphical user interface for ammunition risk & reliability and thermal pallet algorithms, incorporate into the Ammunition Quality Decision Tool and evaluate tool effectiveness. Complete JMIC Cost Benefit Analysis and alternative prototype design. Complete design of an applique interface kit for manually operated MHE that links the MHE to the ASP-S planning and control system for seamless operations during the transition period from fully manual operations to fully autonomous operations. Evaluate requirements and modify design as needed of munitions health monitoring systems to provide stockpile management capability for and ensure interoperability with ASP-S hardware and software. Develop the design concept for an automated pallet scanning and weighing capability to enable rapid accountability and autonomous load building in the ASP-S. Complete design of a web based version of the Munitions Survivability Software (MSS) prototype that will permit the quick design and layout of safe ammunition storage areas and integrate into the Virtual Forward Operating Base (VFOB) site planning tool. Complete design of an Unmanned Aerial System (UAS) – Resupply Pod and unpowered descent system that will improve supply delivery accuracy and survivability and UAS			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 297 / *Mun Survivability & Log*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
maneuverability. Develop requirements and design architecture for an intelligent, anticipatory, real-time ammunition management software tool.			
Accomplishments/Planned Programs Subtotals	13.279	7.544	15.149

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) 857 / *DoD Explosives Safety Standards*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
857: *DoD Explosives Safety Standards*	-	1.766	1.826	1.607	-	1.607	1.603	1.649	1.675	1.706	-	-
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)	FY 2015	FY 2016	FY 2017
Title: Explosive and Munitions Tests	0.113	-	0.500
Description: Funding is provided for the following effort ***FY 2015 Accomplishments:*** Developed improved explosives and munitions tests and characterization data. Specifically, continue development of improved gap tests for rocket motors. ***FY 2017 Plans:*** Explsoion effects testing to provide data for increasingly accurate predictions of real world effects			
Title: Safety Guidelines	1.061	1.826	0.450
Description: Funding is provided for the following effort ***FY 2015 Accomplishments:*** Developed improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepare revised Dod 6055.9-STD and 4145.26M. ***FY 2016 Plans:*** Develop standards for modern (large, robust) magazine construction and munitions configurations (IM, enhanced energetics, nanotechnology) based on more accurate models based on small scale testing ***FY 2017 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 857 / *DoD Explosives Safety Standards*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Will develop improved DoD and NATO explosives safety guidelines for munitions storage, explosives and field operation facilities. Prepare revised Dod 6055.9-STD and 4145.26M.			
Title: Analysis Tools ***Description:*** Funding is provided for the following effort ***FY 2015 Accomplishments:*** Developed and improved analysis tools for explosives safety. Develop sequence of operations prototype. ***FY 2017 Plans:*** Develop more accurate models based on results of small scale testing and tools to implement revised standards. Improve usability.	0.592	-	0.657
Accomplishments/Planned Programs Subtotals	1.766	1.826	1.607

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) 858 / *Army Explosives Safety Management Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
858: *Army Explosives Safety Management Program*	-	0.526	0.542	0.633	-	0.633	0.645	0.671	1.172	1.170	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project establishes, validates or modifies explosives technical safety requirements per Department of Defense Pamphlet 385-64, Ammunition and Explosives Safety Standards. Project activities promote 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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Risk based explosives safety criteria	0.185	0.130	0.150
Description: Development of risk based explosives safety criteria that will aid commanders and safety personnel in the transition from regulation to risk management. ***FY 2015 Accomplishments:*** Continued explosives testing and support of hazard research and exposure consequences. ***FY 2016 Plans:*** Continue explosives testing and support of hazard research and exposure consequences. ***FY 2017 Plans:*** Will continue explosives testing and support of hazard research and exposure consequences.			
Title: Development of enhanced protective structure designs	0.241	0.200	0.260
Description: Develop enhanced protective structure designs that improve the survivability of Army personnel, facilities and equipment. ***FY 2015 Accomplishments:*** Continued explosives testing and support for improving protective construction designs. ***FY 2016 Plans:*** Continue explosives testing and support for improving protective construction designs. ***FY 2017 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 858 / *Army Explosives Safety Management Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Will continue explosives testing and support for improving protective construction designs.			
Title: Development of explosive safety tools ***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 methodologies. ***FY 2015 Accomplishments:*** Continued development of new methods and tools for risk assessment to improve explosive safety risk management decisions. ***FY 2016 Plans:*** Continue development of new methods and tools for risk assessment to improve explosive safety risk management decisions. ***FY 2017 Plans:*** Will continue development of new methods and tools for risk assessment to improve explosive safety risk management decisions.	0.100	0.212	0.223
Accomplishments/Planned Programs Subtotals	0.526	0.542	0.633

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) 859 / *Life Cycle Pilot Process*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
859: *Life Cycle Pilot Process*	-	19.433	22.101	4.863	-	4.863	5.243	5.343	5.438	5.568	-	-
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. In addition, the LCPP program addresses Single Point Failures (SPFs)/No Source of supply within the National Technology Industrial Base (NTIB). LCPP provides support to reduce supply chain risk by investigating, developing and evaluating additional sources of supply for a known SPF.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Product Cost Thrust Area	0.662	0.319	1.424
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 2015 Accomplishments:*** Completed multi-use ultrasound probe explosive process control project, foamed starter patch and Nitrocellulose (NC) model verification. Initiate shape charge jet disrupter manufacturing process development. Evaluate new technology for legacy processes to reduce overall production costs for the Army. ***FY 2016 Plans:*** Complete shape charge jet disrupter. Evaluate new technology for legacy processes to reduce overall production costs for the Army. ***FY 2017 Plans:*** Will evaluate, assess and transition new technology for legacy processes to reduce overall production costs for the Army. Technology transitions to affected Industrial Base via the Production Base Support Modernization program.			
Title: Single Point Failures	1.012	0.749	1.076

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 859 / *Life Cycle Pilot Process*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Project thrust area efforts will employ manufacturing technologies to address SPFs. These projects are part of the overall strategy to reduce the number of SPFs in the NTIB. Additionally, thrust area efforts address ammunition manufacturing capability shortfalls. This area leverages RDTE accomplishments and product knowledge to satisfy manufacturing requirements. ***FY 2015 Accomplishments:*** Completed mitigation of High Fragmentation-1 (HF-1) Steel single point failure. Complete Commercial Off-the Shelf (COTS) primer project. Initiate mitigation of antimony sulfide and smoke pot lid SPFs. Continue development of manufacturing technology and processes for SPFs. Efforts will address source of supply problems within the NTIB. ***FY 2016 Plans:*** Complete mitigation of single point failures for antimony sulfide and smoke pot lid. Continue development of manufacturing technology and processes for SPFs. Efforts will address source of supply problems within the NTIB. ***FY 2017 Plans:*** Will continue development of manufacturing technology and processes for SPFs. Efforts will address source of supply problems within the NTIB. Technology transitions and risk mitigation strategies are transferred to Product Managers (PMs)/Product Directors (PDs) for their use in assessing procurement strategies for affected SPF end items.			
Title: Manufacturing Technology for Industrial Base Transformation ***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 2015 Accomplishments:*** Completed ultrasound analyzer for process control in explosives manufacturing, NC model verification and Counter Current Ion Exchange for nitrate laden waste treatment. Initiate multi-axis platform for energetic manufacture, ultrasound applications to propellant extrusion and Metastable Interstitial Composite (MIC)/green primer pilot scale manufacturing. Investigate potential technologies to transform key manufacturing processes in the NTIB. Continue investigations, develop and document manufacturing technology for transition to the NTIB. ***FY 2016 Plans:*** Complete multi-axis platform for manufacture of energetic systems and ultrasound inspection of propellant during extrusion. Continue MIC/green primer pilot scale manufacturing. Continue investigations, develop and document manufacturing technology for transition to the NTIB. ***FY 2017 Plans:***	2.759	4.033	2.363

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 859 / *Life Cycle Pilot Process*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Will continue MIC/green primer pilot scale manufacturing. Continue investigations, develop and document manufacturing technology for transition to the NTIB. Technology transitions to affected Industrial Base via the Production Base Support Modernization program.			
Accomplishments/Planned Programs Subtotals	4.433	5.101	4.863

	FY 2015	FY 2016
Congressional Add: FY 2015 Congressional Add ***FY 2015 Accomplishments:*** FY 2015 Congressional Add titled Program Increase	15.000	-
Congressional Add: FY 2016 Congressional Add ***FY 2016 Plans:*** FY 2016 Congressional titled program increase of $17M.	-	17.000
Congressional Adds Subtotals	15.000	17.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) 862 / *Indirect Fire And Fuze Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
862: *Indirect Fire And Fuze Technology*	-	7.594	15.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project 862 Indirect Fire and Fuze Technology transferred to PE 0607131A - Weapons and Munitions Product Improvement, Project ER5 in FY 2016.

A. Mission Description and Budget Item Justification

This program will identify, study, analyze and support enhanced lethality, range extension and standardization to improve target engagement effectiveness; increase reliability, safety, and exportability; and reduce taxpayer costs including elimination of sole source supply of indirect fires ammunition materials as well as studies and analyses of such technology solutions in comparison to current stockpile indirect fire conventional munitions and their associated production processes. Additionally, environmental impacts of legacy propellants, explosives and metal parts will be studied. Replacement of hazardous materials such as Ammonium Perchlorate, Diphenylamine, Lead, etc. and addition of propellant anti-tubewear additives will remain a focus. This program supports the standardization and interoperability of legacy and new production ammunition to maximize munitions battlefield interchangeability/compatibility between 52 and 39 caliber guns under the auspices of the international Joint Ballistics Memorandum Of Understanding (JBMOU) as well as rifled and smooth-bore mortars. Maximizing standardization, interchangeability, and exportability will potentially increase FMS sales of US products to maintain domestic production and economies of scale.

This program will also identify, study, analyze and support fuzing and safe and arm devices. This program will implement these technologies into fuzing systems to preclude obsolescence, maximize standardization, enhance performance, and improve the safety and exportability of existing munitions. The project addresses two major areas: (1) analysis and (2) block upgrades. Analysis efforts will identify 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 identify and perform studies on improvements to fuzes; increase commonality of fuze components and requirements. Block upgrades will enable the introduction of the latest technologies into fuzing, keep the fuzing design current to avoid obsolescence issues, and add capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Indirect Fire & Fuze ARDEC Support.	1.699	-	-
Description: Evaluate component alternatives. ***FY 2015 Accomplishments:*** Block Upgrades: Evaluated Micro Electro-Mechanical Systems (MEMS) component fabrication improvements to increase yield and lower cost. Conducted engineering tests to verify MEMS fabrication improvements. Studied improvements on M734A1/M783 mortar fuze delay primer for increased delay mode reliability. Conducted evaluations on electronics upgrades to M734A1 mortar			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** 862 / *Indirect Fire And Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
fuze for improved safety and increased performance reliability. Conducted evaluations and prove-out packing clip improvement on mortar training rounds. Implement with production fuzes. Studied M734A1/M783 impact switch upgrade concept for performance improvements. Identified & evaluated 40mm M550 setback spring interface improvements for increased throughput. Studied improvements on fuze setter interface.			
Title: Indirect fire & Fuze PM CAS Support ***Description:*** Study and analyze enhanced lethality technology to improve effectiveness and eliminate sole source High Fragmentation -1 steel indirect fires. ***FY 2015 Accomplishments:*** Studied, analyzed and supported enhanced lethality technology to improve effectiveness and eliminate sole source High Fragmentation (HF-1) steel in indirect fires. Examined alternate commercial AISI steel and advanced processes. Fabricated prototypes and conducted lethality testing to validate commercial steel producibility with novel controlled fragmentation processes. Conducted ballistic testing on M821 to verify firing tables. Conducted joint NATO/Allied Cannon Munitions Interchangeability analysis and support of battlefield interchangeability/compatibility of munitions and associated enabling technologies between 52 and 39 caliber 155mm guns. Activities included ballistic testing including firing tables, safety, reliability and performance.	5.895	-	-
Accomplishments/Planned Programs Subtotals	7.594	-	-

	FY 2015	FY 2016
Congressional Add: Hybird Projectile Technology ***FY 2016 Plans:*** Congressional Add for Hybird Projectile Technology. Army seeking to move Congressional Add for $15M for Hybrid Technology into appropriate 6.2 or 6.3 PE.	-	15.000
Congressional Adds Subtotals	-	15.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) F21 / *Direct Fire Technology and NATO Ammo Eval*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
F21: *Direct Fire Technology and NATO Ammo Eval*	-	6.607	0.000	0.650	-	0.650	0.665	0.680	0.675	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

New planned program in FY 2017: Support improvements in Direct Fire Propulsion Systems.

A. Mission Description and Budget Item Justification

The F21 Direct Fire Technology and North Atlantic Treaty Organization (NATO) Ammunition Evaluation program funding is used to support small caliber ammunition, 40mm grenade munitions, medium caliber cannon ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements. In addition, this program assures interchangeability of direct fire ammunition and weapons among all the NATO countries with all of the associated logistic, strategic and tactical advantages of the alliance. Project involves development and testing compliance of NATO standardization agreements (STANAGS) and staffing of the North American Regional Test Center (NARTC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: New Ammo Design Qualification & NATO Mission Support ***Description:*** This program assures complete interchangeability of small caliber, automated cannon-caliber, 40mm grenade ammunition and weapons among NATO countries to achieve the associated logistic, strategic and tactical advantages. ***FY 2015 Accomplishments:*** FY 2015 funds supported NATO small arms ammunition interchangeability group meetings and the purchase of skyscreens for NARTC. ***FY 2017 Plans:*** FY 2017 work supports NATO small arms ammunition interchangeability group meetings, documentation and test operations.	0.200	-	0.455
Title: Support improvements in Direct Fire Propulsion Systems ***Description:*** Improve Direct Fire Propulsion Systems to increase user survivability. ***FY 2017 Plans:*** FY 2017 work will explore additional sources of supply in the National Technology and Industrial Base (NTIB) to reduce the dependence on foreign suppliers and pursue improvements to address temperature sensitivities of energetics.	-	-	0.195
Title: Propellant Optimization	0.780	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** F21 / *Direct Fire Technology and NATO Ammo Eval*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Develop optimized spherical propellant for reduced muzzle signature, fouling and chamber pressure. Cartridges containing alternate flash suppressants and deterrents will be manufactured and tested to determine optimum propellant composition. ***FY 2015 Accomplishments:*** FY 2015 funds used to optimize and evaluate improvements to flash suppression fouling and barrel wear technology for small caliber propellants.			
Title: Lightweight Ammunition ***Description:*** Investigate alternate cartridge case materials for cost and weight savings over conventional brass cartridge cases. ***FY 2015 Accomplishments:*** FY 2015 funds used to perform government testing and continued improvement of candidate designs.	1.200	-	-
Title: M433 Warhead Improvement ***Description:*** 40mm: Improve lethality (fragmentation) of the M433 grenade. ***FY 2015 Accomplishments:*** FY 2015 funds used to complete component and integration subsystem and system testing. Three hundred cartridges will be built and tested to complete qualifications of the cartridge.	2.347	-	-
Title: Target Practice Spotter Technology Insertion ***Description:*** Training Cartridge with impact initiated spotting charge. Goal is visible signature upon impact under all conditions. ***FY 2015 Accomplishments:*** The FY 2015 funds used to define and develope a pyrotechnic which met the User's reliability requirements. The FY 2015 effort also focused on a perchlorate free green pyrotechnic.	0.850	-	-
Title: Improved M789 Lethality, Warhead fragmentation improvement ***Description:*** Improve M789 warhead fragmentation for lethality by utilizing fragmentation sleeves, scoring or other technologies within the warhead to promote more efficient fragmentation. ***FY 2015 Accomplishments:***	0.500	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** F21 / *Direct Fire Technology and NATO Ammo Eval*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 funds used to complete developmental and demonstration testing of the M789 warhead, TDP development and fragmentation liner integration into shaped charge warhead.			
Title: DBX-1 Lead free replacement for Lead Azide ***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 2015 Accomplishments:*** FY 2015 funds used to iniate lead free testing into M789.	0.050	-	-
Title: Extruded Propellant ***Description:*** Develop and demonstrate a government owned alternate propellant for M855A1 using existing extruded propellant technology. ***FY 2015 Accomplishments:*** FY 2015 funds used for initiatives where Extruded Propellant closed out Phase I by concluding designs, propellant iterations, initial testing and culminating in a Preliminary Design Review (PDR). At the conclusion of PDR, the program moved into Phase II/III which consisted of larger scale testing, production testing, and working actions necessary for TDP finalization and ECP draft.	0.270	-	-
Title: Small Caliber Ammunition Training Range Impact Reduction Engineering Study ***Description:*** Perform an engineering study on the feasibility of reducing the surface danger zone of small caliber training ammunition while maintaining a ballistic match to the combat ammunition out to maximum effective range of the combat ammunition. The results of the study will assist in establishing the baseline requirements for future training ammunition. ***FY 2015 Accomplishments:*** FY 2015 funds used to complete testing of 7.62mm ball and trace potential candidates.	0.050	-	-
Title: 40mm Pyrotechnics Cartridges ***Description:*** Improve reliability and hang time. ***FY 2015 Accomplishments:*** FY 2015 funds used to complete initial phase of multiyear effort starting with reliability and hang time improvements.	0.250	-	-
Title: Close Combat Mission Capability Kit (CCMCK) ***Description:*** CCMCK is a user installed weapons modification system, which allows the Soldier to employ weapons at a short range for force-on-force training using low velocity marking ammunition while precluding the weapon from firing standard service	0.010	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** F21 / *Direct Fire Technology and NATO Ammo Eval*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
ammunition. The system provides normal environmental/weapon employment cues and immediate target feedback through force-on-force, interactive live fire scenario tasks, and mission execution. ***FY 2015 Accomplishments:*** FY 2015 funds used for engineering studies to analyze unmet user requirements.			
Title: Metastable Intermolecular Composite (MIC) Primer Lead free primer ***Description:*** Integrate environmental friendly lead free primary explosives within the primer of the M789 and remove lead Styphnate. Work small caliber 7.62mm and .50cal testing. ***FY 2015 Accomplishments:*** FY 2015 funds supported local functional testing of 7.62mm and .50cal primer mix. Also supported additional contracting cost for 7.62mm and .50cal tooling for pilot line.	0.100	-	-
Accomplishments/Planned Programs Subtotals	6.607	-	0.650

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 6	R-1 Program Element (Number/Name) PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	Project (Number/Name) F24 / *Conventional Munitions Demil*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
F24: *Conventional Munitions Demil*	-	8.426	17.591	17.643	-	17.643	17.013	17.523	20.305	16.881	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Conventional Munitions Demilitarization technology program supports the Single Manager for Conventional Ammunition (SMCA) responsibility per Department of Defense Instruction (DoDI) 5160.68 to plan, program, budget and fund a Joint Service Research and Development (R&D) program that develops capability and capacity as well as technology and facilities to support the SMCA mission to demil and dispose of conventional ammunition stored in the SMCA Resource, Recovery and Disposition Account (B5A). The program goals include SMCA efforts to increase efficiencies and effectiveness to reduce the demil stockpile; reduce processing costs including packaging, handling and crating; and increase capacity through improved demil capabilities and processes. Project F24 includes activities: (1) to establish requirements and develop processes to focus investments, assess capabilities, analyze alternatives, and recommend and implement R&D projects; (2) to improve products and processes that support existing capabilities; (3) to develop or improve demil methods and processes related to advance the primary demilitarization core thrust areas of destruction, disassembly, removal, resource recovery and recycling, and waste stream treatment; (4) to ensure safe and environmentally acceptable demil operations; (5) to transition R&D products to United States Army depots or plants as well as commercial facilities performing demil; and (6) to mitigate risk and close-out project activities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Destruction	4.900	6.460	7.967
Description: This effort focuses on developing capabilities and capacities for the destruction of munitions. ***FY 2015 Accomplishments:*** Continued Ammonium Perchlorate (AP) Rocket Motor Destruction (ARMD) at Letterkenny Munitions Center (LEMC); installed components of the Pollution Abatement System (PAS); completed factory acceptance test for the Remote Automated Motor Sealing, Loading, & Ignition Circuit Completion System; obtained necessary permits from Pennsylvania Department of Environmental Protection upon submission of Continuous Emissions Monitoring System Test Plan; completed inert testing at vendor site for Rocket Motor Segmenting (RMS). Continued the Munitions Cryofracture Demil Facility (MCDF) upgrade and Area Denial Artillery Munition (ADAM) Projectile download capability at McAlester Army Ammunition Plant (MCAAP); obtained safety certification approval for the Ammunition Peculiar Equipment 2253 for Improved Conventional Munitions download; completed low rate initial production (LRIP) and compiled data for submission to Department of Defense Explosive Safety Board. Continued the capability assessment for the Static Detonation Chamber (SDC) at Anniston Munitions Center (ANMC) and successfully			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** F24 / *Conventional Munitions Demil*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
processed DODICS N335, N412, M692, and M703. Completed and staffed statement of work and initiated contracting for the assessment of non-thermal demil capability for whole munitions on the Castalia Demil Demonstration project. ***FY 2016 Plans:*** Conduct Phase I integration testing for LEMC ARMD project; conduct inert motor tests on RMS at Redstone Arsenal and conduct prototype demonstration of Thermal Treatment Chamber (TTC) at LEMC. Plan and execute transition to production of the ADAM projectile download line at MCAAP. Complete the capability assessment for the SDC project at ANMC. Award contract for the Castalia Demil Demonstration and initiate project work in Greece; begin testing of the Castalia Demil system. Plan and initiate the cluster bomb unit (CBU) 100 (also called MK 20 Rockeye) demil project at Crane Army Ammunition Activity (CAAA); begin designing Rockeye download equipment for installation at CAAA. Design and build engine starter cartridge stands at MCAAP. ***FY 2017 Plans:*** Will conduct the ARMD TTC LRIP and transition operations to LEMC. Execute transition of MCDF capability to MCAAP. Analyze the results of the SDC capability assessment and conduct an analysis of alternatives; plan and initiate Phase II SDC project. Analyze the results of the Castalia Demil assessment and conduct an analysis of alternatives; plan and initiate Phase II Castalia Demil project. Begin fabrication of Rockeye download equipment.			
Title: Resource Recovery and Recycling (R3) ***Description:*** This effort focuses on enhancing existing methods of munitions R3. ***FY 2015 Accomplishments:*** Planned and initiated project to segment and washout 16-inch Navy gun projectiles at CAAA. ***FY 2016 Plans:*** Award contract and begin design of segmenting and washout equipment for 16-inch Navy gun projectiles at CAAA. ***FY 2017 Plans:*** Will design, fabricate and install equipment for the 16-inch Navy Gun projectile washout line at CAAA.	1.700	2.100	0.940
Title: Advanced Removal ***Description:*** This effort develops technology to remove propellant and energetics. ***FY 2015 Accomplishments:*** Fabricated components for Red Phosphorous (RP) demil line, assembled system components and integrated the capability with Phosphoric Acid Recovery Plant at CAAA. ***FY 2016 Plans:***	0.426	0.741	1.875

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** F24 / *Conventional Munitions Demil*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Complete the integrated demonstration/validation (dem/val) of the RP demil line at CAAA. Initiate and plan a closed disposal project for 155mm Copperhead Munitions at MCAAP. ***FY 2017 Plans:*** Will proveout a closed disposal capability for 155mm Copperhead Munitions at MCAAP.			
Title: Advanced Waste Stream Treatment ***Description:*** This effort focuses on handling waste streams from munitions items. ***FY 2016 Plans:*** Plan and initiate a feed system upgrade acquisition on the Rotary Kiln Process Improvement (RKPI) project and develop procurement package. Apply process efficiency changes to the environmental permitting process for the RKPI project. Perform stockpile analysis and determine parameters for organic incineration of CS gas (or tear gas); evaluate changes to air permit modifications needed to thermally treat CS gas. ***FY 2017 Plans:*** Will install the upgraded feed system on a rotary kiln incinerator at an organic location to be determined as per RKPI planning. Plan and initiate a closed disposal project for CS gas.	-	3.206	2.850
Title: Advanced Munitions Disassembly ***Description:*** This effort focuses on developing innovative and efficient processes to disassemble munitions. ***FY 2015 Accomplishments:*** Initiated project for Family of Scatterable Munitions (FASCAM) demil. Completed detailed design review, equipment fabrication and installation for CBU-87 project at Hawthorne Ammunition Depot (HWAD); completed successful test of single layer bomb live units-97 submunition open detonation configuration. Completed hardware changes on the Demil Induction Heating Meltout System (DIHMES) at HWAD and developed a test plan. ***FY 2016 Plans:*** Continue planning and support of FASCAM demil project; develop design to integrate the preprocessing cryofracture capability of FASCAM mines with thermal processing in the rotary kiln at CAAA. Finalize installation of CBU-87 download hardware, conduct dem/val and LRIP of CBU-87 download equipment to include open detonation of submunitions at HWAD. Plan and execute transition of production demil process for Liquid Rocket-62 Bullpup motors at ANMC. Conduct dem/val of the DIHMES capability on 60mm mortar bodies loaded with Comp B at HWAD. Plan and initiate a size reduction project for Reactive Armor Tiles to facilitate thermal treatment feeds. ***FY 2017 Plans:***	1.400	5.084	4.011

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605805A / *Munitions Standardization, Effectiveness and Safety*	**Project (Number/Name)** F24 / *Conventional Munitions Demil*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Will finalize design for FASCAM capability, and begin fabrication and installation at CAAA. Design, fabricate and install size reduction hardware and conduct dem/val of size reduction hardware for Reactive Armor Tiles.			
Accomplishments/Planned Programs Subtotals	8.426	17.591	17.643

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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