Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Office of Secretary Of Defense											DATE: April 2013	
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*					R-1 ITEM NOMENCLATURE PE 0603000D8Z: *Joint Munitions Advanced Technology*							
COST ($ in Millions)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	-	14.590	25.612	26.646	-	26.646	30.040	30.924	31.428	32.039	Continuing	Continuing
P002: *Insensitive Munitions Advanced Technology*	-	13.515	20.819	20.224	-	20.224	22.153	22.812	23.055	23.503	Continuing	Continuing
P301: *Enabling Fuze Advanced Technology*	-	1.075	4.793	6.422	-	6.422	7.887	8.112	8.373	8.536	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 Officers 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.

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 five, ten, and fifteen 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 Program Executive Offices (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 DoD and DOE laboratory representatives and senior Munitions PEO representatives) to provide program oversight, policy, direction, and priorities during its annual meeting.

The Insensitive Munitions effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoDI 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. Munition Area Technology Groups (MATG), 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 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	15.606	25.612	27.326	-	27.326
Current President's Budget	14.590	25.612	26.646	-	26.646
Total Adjustments	-1.016	0.000	-0.680	-	-0.680
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.011	-			
• SBIR/STTR Transfer	-	-			
• Baseline Adjustments	-	-	-0.680	-	-0.680
• Other Adjustments	-0.005	-	-	-	-

Change Summary Explanation

FY 2014 baseline adjustments are reflective of DoD S&T priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Office of Secretary Of Defense			DATE: April 2013
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COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
P002: *Insensitive Munitions Advanced Technology*	-	13.515	20.819	20.224	-	20.224	22.153	22.812	23.055	23.503	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

The Insensitive Munitions 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.

This effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoDI 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 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 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 2012	FY 2013	FY 2014
Title: High Performance Rocket Propulsion (HPP)	2.858	4.232	4.169
Description: High Performance Rocket Propulsion (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 least maintaining munition performance. Technologies include, but are not limited to, rocket propellant ingredients (including synthesis, characterization and scale-up), reduced smoke or smokey 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Operating conditions may be controlled or widely varying in both temperature and vibration. The five, ten, and fifteen year goals of the HPP MATG are concentrated on 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 2012 Accomplishments:*** • Conducted aging study and full scale Insensitive Munition (IM) demonstration tests on new propellant filled rocket cases. Conducted 70 pound BATES motor static test firing to demonstrate propellant performance. • Fabricated five-inch rocket motors using novel rocket motor design, and conducted IM testing to include bullet and fragment impact, and fast and slow cook off. ***FY 2013 Plans:*** • Contract award to manufacture seven inch diameter rocket motor cases using novel technique and load with propellant to support baseline IM testing. Integrate components of delivered assets and finalize motor fabrication for testing. Conduct IM testing. • Manufacture motor cases, demonstrate five-gallon mix process, and perform initial aging and thermal/mechanical studies on an extinguishable rocket propellant. • Scale up to 50 gallon mix a high energy propellant, fill three uniquely manufactured cases and conduct IM testing. • Conduct IM testing on rocket motor equipped with unique safety device. Finalize rocket motor design for high performance solid propellant. ***FY 2014 Plans:*** • Conduct baseline slow cook off and fragment impact IM testing in seven inch diameter rocket motors. Receive additional rocket motors, prepare and conduct baseline fast cook off and bullet impact IM tests. Integrate IM mitigation technologies and perform final IM testing. • Complete bondline evaluation and demonstrate 30 gallon mix process. Perform testing of 30 gallon mix properties. • Prepare, load, and conduct IM testing om novel small diameter missile propellant formulation in manufactured motor cases. • Procure rocket motor materials, cast motors, and conduct component testing to validate proof of concept.			
Title: Minimum Signature Rocket Propulsion (MSP) ***Description:*** Minimum Signature Rocket Propulsion (MSP) focus 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 least 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	3.171	4.629	2.504

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
design, active and passive 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 five, ten, and fifteen 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 2012 Accomplishments:*** • Conducted slow cook off and fragment impact reliability testing of motor designs. Manufactured test motor hardware and conducted propellant down-select testing. Prepared, loaded, and conducted IM tests on propellant candidates in metal and composite cases, for direct comparison with baseline propellants. Scaled-up additional novel propellant formulation to five gallon scale and conducted physical property tests and prepared samples for seven-inch rocket motor testing. • Refined vent mechanism design, manufactured and tested components to validate precision and accuracy. Conducted slow cook off testing on large scale motor. • Conducted aging and environmental tests of rocket motor thermal ring venting mechanism. Modified containers with venting system and conducted fast and slow cookoff tests using inert as well as live rocket motors modified with the case venting mechanism to determine benefits of both systems. • Manufactured and conducted characterization testing of unique propellant for man-portable weapons with minimum signature and operator-friendly properties. ***FY 2013 Plans:*** • Load demonstrator motor with down-selected propellant formulation, incorporate case enhancements, and prepare to conduct IM tests. • Conduct full-scale motor static tests of IM propellants. • Prepare to demonstrate reduced sensitivity minimum signature propellant IM and ballistic properties in full-scale test. • Complete initial motor designs and hardware production in order to conduct IM evaluations for fielded munition designs. • Demonstrate enhanced insensitive propellant readiness for motor design. • Complete venting design to include propellant fabrication, acquisition of hardware, assembled and tested for man-portable weapon, and subsequent munition scale slow cook off and bullet impact testing, demonstrating improved IM response with minimum signature and operator-friendly properties. ***FY 2014 Plans:*** • Demonstrate reduced sensitivity minimum signature propellant ballistic and IM properties in full-scale test and transition to 6.4 Insensitive Munition Technology Transition Program and insertions into weapon systems. • Conduct IM, structural, and ballistic testing on full-scale demonstrator motor to validate that design meets defined requirements.			
Title: Blast and Fragmentation Warheads (BFW)	2.942	7.203	7.686

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014

Description: Blast and Fragmentation Warheads (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 that, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and at least maintaining munition performance are of particular interest. 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 five, ten, or fifteen 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 SCJ threats.

FY 2012 Accomplishments:

- Conducted full scale IM and performance tests on unique 500 pound bombs and completed manufacturing study to prepare for selection of final candidate for transition to responsible program manager.
- Completed validation testing using unique explosives to ensure functionality of initiator.
- Completed initiation system environmental survivability testing and prepared for IM tests using system level hardware.
- Conducted characterization tests to ensure purity and particle size of materials. Conducted environmental and IM tests to include full scale slow cook off test in various warhead sizes.
- Performed high explosive testing to compare subject materials against baseline bomb fill materials. Used sympathetic reaction models to assess new Insensitive High Explosive (IHE) fills and selected appropriate formulation for refinement.
- Prepared and conducted sub-scale performance testing using candidate formulations to compare to baseline fills.

FY 2013 Plans:

- Complete large scale testing of initiator using novel explosive. Fabricate initiation systems and conduct IM tests using system level hardware to transition to IM technology transition program.
- Conduct formulation refinements and subscale IM tests. Prepare assets for full-scale IM tests.
- Integrate initiation designs with explosive fill candidate and conduct small-scale tests as well as full Bucket Test series.
- Conduct testing to demonstrate that unique initiation system components can pass impact survivability requirements and sympathetic detonation testing.
- Manufacture novel bomb fill for initial characterization testing and loading to determine baseline formulation.
- Conduct "quick look" performance testing on prototype unique warheads to determine baseline performance and to ensure acceptable initiation and fragmentation performance has been obtained, prior to initiating design optimization efforts.

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
• Conduct full-scale 500 pound bomb demonstration lethality testing to include horizontal and vertical arena testing and subsequent analysis. ***FY 2014 Plans:*** • Demonstrate fault tolerant redundant initiation system capable of passing shaped charge jet testing and capable or reliably initiating unique explosive formulation at hot and cold temperatures. • Conduct bullet impact, fragment impact, and slow cook off testing with production representative grenade assembly using novel explosive. • Conduct modeling and simulation effort on novel bomb fill to optimize formulation, scale up best candidates, and fill representative articles for testing. • Conduct slow and fast cook off, plus bullet impact Insensitive Munition (IM) testing on 500 pound bomb unique fills in half-fill configuration with new booster initiation systems. • Computational analysis will be applied as a design tool to substantiate the feasability of meeting IM and performance requirements with less sensitive explosives and other mechanical IM design features in unique warheads. Hardware will be fabricated for testing and IM mitigation designs will be tested against slow and fast cook off, fragment impact, sympathetic reaction, and shaped charge jet threats.			
Title: Anti-Armor Warheads (AAW) ***Description:*** Anti-Armor Warheads (AAW) focus on the development and demonstration of explosive ingredients, explosives, warhead and fuze technologies for improving IM of AAW munitions. The development of explosive ingredients, explosives, and warhead and fuze technologies that, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and at least 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, and all other technology to mitigate the violent response of Anti-Armor Warhead 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 five, ten, and fifteen year goals of the AAW MATG are concentrated on solving the IM response of anti-armor warheads to the Fragment Impact and Slow Cook Off threats and a five year goal of solving Sympathetic Detonation threats, with a five to fifteen year goal of resolving the IM response to the Shaped Charge Jet threat. ***FY 2012 Accomplishments:*** • Loaded hardware and conducted IM and performance tests to validate performance and finalize recommended solutions for transition to a program of record.	2.322	2.457	3.789

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
• Optimized phase one designs based upon small and large warhead tests. Conducted modeling and simulation of phase two designs and optimized design for fast and slow cook off and bullet and fragment impact testing. ***FY 2013 Plans:*** • Conduct modeling and simulation down-selection of candidate technologies to determine fragment impact technologies suitable for higher velocity munition requirements. Fabricate, load, inspect, and conduct limited IM and performance testing on representative articles. • Conduct synthesis and production of two unique energetic materials and conduct initial performance validation studies for a medium caliber munition. • Conduct synthesis and production of two unique energetic materials and conduct initial performance validation studies for a replacement munition booster. ***FY 2014 Plans:*** • Finalize higher velocity munition IM design, fabricate, load, and conduct shock and thermal assessments. • Continue performance validation studies, and initial IM testing on two unique energetic materials for a medium caliber munition. • Continue performance validation studies, and initial IM testing on two unique energetic materials for a replacement munition booster.			
Title: Gun Propulsion (GP) ***Description:*** Gun Propulsion (GP) focuses on the development and demonstration of technologies in the area of Gun Propulsion systems. The development and demonstration of gun propulsion 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 least 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 five, ten, and fifteen 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 2012 Accomplishments:*** • Conducted primer testing and final IM testing of propellant and primer optimization formulations less sensitive to fragment impact, shaped charge jet impacts and slow and fast cook off. ***FY 2013 Plans:*** • Scale-up two propellant formulations for use in shoulder fired weapon system.	2.222	2.298	2.076

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
• Conduct engineering and sensitivity testing. ***FY 2014 Plans:*** • Conduct full-scale fast and slow cook off and fragment impact testing of two propellant formulations for use in shoulder fired weapon systems. • Conduct initial container venting design, manufacture, and tests.			
Accomplishments/Planned Programs Subtotals	13.515	20.819	20.224

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• 0602000D8Z P000: *BA2 Insensitive Munitions*	14.495	14.216	13.588		13.588	14.615	15.041	15.220	15.516	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transitions of technologies developed by the program are tracked and documented using DoD/NASA Technical Readiness Level (TRL) scale.
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.

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COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
P301: *Enabling Fuze Advanced Technology*	-	1.075	4.793	6.422	-	6.422	7.887	8.112	8.373	8.536	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 Technical Readiness Level (TRL) five and demonstrate the technologies to a TRL-six 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 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 2012	FY 2013	FY 2014
Title: Hard Target Fuzing	0.326	1.123	1.726
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 2012 Accomplishments: - Built Hardened Miniature Fuze Technology (HMFT) hardware for survivability and functionality evaluation in sled testing against complex penetration targets.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Developed and applied advanced fuze modeling and simulation tools for Service applications including Air Force High Velocity Penetrating Weapon. ***FY 2013 Plans:*** - Conduct validation experiments on advanced fuze High-G modeling and simulation tools. - Continue to develop survivable modular fuze technology for application into multi-role common miniature munitions with distributed/embedded fuzes. ***FY 2014 Plans:*** - 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.			
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 2012 Accomplishments:*** - Developed variable yield warhead initiation architecture and control technologies. Conducted tri-Service evaluation of designed for warhead applications. - Completed advanced micro-transformer tests to enable Industry transition and production of transformer into Service miniature high voltage firing systems. ***FY 2013 Plans:*** - Conduct tests of warhead initiation architecture and control technologies into warheads. Specifically, weapons capable of reducing collateral damage will benefit using tailorable effects technologies. ***FY 2014 Plans:*** - Conduct demonstration tests of warhead initiation and selectable architecture and control technologies in live explosive tests.	0.430	1.220	1.494
Title: High Reliability Fuzing ***Description:*** Develop high reliability fuzing architectures, fuzing components, and unexploded ordnance (UXO) reduction features. These technologies will enable the next generation of cluster munitions to achieve the required greater than 99%	0.119	1.310	1.746

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APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603000D8Z: *Joint Munitions Advanced Technology*	PROJECT P301: *Enabling Fuze Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
reliability goal. 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. ***FY 2012 Accomplishments:*** - Built and tested high reliability fuze architecture technology initial prototypes that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures. - Integrated phase one MEMS fuze device components and fabrication processes for high reliability fuze applications. ***FY 2013 Plans:*** - Refine 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. - Demonstrate high reliability miniature fuzes in air-gun testing, that simulate cluster munitions environments, to achieve Technical Readiness Level (TRL) five. ***FY 2014 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.			
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 2012 Accomplishments:*** - Built and tested second phase miniature retard and impact sensors for bomb and air dropped munitions. Testing will be in relevant environments simulating bomb deployment. - Conducted functional and safety assessment and testing of common fuze architecture technologies: safety components, modular electronics, sensors, interfaces, and packaging. ***FY 2013 Plans:*** - Begin joint program with Industry to develop sensor technology into bomb fuzing applications.	0.200	1.140	1.456

Exhibit R-2A, RDT&E Project Justification: PB 2014 Office of Secretary Of Defense		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603000D8Z: *Joint Munitions Advanced Technology*	PROJECT P301: *Enabling Fuze Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Begin (transition from 6.2 efforts) of advanced, exploitation resistant proximity sensor advanced technology development. ***FY 2014 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.			
Accomplishments/Planned Programs Subtotals	1.075	4.793	6.422

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• 0602000D8Z P204: *BA2 Enabling Fuze Technology*	5.833	6.399	5.977		5.977	6.941	7.131	7.316	7.458	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transitions of technologies developed by the Program are tracked and documented using DoD/NASA TRL scale.
2) FATG Technology Roadmaps are prepared, evaluated, and analyzed by 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.