| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army | | | | | | | | | | | Date: February 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support* | | | | | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2017** | **FY 2018** | **FY 2019 Base** | **FY 2019 OCO** | **FY 2019 Total** | **FY 2020** | **FY 2021** | **FY 2022** | **FY 2023** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 63.983 | 43.444 | 42.332 | - | 42.332 | 44.269 | 41.862 | 43.273 | 43.575 | 0.000 | 322.738 |
| 297: *Mun Survivability & Log* | - | 14.566 | 16.650 | 16.658 | - | 16.658 | 15.479 | 16.235 | 16.924 | 16.661 | 0.000 | 113.173 |
| 857: *DoD Explosives Safety Standards* | - | 1.544 | 1.968 | 1.842 | - | 1.842 | 1.858 | 1.892 | 1.930 | 1.964 | 0.000 | 12.998 |
| 858: *Army Explosives Safety Management Program* | - | 0.609 | 1.085 | 0.992 | - | 0.992 | 1.011 | 1.030 | 1.047 | 1.065 | 0.000 | 6.839 |
| 859: *Life Cycle Pilot Process* | - | 29.676 | 5.568 | 5.441 | - | 5.441 | 5.536 | 5.634 | 5.732 | 5.829 | 0.000 | 63.416 |
| F21: *NATO Ammo Evaluation* | - | 0.625 | 0.589 | 0.742 | - | 0.742 | 0.741 | 0.741 | 0.741 | 0.741 | 0.000 | 4.920 |
| F24: *Conventional Munitions Demil* | - | 16.963 | 17.584 | 16.657 | - | 16.657 | 19.644 | 16.330 | 16.899 | 17.315 | 0.000 | 121.392 |

**A. Mission Description and Budget Item Justification**

This Program Element (PE) 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.

Project 297 - Munitions Survivability & Logistics: 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 munition stocks could cripple the force, jeopardize the mission, and result in high loss of life. This Project mitigates vulnerabilities and ensures a survivable fighting force.

Project 857 - DoD Explosives Safety Standards: This Project supports the Research, Development, Test, and Evaluation efforts of the Department of Defense (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.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army | Date: February 2018 |
|---|---|
| **Appropriation/Budget Activity**<br>2040: *Research, Development, Test & Evaluation, Army I* BA 6: *RDT&E Management Support* | **R-1 Program Element (Number/Name)**<br>PE 0605805A *I Munitions Standardization, Effectiveness and Safety* |

Project 858 - Army Explosives Safety Management Program: This Project establishes, validates or modifies explosives technical safety requirements per Department of Defense Manual 6055.09 and Department of the Army Pamphlet 385-64, Ammunition and Explosives Safety Standards. Project activities promote Research, Development, Test, and Evaluation (RDTE) 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 (with highest priority directed to combat theater of operations).

Project 859 - Life Cycle Pilot Process: 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.

Project F21: The North Atlantic Treaty Organization (NATO) Ammunition Evaluation program funding 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. The Project involves development and testing compliance of NATO standardization agreements (STANAGS) and staffing of the North American Regional Test Center (NARTC). In addition, this Project supports small caliber ammunition, 40mm grenade munitions, medium caliber cannon ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements. This Project also supports the standardization and interchangeability of legacy and new production United States (U.S.) weapons and ammunition with Allied Nations to maximize battlefield interchangeability/compatibility under the auspices of the international Joint Ballistics Memorandum Of Understanding (JBMOU). Maximizing standardization, interchangeability, and exportability will also potentially increase Foreign Military Sales (FMS) of U.S. indirect fire Weapon and Munition products to maintain critical mass domestic production and affordable taxpayer costs through increased economies of scale. Fiscal Year (FY) 2019 funding supports NATO small arms ammunition interchangeability group meetings, documentation, and test operations. FY 2019 funding also supports JBMOU ballistic testing including firing tables, safety, reliability, and performance.

F24 - Conventional Munitions Demilitarization (Demil): The Conventional Munitions Demilitarization technology Project 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 demilitarization 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.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army | Date: February 2018 |
|---|---|
| **Appropriation/Budget Activity**<br>2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support* | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* |

| B. Program Change Summary ($ in Millions) | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 40.545 | 43.444 | 41.589 | - | 41.589 |
| Current President's Budget | 63.983 | 43.444 | 42.332 | - | 42.332 |
| Total Adjustments | 23.438 | 0.000 | 0.743 | - | 0.743 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | 25.000 | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.543 | - | | | |
| • Adjustments to Budget Years | - | - | 0.743 | - | 0.743 |
| • FFRDC Transfer | -0.019 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2017 | FY 2018 |
|---|---|---|
| **Project:** 859: *Life Cycle Pilot Process* | | |
| Congressional Add: *Fiscal Year (FY) 2017 Congressional Add* | 25.000 | - |
| Congressional Add Subtotals for Project: 859 | 25.000 | - |
| Congressional Add Totals for all Projects | 25.000 | - |

**Change Summary Explanation**

$25 Million Congressional Add in Fiscal Year 2017 applied to Project 858, Life Cycle Pilot Process.

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | | Date: February 2018 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 6 | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | Project (Number/Name)<br>297 / *Mun Survivability & Log* | |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297: *Mun Survivability & Log* | - | 14.566 | 16.650 | 16.658 | - | 16.658 | 15.479 | 16.235 | 16.924 | 16.661 | 0.000 | 113.173 |
| 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 munition stocks 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 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** Munitions Predictive Life | 1.916 | 1.718 | 1.766 |
| ***Description:*** This activity will demonstrate technologies and algorithms that can help assess munitions serviceability based upon aggregate environmental exposures, system cycling and munition degradation models. The activity will provide life cycle management tools for risk mitigation strategies, while reducing testing, inspection & surveillance required as well as improving weapon system reliability and warfighter effectiveness. | | | |
| ***FY 2018 Plans:***<br>Conduct qualification safety testing of a next generation ammunition container based temperature/humidity exposure reliability sensor and complete data integration into Munitions History Program (MHP) and Stockpile reliability program Quality Assurance Specialist Ammunition Surveillance User Inspection Device. Conduct prototype engineering testing of a Multi Frequency Sensor Suite that will monitor munitions exposure to ambient radiation over their lifecycle for improved reliability knowledge. Conduct correlation testing on the passive time/temperature exposure sensor with legacy ammunition items and integrate. Conduct market survey of passive Radio Frequency Identification and low cost active environmental sensors for legacy munitions, select viable candidates, and test. Integrate passive propellant temperature sensor with fire control systems and processes. | | | |
| ***FY 2019 Plans:***<br>Conduct qualification safety testing of an integrated second generation prototype next generation ammunition container based temperature/humidity exposure reliability sensor. Conduct qualification testing of a Multi Frequency Sensor Suite that will monitor munitions exposure to ambient radiation over their lifecycle for improved reliability knowledge. Conduct correlation testing on | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>297 / *Mun Survivability & Log* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| the passive time/temperature exposure sensor with legacy ammunition items and integrate. Conduct market survey of passive Radio Frequency Identification and low cost active environmental sensors for legacy munitions, select viable candidates, and test. Integrate passive propellant temperature sensor with fire control systems and processes. Incorporate automation friendly health monitors into automation supply point - scalable and continue integration testing.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Funding explained by revised economic assumptions. | | | |
| ***Title:*** Insensitive Munitions (IM) Integration Program<br>***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, enclosed heat build-up (cook-off), bullets, adjacent munitions reaction (sympathetic detonation), and shape charge jet attacks.<br>***FY 2018 Plans:***<br>Conduct final integration testing of all 30mm M788/M789 IM technologies and transition to Project Manager Maneuver Ammunition Systems (PM-MAS). Validate reduced-sensitivity and high performance explosives in small and medium caliber munitions systems. Optimize the use of nano-energetic materials as reduced-sensitivity but high-output main fill explosives or boosters in small and medium caliber munition systems. Validate the use of high-energy output and reduced-sensitivity 3,4-dinitropyrazole (DNP) explosive in hand grenades and optimize booster configuration to accommodate enhanced fuze. Optimize the use of new packaging and dunnage materials that actively attract or pull heat away from vulnerable munition components in case of fire.<br>***FY 2019 Plans:***<br>Transition improvements from High Shear Mix project to qualified propellant materials to produce high-performing propellants with better fragment impact (FI) responses. Validate novel propellant technologies in medium and large caliber munitions to reduce hazards from FI threat. Demonstrate novel packaging heat management materials in mortars systems to delay catastrophic responses in Slow Cook Off (SCO) conditions. Validate packaging configurations that eliminate mass detonation events in tightly-packed medium caliber munitions. Optimize granulated melt-pour energetics to reduce mass-detonation hazards of tightly-packed medium caliber munitions while maintaining high-energy output.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>FY 2019 funding level is higher than FY 2018 due to anticipated increase in labor, test, and prototype costs. | 5.497 | 6.288 | 6.570 |
| ***Title:*** Improved Munitions Packaging | 2.718 | 3.575 | 2.804 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>297 / *Mun Survivability & Log* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Description:*** This activity 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.<br><br>***FY 2018 Plans:***<br>Develop prototypes and conduct sequential rough handling and environmental testing for the injection molded cylindrical container that integrates it for use with the M829A4 120mm tank and 120mm mortar munitions. Develop prototypes and conduct sequential rough handling and environmental testing for the plastic rectangular container to integrate it for use with legacy 5.56 small caliber ammunition. Develop several concepts geared to ?lighten the load? and down select concepts thru modeling and simulation and analysis. Complete qualification testing of plastic sealed ammunition pouches for use with 5.56mm ammunition. Perform final hazard classification testing on M6 and M7 blasting cap container design with Mycofoam. Fully implement Mycofoam as replacement dunnage design option for M6 and M7 blasting cap packaging design as part of the eco-friendly program. Conduct engineering and prototype testing of a small caliber ammunition bulk packaging container for improved distribution efficiency.<br><br>***FY 2019 Plans:***<br>Conduct verification testing on injection molded cylindrical container that integrates it for use with the M829A4 120mm tank and 120mm mortar munitions. Conduct verification testing for the plastic rectangular container to integrate it for use with legacy 5.56mm small caliber ammunition. Produce prototypes geared to ?lighten the load? and perform in-house engineering tests to validate. Perform final hazard classification testing on M6 and M7 blasting cap container design with Mycofoam. Conduct verification testing of a small caliber ammunition bulk packaging container for improved distribution efficiency. Facilitate implementation of new bulk container at LCAAP and identify other potential small caliber ammunition bulk container candidates. Conduct developmental testing of the initial plastic mortar container prototype for use with all families of mortars. Perform rough handling, drop testing, and other developmental testing on the rapid access container consolidator.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>FY 2019 funding level is lower than FY 2018 because multiple projects are transitioning to Budget Activity 4. | | | |
| ***Title:*** Ammo Provider<br><br>***Description:*** This activity 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). | 4.435 | 5.069 | 5.518 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>297 / *Mun Survivability & Log* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***FY 2018 Plans:***<br>Conduct phase 1 demonstration of the enhanced speedbag with the Tactical Resupply Unmanned Aerial System ? Competitive (TRUC). Complete the design of a graphical user interface for the Ammunition Quality Decision Tool and conduct user evaluation of tool effectiveness. Complete Joint Modular Intermodal Container (JMIC)/container Analysis of Alternatives and transition alternative prototype. Implement software requirements for operating Expeditionary Munitions Survivability Software (EMSS) in a disconnected state. Add basic site surveying capability with a mobile hardware device. Expand Configured Load Building Tool (CLBT) prototype capabilities to determine and visualize loads at the sub-pallet level on set of defined standard transportation conveyances. Mature 5K forklift and Rough Terrain Container Handler (RTCH) automation kit prototypes to include integration of maintenance and troubleshooting aids and conduct validation testing. Integrate applique interface kit for manually operated Material Handling Equipment (MHE) into the 5K forklift and RTCH, implement software control subsystems, and perform subsystem testing. Conduct engineering and user testing of the automated pallet scanning and weighing system. Develop software links to Automated Supply Point-Scalable (ASP-S) for data transmission. Complete design for an integrated round counting sensor device that enables automatic capturing of fired ammunition data from weapon systems to facilitate anticipatory resupply. Complete requirements analysis and update design architecture of the Class V Adaptive Demand Estimation System (CADES) that will permit intelligent, anticipatory ammunition management on the battlefield with the ability to monitor consumption and supply node stock levels for forward warfighting units. Modify as necessary and conduct demonstration of the CADES prototype to provide theater level stockage objective to meet anticipated demand. Support continued use of the Distribution & Retrograde APEX Management (DRAM) prototype in operational demonstrations. Complete the design of a multi-modal supply pallet that minimizes the requirement for handling and reconfiguration of cargo in transit. | | | |
| ***FY 2019 Plans:***<br>Demonstrate multiple enablers including Ammunition Quality Decision Tool, Configured Load Building Tool, MHE applique interface kit and CADES as parts of an integrated ammunition scenario within ASP-S. Develop the design concept and down select sensor and scanning hardware for an automated truck scanning capability to enable conveyance level transfer of accountability and autonomous inspections of transported cargo in the ASP-S. Develop the design concept and down select platform, sensor and scanning hardware for a yard mule transport capability to enable local autonomous lift capability during the consolidation and put-away processes within the ASP-S. Perform engineering evaluation of an integrated round counting sensor device that enables automatic capturing of fired ammunition data from weapon systems to facilitate anticipatory resupply. Support continued use of DRAM and the Class V Adaptive Demand Estimation System (CADES) prototypes in operational demonstrations. Perform validation and verification testing for an integrated round counting sensor device that enables automatic capturing of fired ammunition data from weapon systems to facilitate anticipatory resupply. Develop artificial intelligence concepts | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>297 / *Mun Survivability & Log* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| and apply to ammunition handling activities such as turn in and retrograde operations. Conduct operational assessment of expeditionary MSS enhancements.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>FY 2019 funding level is higher than FY 2018 due to anticipated increase in labor, test, and prototype costs. | | | |
| **Accomplishments/Planned Programs Subtotals** | 14.566 | 16.650 | 16.658 |

**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 2019 Army | | | Date: February 2018 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 6 | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | Project (Number/Name)<br>857 / *DoD Explosives Safety Standards* | |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 857: *DoD Explosives Safety Standards* | - | 1.544 | 1.968 | 1.842 | - | 1.842 | 1.858 | 1.892 | 1.930 | 1.964 | 0.000 | 12.998 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This Project supports the Research, Development, Test, and Evaluation (RDTE) efforts of the Department of Defense (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 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** Explosive and Munitions Tests | 0.500 | 0.574 | 0.534 |
| ***Description:*** Testing aimed at solving practical problems and increasing predictability of the effects of explosions and impacts on people, materials and structures. Additionally, testing provides data on the interaction of explosives in various configurations. Testing results are used to improve predictability of effects from explosive incidents and improve criteria to protect people, structures and the environment from the damaging effects of DoD munitions.<br><br>***FY 2018 Plans:***<br>Continue testing of laboratory quantities, potential partnering effort for testing of underwater shock effects, further maturation of HD 1.3 testing and scaled testing of earth-covered magazines to determine blast pressures at intermagazine distance.<br><br>Laboratory quantity testing: Explosives safety criteria are generally geared towards larger quantities of explosives where the specifics of the donor structure have less of an effect on the hazards generated. This is particularly problematic for lab quantities of explosives (e.g., 500 grams and lower), where the specifics of the construction type, room geometry, standoff, etc., can have a profound effect on the associated hazards. Current criteria is admittedly conservative in this regime, but testing and analysis are needed to justify reduced safety standoff distances. This work will leverage previous ATF lab quantities testing by increasing the explosive weight until breach of a sheetrock wall; determine the secondary breach debris hazards from a nominal laboratory room design; and assess overpressurization failure hazards of a nominal laboratory room design. This will result in reduced safety standoff distances for the conditions tested. | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>857 / *DoD Explosives Safety Standards* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| Hazard Division 1.3 testing: As a result of a study of historical accidents approximately 75% of accidents are initiated by fire versus by detonation via an initiation chain. Also, the Insensitive Munitions Program has as a primary goal to develop more ? insensitive? munitions and their end state is systems that react by burn only. These two conditions combine to make the potential for a non-detonation reaction more likely in the event of an explosives accident. This testing effort is designed to address the gaps in knowledge of HD 1.3/thermal hazards from a non-detonation reaction by performing testing to characterize the debris hazards from breakup of a confining structure, characterize the directional jetting effects from such structures, and assess the thermal hazard of burning in the open.<br>***FY 2019 Plans:***<br>Continue testing of laboratory quantities, potential partnering effort for testing of underwater shock effects, further maturation of HD 1.3 testing and scaled testing of earth-covered magazines to determine blast pressures at intermagazine distance.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Economic assumptions revised. | | | |
| ***Title:*** Safety Guidelines<br>***Description:*** The DDESB is charged with developing DoD explosives safety standards. These standards are captured in several DoD issuances, but the primary one is DoDM 6055.09, DoD Ammunition and Explosives Safety Standards. Changes to DoDM 6055.09 must be approved by the DoD Explosives Safety Board. The Board Members have identified their priorities for update of DoDM 6055.09, and these priorities are reflected in the formation of DDESB working groups and test programs to develop new and revised explosives safety standards. This effort continually improves safety policy and guidance.<br>***FY 2018 Plans:***<br>Continuation of work on hazard classification criteria. Initial development of major rewrite of DoD explosives safety standards, to include addressing revised Hazard Division 1.2 criteria in both NATO and DoD policy. Development of example design procedures for design of blast-resistant windows and glazing.<br>Near complete rewrite of DoD explosives safety standards. Continue effort on harmonization with NATO and UN policy resulting in seamless NATO and multi-national operations. Initial phase of work to develop more refined secondary debris hazards from explosives storage buildings.<br>***FY 2019 Plans:***<br>Will continue effort on harmonization with NATO and UN policy resulting in seamless NATO and multi-national operations. Initial phase of work to develop more refined secondary debris hazards from explosives storage buildings.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:*** | 0.450 | 0.545 | 0.459 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>857 / *DoD Explosives Safety Standards* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| Economic assumptions revised. | | | |
| ***Title:*** Analysis Tools | 0.594 | 0.849 | 0.849 |
| ***Description:*** Develop tools & models required to calculate, estimate and predict explosives safety hazards, associated standoff distances, fragmentation distribution, personnel risks and other parameters. Additionally tools are required to develop and maintain explosives safety site plans.<br><br>***FY 2018 Plans:***<br>Leverage master planning partnerships to develop initial web-based site planning capability. Develop a tool to predict fragment distances from piping partially contaminated with explosives residue model which will utilize the pipe size (diameter and thickness), the length of pipe, and the maximum credible event to account for only a percentage of the total available volume in the pipe being filled to better predict fragmentation hazards in building remediation. Develop a model to predict coupled effects of over-pressurization of a structure from a thermal event and the mass distribution of the resulting debris. Development of modeling to predict burn characterization of propellants<br><br>***FY 2019 Plans:***<br>Develop tools & models required to calculate, estimate and predict explosives safety hazards, associated standoff distances, fragmentation distribution, personnel risks and other parameters. Additionally tools are required to develop and maintain explosives safety site plans. | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.544 | 1.968 | 1.842 |

**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 2019 Army | | | Date: February 2018 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 6 | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | Project (Number/Name)<br>858 / *Army Explosives Safety Management Program* | |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 858: *Army Explosives Safety Management Program* | - | 0.609 | 1.085 | 0.992 | - | 0.992 | 1.011 | 1.030 | 1.047 | 1.065 | 0.000 | 6.839 |
| 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 RDTE 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 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** Risk based explosives safety criteria | 0.150 | 0.150 | 0.200 |
| ***Description:*** Development of risk based explosives safety criteria that will aid commanders and safety personnel in the transition from regulation to risk management.<br><br>***FY 2018 Plans:***<br>Continue explosives testing and support of hazard research and exposure consequences.<br><br>***FY 2019 Plans:***<br>Will continue explosives testing and support of hazard research and exposure consequences.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Economic assumptions adjusted. | | | |
| ***Title:*** Development of enhanced protective structure designs | 0.236 | 0.425 | 0.500 |
| ***Description:*** Develop enhanced protective structure designs that improve the survivability of Army personnel, facilities and equipment.<br><br>***FY 2018 Plans:***<br>Continue explosives testing and support for improving protective construction designs.<br><br>***FY 2019 Plans:***<br>Will continue explosives testing and support for improving protective construction designs.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:*** | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>858 / *Army Explosives Safety Management Program* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| Economic assumptions adjusted. | | | |
| ***Title:*** Development of explosive safety tools<br>***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.<br>***FY 2018 Plans:***<br>Continue development of new methods and tools for risk assessment to improve explosive safety risk management decisions.<br>***FY 2019 Plans:***<br>Will continue development of new methods and tools for risk assessment to improve explosive safety risk management decisions.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Reversion to previous funding profile. | 0.223 | 0.510 | 0.292 |
| **Accomplishments/Planned Programs Subtotals** | 0.609 | 1.085 | 0.992 |

**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 2019 Army | | | Date: February 2018 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 6 | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | Project (Number/Name)<br>859 / *Life Cycle Pilot Process* | |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 859: *Life Cycle Pilot Process* | - | 29.676 | 5.568 | 5.441 | - | 5.441 | 5.536 | 5.634 | 5.732 | 5.829 | 0.000 | 63.416 |
| 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 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** Product Cost Thrust Area | 1.409 | 1.086 | 1.261 |
| ***Description:*** This thrust area seeks out new opportunities to reduce overall manufacturing costs of ammunition and ammunition components. Efforts will review and analyze legacy manufacturing processing for opportunities to integrate new technology and lean manufacturing processes to reduce cost.<br><br>***FY 2018 Plans:***<br>Complete evaluation of the mortar fin inspection process. Continue to evaluate, assess and transition new technology for legacy processes to reduce overall production costs for the Army.<br><br>***FY 2019 Plans:***<br>Continue to evaluate new processes and technology to reduce overall production and end item costs for the Army. Continue and transition insensitive munitions explosives (IMX) riser reclamation prototype process to NTIB. Complete mortar illuminant canister material evaluation.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Economic assumptions revised. | | | |
| ***Title:*** Single Point Failures | 1.062 | 1.903 | 1.925 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>859 / *Life Cycle Pilot Process* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Description:*** This thrust area will assess alternative sources and processes to mitigate SPFs. These efforts are part of the overall strategy to reduce the number of SPFs in the NTIB. Additionally, thrust area efforts will address ammunition manufacturing capability shortfalls. This area leverages RDTE accomplishments and product knowledge to satisfy manufacturing requirements.<br><br>***FY 2018 Plans:***<br>Continue to evaluate fuze battery material alternatives and complete evaluation of tank ammunition primer sealant alternatives. Efforts will address source of supply problems within the NTIB. Efforts will address source of supply problems within the NTIB. Technology transitions and risk mitigation strategies are transferred to PMs/PDs for their use in assessing procurement strategies for affected SPF end items.<br><br>***FY 2019 Plans:***<br>Complete liquid battery reserve SPF for artillery fuzes and transition to PM or PD for their use in risk mitigation implementation supply strategies and assessing procurement strategies for affected end items. Complete SPF densified basic magnesium carbonate (DBMC) assessment. Complete tank primer sealant evaluation.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Economic assumptions revised. | | | |
| ***Title:*** Manufacturing Technology for Industrial Base Transformation<br><br>***Description:*** Project thrust area evaluates mature processes and manufacturing technologies that provides enhanced capabilities to legacy manufacturing operations. Efforts will pilot process technologies from government research and development centers and private industry for utilization in ammunition related manufacturing processes.<br><br>***FY 2018 Plans:***<br>Complete MIC/green primer pilot scale manufacturing and prototype manufacturing of pre-cursor materials for foamed celluloid sheets. Continue investigations, develop and document manufacturing technology for transition to the NTIB. Technology transitions to affected Industrial Base via the Industrial Facilities modernization program.<br><br>***FY 2019 Plans:***<br>Continue investigations, develop and document technology for transfer to NTIB. Complete manufacture celluloid sheets for foamed celluloid applications. Continue Green Primer Pilot Process. Complete ammonium nitrate solution (ANSOL) technology evaluation to affected IB.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Reversion to previous funding profile. | 2.205 | 2.579 | 2.255 |
| **Accomplishments/Planned Programs Subtotals** | 4.676 | 5.568 | 5.441 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>859 / *Life Cycle Pilot Process* |

| | FY 2017 | FY 2018 |
|---|---|---|
| ***Congressional Add:*** Fiscal Year (FY) 2017 Congressional Add<br>***FY 2017 Accomplishments:*** N/A | 25.000 | - |
| **Congressional Adds Subtotals** | 25.000 | - |

**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 2019 Army | | | Date: February 2018 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 6 | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | Project (Number/Name)<br>F21 / *NATO Ammo Evaluation* | |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F21: *NATO Ammo Evaluation* | - | 0.625 | 0.589 | 0.742 | - | 0.742 | 0.741 | 0.741 | 0.741 | 0.741 | 0.000 | 4.920 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The North Atlantic Treaty Organization (NATO) Ammunition Evaluation program funding ensures 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. The Project involves development and testing compliance of NATO standardization agreements (STANAGS) and staffing of the North American Regional Test Center (NARTC). In addition, this Project supports small caliber ammunition, 40mm grenade munitions, medium caliber cannon ammunition, and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy, and general product improvements. This Project also supports the standardization and interchangeability of legacy and new production U.S. weapons and ammunition with Allied Nations to maximize battlefield interchangeability/compatibility under the auspices of the international Joint Ballistics Memorandum Of Understanding (JBMOU). Maximizing standardization, interchangeability, and exportability will also potentially increase Foreign Military Sales (FMS) of U.S. indirect fire Weapon and Munition products to maintain critical mass domestic production and affordable taxpayer costs through increased economies of scale. Fiscal Year (FY) 2019 funding supports NATO small arms ammunition interchangeability group meetings, documentation and test operations. FY 2019 funding also supports JBMOU ballistic testing including firing tables, safety, reliability, and performance.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** New Ammo Design Qualification & NATO Mission Support | 0.217 | 0.139 | 0.292 |
| ***Description:*** This activity ensures complete interchangeability of small caliber, automated cannon-caliber, 40mm grenade ammunition, air burst capable 30mm/40mm ammunition, and weapons among NATO countries to achieve the associated logistic, strategic and tactical advantages.<br><br>***FY 2018 Plans:***<br>FY 2018: work to support NATO small arms ammunition interchangeability group meetings, documentation and test operations.<br><br>***FY 2019 Plans:***<br>FY 2019 will continue work to support NATO small arms ammunition interchangeability group meetings, documentation and test operations.<br><br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Increased for activities planned in FY 2019. | | | |
| ***Title:*** Joint Ballistics Program Support | 0.408 | 0.450 | 0.450 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>F21 / *NATO Ammo Evaluation* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Description:*** The activity supports the maturation, validation, and risk reduction of battlefield interchangeability/compatibility and associated enabling technologies between domestic U.S. and NATO/Allied Nations Indirect Fires Weapons and Munitions.<br><br>***FY 2018 Plans:***<br>FY 2018 activities include ballistic testing including firing tables, safety, reliability, and performance.<br><br>***FY 2019 Plans:***<br>FY 2019 continues ballistic testing including firing tables, safety, reliability, and performance. | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.625 | 0.589 | 0.742 |

**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 2019 Army | | | Date: February 2018 |
|---|---|---|---|
| Appropriation/Budget Activity<br>2040 / 6 | R-1 Program Element (Number/Name)<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | Project (Number/Name)<br>F24 / *Conventional Munitions Demil* | |

| COST ($ in Millions) | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F24: *Conventional Munitions Demil* | - | 16.963 | 17.584 | 16.657 | - | 16.657 | 19.644 | 16.330 | 16.899 | 17.315 | 0.000 | 121.392 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Conventional Munitions Demilitarization technology Project 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 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 Project 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 several 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 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| ***Title:*** Advanced Destruction | 7.287 | 7.209 | 4.401 |
| ***Description:*** This effort focuses on developing capabilities and capacities for the destruction of munitions.<br><br>***FY 2018 Plans:***<br>Conduct the final transition of Letterkenny Munitions Center (LEMC) Ammonium Perchlorate Rocket Motor Destruction (ARMD) resulting in Initial Operational Capability (IOC). Complete the Final Design for the Multiple Rocket Motor (MRM) Upgrade to the LEMC ARMD. Initiate Equipment Installation on the Multiple Rocket Motor (MRM) to the LEMC ARMD. Will conduct the Operational Demonstration for the MCDF. Complete the MCDF transition to IOC. Complete fabrication and begin install of Rockeye download equipment at CAAA. Conduct an operational demonstration of the Rockeye Download Equipment. Complete Phase I operational testing of the Engine Starter Cartridge at MCAAP and initiate design of Phase II Engine Starter Cartridge equipment.<br><br>***FY 2019 Plans:***<br>Will verify functionality of LEMC ARMD under FOC conditions. Will complete MCDF FOC Transition. Conduct an operational demonstration of the Rockeye Download Equipment at CAAA. Complete Operational Demonstration of Rockeye download | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>F24 / *Conventional Munitions Demil* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| equipment. Complete testing on ARMD Multi Motor and Build fixturing to install at ARMD. Conduct safety and assessment effort on the obsolete Talos Missile. Conduct Analysis of Alternatives and Talos Demil process.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Completed final transition of ARMD to LEMC. | | | |
| ***Title:*** Resource Recovery and Recycling (R3)<br>***Description:*** This effort focuses on enhancing existing methods of munitions R3.<br>***FY 2018 Plans:***<br>Conduct the factory acceptance testing for washout equipment for 16-inch Navy Gun projectiles.<br>***FY 2019 Plans:***<br>Will conduct testing to determine cleanliness of ammunition scrap on the Automated Scrap Inspection System at an organic depot location.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Economic assumptions revised. | 0.940 | 1.620 | 1.800 |
| ***Title:*** Advanced Removal<br>***Description:*** This effort develops technology to remove propellant and energetics from munitions.<br>***FY 2018 Plans:***<br>Initiate design modifications and build fixturing for the RP Demil line at CAAA. Develop a Design for a capability to demil infrared (IR) munitions at CAAA. Transition the Copperhead Munitions Closed Disposal process at MCAAP.<br>***FY 2019 Plans:***<br>Will conduct operational testing on IR Munitions Demil line at CAAA. Conduct Operational Testing of the 2.75-inch Rocket Demil Line at CAAA. Will initiate design modifications and build fixturing to the red phosphorus (RP) demil line at CAAA to add RP Mortar Demil capability.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Initiating design modifications. | 1.875 | 2.175 | 3.005 |
| ***Title:*** Advanced Waste Stream Treatment<br>***Description:*** This effort focuses on handling waste streams from munitions items.<br>***FY 2018 Plans:*** | 2.850 | 3.976 | 2.500 |

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>F24 / *Conventional Munitions Demil* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2017 | FY 2018 | FY 2019 |
|---|---|---|---|
| Assemble major components and conduct operational demonstration of the upgraded feed system on a rotary kiln incinerator at an organic location. Conduct testing on CS Gas munitions to verify analytical estimates to thermally treat CS gas and provide a final report.<br>***FY 2019 Plans:***<br>Will initiate the building of the upgraded feed system on a rotary kiln incinerator at an organic location. Will conduct an Analysis of Alternatives for a Bulk Energetics Confined Burn Capability located at Hawthorne Army Depot (HWAD).<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Slightly reduced cost of fulfilling requirement for Fiscal Year 2019. | | | |
| ***Title:*** Advanced Munitions Disassembly<br>***Description:*** This effort focuses on developing innovative and efficient processes to disassemble munitions.<br>***FY 2018 Plans:***<br>Complete the Design for a capability to Cryofracture Rockeye Munitions with thermal processing in the rotary kiln at CAAA. Initiate equipment installation for a Rockeye Demil Capability at CAAA. Planned transition of production demil process for Liquid Rocket-62 (LR-62) Bullpup motors at ANMC. Install equipment to conduct Reactive Armor Tile Thermal Treatment and disposal. Conduct an Operational Demonstration of size reduction of reactive armor tiles to facilitate thermal treatment/disposal. Transition an Initial Capability for Size Reduction of Reactive Armor Tiles. Develop a Design for D561/D562 155mm ICM Project Demil. Fabricate and Install equipment for D561/D562 ICM Demil at a Depot location. Develop a design for disassembly of MK46 Torpedoes at HWAD.<br>***FY 2019 Plans:***<br>Will initiate systemization of Family of Scatterable Mines (FASCAM) demil project to integrate the preprocessing Cryofracture capability of FASCAM mines with thermal processing in the rotary kiln at Crane Army Ammunition Activity (CAAA). Conduct operational demonstration of MK46 Torpedo Warhead segmenting capability at HWAD. Complete testing of capability developed to size reduce Reactive Armor Tiles. Complete testing on Thermal Treatment of Reactive Armor Tiles.<br>***FY 2018 to FY 2019 Increase/Decrease Statement:***<br>Initiating Family of Scattered Mines demilitarization project. | 4.011 | 2.604 | 4.951 |
| **Accomplishments/Planned Programs Subtotals** | 16.963 | 17.584 | 16.657 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2019 Army | | Date: February 2018 |
|---|---|---|
| **Appropriation/Budget Activity**<br>2040 / 6 | **R-1 Program Element (Number/Name)**<br>PE 0605805A / *Munitions Standardization, Effectiveness and Safety* | **Project (Number/Name)**<br>F24 / *Conventional Munitions Demil* |

**C. Other Program Funding Summary ($ in Millions)**

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A