Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	32.843	19.709	26.650	25.915	-	25.915	25.941	26.001	26.197	26.551	Continuing	Continuing
P002: *Insensitive Munitions Advanced Technology*	29.129	16.312	19.788	19.229	-	19.229	19.248	19.293	19.446	19.701	Continuing	Continuing
P301: *Enabling Fuze Advanced Technology*	3.714	3.397	6.862	6.686	-	6.686	6.693	6.708	6.751	6.850	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program addresses advanced technology development associated with improving the lethality, reliability, safety, and survivability of munitions and weapon systems. The goal is to develop and demonstrate joint enabling technologies that can be used by the Program Executive Offices (PEO) as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus maximizing efficiencies, ensuring the development of technology with the broadest applicability while avoiding duplication of efforts.

Munition Area Technology Groups (MATGs) and Fuze Area Technology Groups (FATGs) have been established for each munition and capability area and are tasked with: 1) coordinating, establishing, and maintaining 2018 and 2023 year technology development plans and roadmaps, 2) coordinating biannual meetings to review technical and programmatic details of each funded and proposed effort, 3) developing and submitting Technology Transition Agreements in coordination with appropriate PEO for insertion in their Insensitive Munition (IM) Strategic Plans / Fuze Technology Development Plan, and 4) interfacing with other MATGs / FATGs and IM / fuze science and technology projects as appropriate. The Joint Insensitive Munitions Technical Program (JIMTP) and Joint Fuze Technical Program (JFTP) will utilize a Technical Advisory Committee (TAC) (consisting of senior Department of Defense (DoD) and Department of Energy (DOE) laboratory representatives and senior Munitions PEO representatives) to provide program oversight, policy, direction, and priorities during its annual meeting.

The IM effort will demonstrate enabling technologies needed to develop weapons in compliance with IM requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoD Instruction 5000.1. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority munitions identified in the PEO IM Strategic Plans. Mature and demonstrated IM technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other non-compliant munitions within their portfolios.

The JIMTP investments focus on five Munition Areas: 1) High Performance Rocket Propulsion, 2) Minimum Signature Rocket Propulsion, 3) Blast and Fragmentation Warheads, 4) Anti-Armor Warheads, and 5) Gun Propulsion. MATGs, under tri-service leadership, have developed technology roadmaps for each Munition Area which are used to guide investments based on goals consistent with the PEO IM Strategic Plans. These IM technologies, alone or in combination, will be incorporated in hardware, simulating real-world munitions, to demonstrate their utility and feasibility as part of Technology Transition Agreements with PEOs.

The Enabling Fuze Advanced Technology effort will also demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development (GDF) of the Force, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm

to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration weapons and programs based on priority capabilities and technology needs identified and validated by the PEOs and the Heads of the Service Science and Technology (S&T) communities. In this way, promising multi-point initiation architectures, high reliability fuze architectures, survivable components, modular fuze packaging, and components produced based on ease of manufacturing can be integrated into munitions applications and its ability to address required capability needs will be validated. Mature fuze technologies will be transitioned to Weapon PEO's and/or Industry, thereby decreasing program costs and schedule risk while facilitating technology into potentially broader range of munitions applications.

The JFTP investments focus on four specific capability areas that have been identified by the Department strategic guidance and current shortfalls in weapon systems and as validated by the PEOs and the Service S&T communities. These capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects Weapon Fuzing, 3) High Reliability Fuzing, and 4) Enabling Fuze Technologies and Common Architecture. These Fuzing technologies will be incorporated in weapon applications to demonstrate their maturity and utility as part of Technology Transition Agreements with PEOs.

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	20.012	26.688	26.897	-	26.897
Current President's Budget	19.709	26.650	25.915	-	25.915
Total Adjustments	-0.303	-0.038	-0.982	-	-0.982
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.010	-			
• SBIR/STTR Transfer	-0.293	-			
• Realignment for Higher Priority Programs	-	-	-0.908	-	-0.908
• FFRDC SEC 8104	-	-0.038	-	-	-
• Economic Assumptions	-	-	-0.074	-	-0.074

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense			Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / *Joint Munitions Advanced Technology*	Project (Number/Name) P002 / *Insensitive Munitions Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P002: *Insensitive Munitions Advanced Technology*	29.129	16.312	19.788	19.229	-	19.229	19.248	19.293	19.446	19.701	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Insensitive Munitions (IM) effort addresses advanced technology development associated with improving the lethality, reliability, safety, and survivability of munitions and weapon systems. The goal is to develop and demonstrate joint enabling technologies that can be used by program managers as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus ensuring the development of technology with the broadest applicability while avoiding duplication of efforts – providing efficiencies and cost savings for the Department.

This effort will demonstrate enabling technologies needed to develop weapons in compliance with IM requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoD Instruction 5000.1 and 5000.02. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority munitions identified in the Program Executive Office (PEO) IM Strategic Plans. Mature demonstrated IM technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other non-compliant munitions within their portfolios.

The Joint Insensitive Munitions Technology Program (JIMTP) investments focus on five Munition Areas: 1) High Performance Rocket Propulsion, 2) Minimum Signature Rocket Propulsion, 3) Blast and Fragmentation Warheads, 4) Anti-Armor Warheads, and 5) Gun Propulsion. Munition Area Technology Groups (MATG), under tri-service leadership, have developed technology roadmaps for each Munition Area which is used to guide investments based on goals consistent with the DoD IM Strategic Plan. These IM technologies, alone or in combination, will be incorporated in hardware, simulating real-world munitions, to demonstrate their utility and feasibility as part of Technology Transition Agreements with PEOs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
Title: High Performance Rocket Propulsion (HPP)	3.311	4.086	3.967
Description: HPP focus on the development and demonstration of technologies to improve the IM response of HPP systems, rocket motors with Ammonium Perchlorate and with or without a metal fuel, for rockets and missiles launched from air, ground, and sea platforms. These technologies, when applied to rocket motors, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, rocket propellant ingredients, including synthesis, characterization and scale-up; reduced smoke or smoky propellants, including formulation, characterization and scale-up; rocket motor case design; materials for active and passive thermal mitigation; shock mitigation materials and techniques; passive and active coatings; active and passive venting techniques for motor cases or containers; ignition systems; sensors; and thrust mitigation techniques. Operating conditions may be controlled or widely varying in both temperature and vibration. The 2018 and 2023 year goals of the HPP MATG are concentrated on			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
solving the IM response of missile propulsions systems due to Fragment Impacts and Slow Cook Off for the majority of High Performance Propulsion rocket motors, and solving the Fast Cook Off response of very large High Performance Propulsion motors. ***FY 2014 Accomplishments:*** - Loaded seven-inch diameter rocket motor cases with propellant to support baseline IM testing. Integrated components of delivered assets and finalized motor fabrication for testing. Conducted baseline slow cook off and fragment impact IM testing. Received additional rocket motors, prepared and conducted baseline fast cook off and bullet impact IM tests. Integrated IM mitigation technologies and performed final IM testing. - Completed bond line evaluation and demonstrated 30 gallon mix process for a less-reactive high performance propellant. Performed testing of 30 gallon mix properties. Procured rocket motor materials, cast motors, and conducted component testing to validate proof of concept. - Conducted individual IM component testing, integrated into rocket motor case, cast rocket motors for IM testing, and conducted full suite of IM tests with baseline and less reactive propellants. - Prepared, loaded, and conducted IM testing on novel small diameter missile propellant formulation in manufactured motor cases. ***FY 2015 Plans:*** - Conduct sub-scale bullet and fragment impact demonstration tests and performance evaluation of 50 to 70 pound motors containing an extinguishable rocket propellant. - Complete design and component testing of slow cook-off mitigation device components for HPP rocket motor. - Perform component-level testing to validate component designs for sensor for surface and air-launched systems. - Demonstrate slow cook-off mitigation sensor performance and validate design for surface launched missile applications. ***FY 2016 Plans:*** - Conduct slow and fast cook-off demonstration tests of 50 to 70 pound motors containing an extinguishable rocket propellant. - Demonstrate fast cook-off sensor mitigation performance and transition to programs of record. - Conduct tests of slow cook-off mitigation device components for HPP rocket motor.			
Title: Minimum Signature Rocket Propulsion (MSP) ***Description:*** MSP focuses on the development and demonstration of technologies to improve the IM response of MSP systems. The development and demonstration of minimum signature (MS) rocket technologies, when applied to munition systems, will improve munition IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, MS rocket propellant formulations; ingredients for MS propellant formulations, including synthesis, characterization and scale-up; case and packaging design; active and passive	1.846	2.420	2.342

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
venting techniques; rocket motor case design; ignition systems; and thrust mitigation techniques. Of particular interest are technologies toward higher burning rate MS propellants with state-of-the-art energy and reduced shock sensitivity. The 2018 and 2023 year goals of the MSP MATG are concentrated on solving the IM response of missile propulsion systems due to Fragment Impact, Slow Cook Off, and Shaped Charge Jet (SCJ) threats. ***FY 2014 Accomplishments:*** - Conducted IM, structural, and ballistic testing on full-scale demonstrator motor to validate that design meets defined requirements. - Demonstrated reduced sensitivity minimum signature propellant ballistic and IM properties in full-scale test for transition to budget activity (BA) 6.4 Insensitive Munitions Technology Transition Program and insertion into weapon systems. - Designed and integrated mitigation technologies to reduce response to cook-off, bullet, and fragment impact. Conducted propellant characterization and sub-scale IM tests. ***FY 2015 Plans:*** - Produce 660 kilograms of innovative explosive fill for general purpose bombs to complete full-scale sympathetic reaction testing and lethality testing to validate performance. - Model and design feasible detonation train, scale up novel bomb formulation to 30 gallon mix quantity, partial fill full-scale assets for testing to validate performance. - Conduct bullet impact, fragment impact, and slow cook-off testing with production representative grenade assembly using novel explosive material. - Scale up and conduct small scale tests on novel bomb fill to optimize formulation and select final formulation. Conduct performance testing of fill and initiation study. - Scale up to produce 100 pounds of unique munition fill material to conduct performance and sensitivity testing in generic warhead assemblies. Prepare for full scale IM testing. - Produce 800 pounds of main fill replacement explosive formulation and prepare hardware for loading and testing. ***FY 2016 Plans:*** - Manufacture motor cases and complete propellant formulation down-select. Conduct case characterization testing, load motors and conduct static firing of motors. - Conduct static motor tests, and fragment impact and slow cook-off tests on representative composite motor cases.			
Title: Blast and Fragmentation Warheads (BFW)	6.705	7.584	7.397
Description: BFW focus on the development and demonstration of technologies to improve the IM response of BFW munitions. The development and demonstration of explosive ingredients, explosives, and warhead and fuze technologies, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum,			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
maintaining munition performance. Technologies include, but are not limited to, new ingredient synthesis and characterization, initial formulation development, scale-up, warhead/charge configuration, venting techniques for both munitions and their containers, protection / packaging materials and systems, shock mitigation liners, initiation devices, techniques, and technologies. Applications vary but include high performance warhead fills, booster explosives, bulk demolition charges, and bulk fills for blast and/or fragmentation charges. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, and reliability may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the BFW MATG are concentrated on solving the IM response of blast fragment warheads to the Sympathetic Detonation, Fast Cook Off, and Shaped Charge Jet (SCJ) threats. ***FY 2014 Accomplishments:*** - Demonstrated fault tolerant redundant initiation system capable of passing shaped charge jet testing and capable of reliably initiating unique explosive formulation at hot and cold temperatures. - Conducted formulation characterization and initial performance and sensitivity testing using novel explosive for grenade assembly. - Conducted modeling and simulation effort on novel bomb fill to optimize formulation, scaled up best candidates, and filled representative articles for initiation testing and design detonation train for insensitive fill. - Developed computational analysis to apply as a design tool to substantiate the feasibility of meeting IM and performance requirements with less sensitive explosives and other mechanical IM design features in unique warheads. Hardware was fabricated for testing and IM mitigation designs were tested against slow and fast cook-off, fragment impact, sympathetic reaction, and shaped charge jet threats. - Synthesized adequate quantities of a unique munition fill material to conduct small scale mixes for scale-up, detonation velocity, and critical diameter tests. - Demonstrated new form of matter and efficient method of producing new form of energetic crystal with modified properties. ***FY 2015 Plans:*** - Produce 660 kilogram of innovative explosive fill for general purpose bombs to complete full-scale sympathetic reaction testing to validate performance. - Model and design feasible detonation train, scale up novel bomb formulation to 150 gallon mix quantity, fill full-scale assets for sympathetic reaction testing to validate performance. - Conduct bullet impact, fragment impact, and slow cook-off testing with production representative grenade assembly using novel explosive material. - Scale up and conduct small scale tests on novel bomb fill to optimize formulation and select final formulation. Conduct performance testing of fill and initiation study.			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
- Scale up to produce 1000 pounds of unique munition fill material to conduct performance and sensitivity testing in generic warhead assemblies. Prepare for full scale IM testing. ***FY 2016 Plans:*** - Scale up novel bomb formulation to 150 gallon mix quantity, and fill full-scale assets for sympathetic reaction testing to validate performance. - Conduct SCJ and fragment impact testing on unique munition fill material in representative hardware. - Conduct pressing evaluation study, load, and begin IM testing of main fill replacement explosive formulation.			
Title: Anti-Armor Warheads (AAW) ***Description:*** AAW focuses on the development and demonstration of explosive ingredients, explosives, and warhead and fuze technologies for improving Insensitive Munitions (IM) of AAW munitions. The development of explosive ingredients, explosives, and warhead and fuze technologies, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, new ingredient synthesis and characterization, initial formulation development, scale-up, warhead/charge configuration, venting techniques for both munitions and their containers, protection/packaging materials and systems, shock mitigation liners, and initiation devices, techniques, and technologies. Applications vary, but include high performance warhead fills, booster explosives, and all other technology to mitigate the violent response of AAW munitions to IM threats. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, and reliability may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the AAW MATG are concentrated on solving the IM response of anti-armor warheads to the Fragment Impact, Sympathetic Reaction, and Shaped Charge Jet threats for larger munitions and the Fragment Impact, Slow Cookoff, and Sympathetic Reaction / Shaped Charge Jet threats for Medium Caliber Munitions. ***FY 2014 Accomplishments:*** - Finalized higher velocity munition IM design. Fabricated, loaded, and conducted shock and thermal assessments. - Completed performance validation studies and initial IM testing for two unique energetic materials as a replacement munition booster. ***FY 2015 Plans:*** - Conduct performance and IM testing on higher velocity munition ID design. - Conduct ballistic assessment and IM testing for two unique energetic materials as a replacement munition booster. - Conduct integration and design efforts with prototype AAW technologies to demonstrate successful IM technologies to mitigate fragment impact responses.	3.031	3.705	3.596

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
- Conduct baseline assessment of unique munition system. ***FY 2016 Plans:*** - Perform modeling and simulation of venting and other mitigation technologies for unique munition system. Conduct propellant formulation, development, and down-select, and begin IM testing.			
Title: Gun Propulsion (GP)	1.419	1.993	1.927
Description: GP focuses on the development and demonstration of technologies in the area of GP systems. The development and demonstration of gun propulsion technologies, when applied to munition systems, will improve munition Insensitive Munitions (IM) response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, gun propellant formulations, ingredients for gun propellant formulations (including synthesis, characterization and scale-up), cartridge case and packaging design, active and passive venting techniques, reduced sensitivity primer propellant and primer systems, and robust primers for insensitive propellants. Applications vary, but include both large and medium caliber munitions, as well as propelling charges for mortars and shoulder launched munitions. Operating requirements vary, and other factors such as barrel life and operation over varying environmental conditions may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the GP MATG are concentrated on solving the IM response of gun propulsion munitions to Fragment Impact and Slow Cook Off threats. ***FY 2014 Accomplishments:*** - Optimized the propellant formulations, conducted characterization and performance tests on formulations, and conducted small scale engineering ballistic tests on components for use in shoulder fired weapon system. - Conducted baseline cook-off testing of large caliber ammunition item and conducted modeling and simulation to assist in venting design selection and survivability assessment. - Conducted propellant formulation, characterization tests, and small scale bullet and fragment impact testing of large caliber munition item. ***FY 2015 Plans:*** - Conduct thermal and venting analysis, full-scale fast and slow cook-off, and fragment impact testing of two propellant formulations for use in shoulder fired weapon systems. - Produce prototype of large caliber ammunition item with venting and prepare for full scale IM testing. - Conduct component design and manufacturing of large caliber munition item, and conduct performance testing. Integrate propellant formulation and component design to conduct small scale fragment impact testing and slow cookoff test. ***FY 2016 Plans:*** - Conduct performance and environmental testing on propulsion and warhead for use in shoulder fired weapon systems. - Conduct full scale IM and performance testing of prototype of large caliber ammunition item.			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
- Conduct integrated technology testing of large caliber munition item to ready for transition to program of record.			
Accomplishments/Planned Programs Subtotals	16.312	19.788	19.229

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0602000D8Z P000: *BA2 Insensitive Munitions*	12.288	13.545	13.082	-	13.082	13.106	13.108	13.262	13.442	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transitions of technologies developed by the program are tracked and documented by technology maturity.
2) MATG Technology Roadmaps are prepared, evaluated, and analyzed by JIMTP management and technical staff.
3) Chairman's Annual Assessments for each MATG are critically reviewed by the TAC to determine progress, transition plans, and relevance of each project.
4) Projects progress toward goals and milestones is assessed at each MATG meeting.
5) Annual technical reports and papers are tracked and documented for the Program.
6) External Peer Reviews of Projects are conducted as part of Joint Army/Navy/NASA/Air Force meetings.
7) Technology Transition Agreements are in place with Munition programs.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense			Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / *Joint Munitions Advanced Technology*	Project (Number/Name) P301 / *Enabling Fuze Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P301: *Enabling Fuze Advanced Technology*	3.714	3.397	6.862	6.686	-	6.686	6.693	6.708	6.751	6.850	Continuing	Continuing

A. Mission Description and Budget Item Justification

This effort will demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development of the Force, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies integrated and tested to technology maturity and demonstrate the technologies to technological maturity utilizing weapon hardware based on priority capabilities and technology needs identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service Science and Technology (S&T) communities. Mature demonstrated fuze technology will be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other munitions within their portfolios. Under the Joint Fuze Technology Program (JFTP), investments are focused on specific capability areas that have been identified by Department strategic guidance and current shortfalls in weapon systems and validated by the PEOs and Heads of the Service S&T communities. These four capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects (TE) Weapon Fuzing, 3) High Reliability Fuzing, and 4) Enabling Fuze Technologies and Common Architecture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
Title: Hard Target Fuzing	0.960	1.841	1.561
Description: The Hard Target Fuzing challenges are grouped into three Technology Areas. First, improved modeling and simulation capabilities provide the validated computational tools necessary for hard target applications. Second, basic phenomenology & understanding of the Fuze Environment is the science-based endeavor of providing the test equipment, instrumentation, and analysis techniques for experimentation and data gathering necessary for next generation fuzing. Third, hard target survivable fuze components are developed to increase the effectiveness of facility denial munitions by improving the prediction tools and testing methodologies to evaluate the survivability and functionality of legacy and future fuzes. Development of these technologies will enable next generation boosted and hypersonic penetrators to execute missions against hardened and deeply buried targets.			
FY 2014 Accomplishments: - Conducted validation experiments on advanced fuze High-G modeling and simulation tools. - Continued to develop survivable modular fuze technology for application into multi-role common miniature munitions with distributed/embedded fuzes. - Used high fidelity modeling and simulation code and test methods for Air Force Quick Reaction Capability (QRC) Penetrator Program.			
FY 2015 Plans:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
- Conduct high speed weapon hard target tests, to include high shock data recorders, to validate High-G fuze models. - Transition survivable modular fuze technology for application into multi-role common miniature munitions with distributed/ embedded fuzes. ***FY 2016 Plans:*** Start development of advanced fuze packaging and alternate low-cost media detection sensor for to measure post impact weapon environments.			
Title: Tailorable Effects Fuzing ***Description:*** Develop fuzing for tailorable effects weapons that encompasses the ability to selectively vary the output of the weapon (Dial-a-Yield) and/or the ability to generate selectable effects (directed blast, fragmentation). Develop initiation and multi-point technologies; electronic safe and arm based multi-point initiators for tunable output – scalable yield warheads; MicroElectro-Mechanical Systems (MEMS) based multi-point initiators for tunable output/scalable yield warheads; and smart fuzing for tailorable effects weapons. These technologies will enable weapons that can effectively defeat a variety of targets while minimizing unintentional collateral effects. ***FY 2014 Accomplishments:*** - Conducted tests of warhead initiation architecture and control technologies into warheads. Specifically, weapons capable of reducing collateral damage will benefit using tailorable effects technologies. ***FY 2015 Plans:*** - Conduct demonstration tests of warhead initiation and selectable architecture and control technologies in live explosive tests. - Continue to develop component technologies for multi-mode, multipoint sequential timing fuze designs that will improve void counting algorithms and optimize detonation timing. ***FY 2016 Plans:*** Conduct weapon demonstration testing of multi-mode, multipoint sequential timing fuze designs against representative target sets.	0.741	1.591	1.644
Title: High Reliability Fuzing ***Description:*** Develop high reliability fuzing architectures, fuzing components, and unexploded ordnance (UXO) reduction features. This program's fuzing technologies are critical to enable the next generation of cluster munitions to achieve the required greater than 99 percent reliability. Evolving DoD emphasis on increased weapon system reliability is driving the need to consider new and novel approaches for achieving increased fuze reliability while maintaining or enhancing fuze design safety. DoD policy, higher weapon reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies.	0.993	1.860	1.820

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Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P301 / *Enabling Fuze Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
FY 2014 Accomplishments: - Refined the design, along with increasing level of integration, and test high reliability fuze prototypes that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures. - Demonstrated high reliability miniature fuzes in air-gun testing, that simulate cluster munitions environments, to achieve technology maturity. ***FY 2015 Plans:*** - Develop and demonstrate phase two high reliability MEMS fuze technology prototypes: wafer level packaging MEMS safety and arming (S&A) in Guided Mortar round and bomb fuze bellows motors. - Begin to develop fuze system communication and interface technologies for Dual-Purpose Improved Conventional Munitions (DPICM) to increase reliability with minimal disruption to the dispense event. ***FY 2016 Plans:*** Conduct laboratory and projectile dispense testing of fuze communication and interface technologies for DPICM to increase reliability with minimal disruption to the dispense event.			
Title: Enabling Fuze Technologies ***Description:*** Develop common / modular fuze architectures; innovative fuze component technologies; sensors; next generation fuze setting capability, tools, and modeling; and fuzing power sources. These fuzing technologies will provide smaller, more cost effective solutions while meeting or exceeding the performance of existing technologies. Development of these technologies will enable future weapon applications to be more mission adaptive and smaller along with improve target detection capabilities. ***FY 2014 Accomplishments:*** - Conducted joint program with Industry to develop sensor technology into bomb fuzing applications. - Began transition from budget activity (BA) 6.2 efforts of advanced, exploitation resistant proximity sensor advanced technology development. ***FY 2015 Plans:*** - Conduct air-drop demonstration testing miniature retard and impact sensors. Partner with Industry to transition sensor technology into bomb fuzing applications. - Conduct testing of advanced, exploitation resistant proximity sensor advanced technology development. ***FY 2016 Plans:*** Complete projectile firing testing of advanced, exploitation resistant proximity sensors against representative target sets.	0.703	1.570	1.661
Accomplishments/Planned Programs Subtotals	3.397	6.862	6.686

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P301 / *Enabling Fuze Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0602000D8Z P204: *BA2 Enabling Fuze Technology*	5.405	6.492	6.270	-	6.270	6.282	6.282	6.357	6.442	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transitions of technologies developed by the Program are tracked and documented by technology maturity.
2) Fuze Area Technology Groups (FATG) Technology Roadmaps are prepared, evaluated, and analyzed by Joint Fuze Technology Program (JFTP) management and technical staff.
3) Chairman's Annual Assessments for each FATG are critically reviewed by the Technical Advisory Committee (TAC) to determine progress, transition plans, and relevance of each project.
4) Project progress toward goals and milestones is assessed at each FATG meeting.
5) Annual technical reports and papers are tracked and documented for the Program.
6) Technology Transition Agreements are in place with Munition programs.