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Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Office of Secretary Of Defense	DATE: February 2012
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APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603000D8Z: <i>Joint Munitions Advanced Technology</i>							
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
Total Program Element	14.343	15.606	25.612	-	25.612	27.326	30.539	31.378	31.949	Continuing	Continuing
P002: <i>Insensitive Munitions Advanced Technology</i>	13.302	14.529	20.819	-	20.819	20.808	22.521	23.147	23.437	Continuing	Continuing
P301: <i>Enabling Fuze Advanced Technology</i>	1.041	1.077	4.793	-	4.793	6.518	8.018	8.231	8.512	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 program managers as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus insuring 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 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.

Under the JIMTP, investments are focused on five Munition Areas: High Performance Rocket Propulsion, Minimum Signature Rocket Propulsion, Blast and Fragmentation Warheads, Anti-Armor Warheads, and Large Caliber Gun Propulsion. Munition Area Technology Groups, under tri-service leadership, have developed technology roadmaps for each Munition Area which are 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.

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0400: *Research, Development, Test & Evaluation, Defense-Wide*
BA 3: *Advanced Technology Development (ATD)*

R-1 ITEM NOMENCLATURE

PE 0603000D8Z: *Joint Munitions Advanced Technology*

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 programs utilizing generic hardware 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 a munition configuration and its ability to address required capability needs can be validated. Mature fuze technology can be transitioned, thereby decreasing program costs and schedule risk and facilitating their spin-off into other munitions within their portfolios.

Under the JFTP, investments are focused on specific capability areas that have been identified by the Department strategic guidance and current shortfalls in weapon systems and will be validated by the PEOs and the Heads of the Service S&T communities. These four 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.

B. Program Change Summary (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	20.551	24.771	27.458	-	27.458
Current President's Budget	14.343	15.606	25.612	-	25.612
Total Adjustments	-6.208	-9.165	-1.846	-	-1.846
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.072	-0.060			
• Section 8014 - FFRDC	-0.057	-0.105	-	-	-
• Economic Assumptions	-0.079	-	-	-	-
• Other Program Adjustments	-1.000	-	-1.846	-	-1.846
• Congressional Adjustments	-5.000	-9.000	-	-	-

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APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE				PROJECT			
0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603000D8Z: <i>Joint Munitions Advanced Technology</i>				P002: <i>Insensitive Munitions Advanced Technology</i>			
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
P002: <i>Insensitive Munitions Advanced Technology</i>	13.302	14.529	20.819	-	20.819	20.808	22.521	23.147	23.437	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 program managers as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus insuring 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 are focused on five Munition Areas: High Performance Rocket Propulsion, Minimum Signature Rocket Propulsion, Blast and Fragmentation Warheads, Anti-Armor Warheads, and Large Caliber Gun Propulsion. Munition Area Technology Groups, 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.

This effort will also demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the GDF, 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 programs utilizing generic hardware 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 a munition configuration and its ability to address required capability needs can be validated. Mature fuze technology can be transitioned, thereby decreasing program costs and schedule risk and facilitating their spin-off into other munitions within their portfolios.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2011	FY 2012	FY 2013
Title: High Performance Rocket Propulsion	2.974	3.075	4.232
Description: High Performance Rocket Propulsion is focused on the development and demonstration of technologies to improve the IM response of High Performance Propulsion systems (rocket motors with Ammonium Perchlorate and with or without a			

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2011	FY 2012	FY 2013
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. Operating conditions may be controlled or widely varying in both temperature and vibration. 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. 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 Cookoff for the majority of High Performance Propulsion rocket motors, and solving the Fast Cookoff response of very large High Performance Propulsion motors. FY 2011 Accomplishments: • Demonstrated 100 pound propellant processing, validating manufacturing process. Conducted sub-scale IM demonstration in eigh inch composite rocket motors and subjected them to standard IM tests. • Conducted component validation testing. Refined and integrated novel rocket motor design for five inch rocket motor demonstration in preparation for full scale IM demonstration testing. FY 2012 Plans: • Conduct aging study and full scale IM demonstration tests on new propellant filled rocket cases. Conduct 70 pound BATES motor static test firing to demonstrate propellant performance. • Fabricate five inch rocket motors using novel rocket motor design, and conduct IM testing to include bullet and fragment impact, and fast and slow cookoff. Transition to Navy Future Naval Capabilities. • Contract to manufacture seven inch diameter rocket motor cases using novel technique and load with propellant to support baseline IM testing. FY 2013 Plans: • Conduct baseline slow cookoff and fragment impact IM testing in seven inch diameter rocket motors. Receive additional rocket motors, prepare and conduct baseline fast cookoff and bullet impact IM tests. Integrate IM mitigation technologies to prepare for additional IM testing.					
Title: Minimum Signature Rocket Propulsion			3.076	3.371	4.629
Description: Minimum Signature Rocket Propulsion is focused on the development and demonstration of technologies to improve the IM response of Minimum Signature Rocket Propulsion Technologies. The development and demonstration of minimum signature (MS) rocket technologies, that when applied to munition systems, will improve munition IM response to					

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2011	FY 2012
one or more threats, while not degrading the response to other IM threats and at least maintaining munition performance. Topics 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 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 2011 Accomplishments: • Conducted IM tests on composite and metal case motors using baseline propellant to benchmark composite case benefits. • Scaled up novel propellant formulation to five gallon scale and conducted physical property tests and prepared samples for confinement IM testing. • Completed mechanism design for unique large rocket motor venting technique. • Characterized propellant in preparation to conduct slow cookoff testing. • Completed design of rocket motor thermal ring venting mechanism unique to small rocket motor and container. Down-selected candidate manufacturing materials to prepare to manufacture venting mechanisms. FY 2012 Plans: • Conduct slow cookoff and fragment impact reliability testing of motor designs. Manufacture test motor hardware and conduct propellant down-select testing. Prepare, load, and conduct IM tests on propellant candidates in metal and composite cases, for direct comparison with baseline propellants. Scale up additional novel propellant formulation to five gallon scale and conduct physical property tests and prepare samples for seven inch rocket motor testing. • Refine vent mechanism design, manufacture and test components to validate precision and accuracy. Conduct slow cookoff testing on large scale motor. • Conduct aging and environmental tests of rocket motor thermal ring venting mechanism. Modify containers with venting system and conduct 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. • Manufacture and conduct characterization testing of unique propellant for man-portable weapons with minimum signature and operator-friendly properties. FY 2013 Plans: • Load demonstrator motor with down-select propellant formulation, incorporate case enhancements and prepare to conduct IM tests.			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2011	FY 2012
• Complete full scale slow cookoff and fragment impact testing of unique propellant for man-portable weapons with minimum signature and operator-friendly properties. • 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 and transition to 6.4 Insensitive Munition Technology Transition Program.			
Title: Blast and Fragmentation Warheads Description: Blast and Fragmentation Warheads (BFW) - Focus on the development and demonstration of technologies to improve the IM response of Blast / Fragmentation 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. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, reliability may be critically important depending on the intended munition application. Applications vary but include high performance warhead fills, booster explosives, bulk demolition charges, and bulk fills for blast and/or fragmentation charges. 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. 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 Cookoff and SCJ threats. FY 2011 Accomplishments: • Completed 500 pound bomb explosive fill and unique manufacturing optimization to prevent sympathetic detonation, and started loading of assets to prepare for shipment for testing. Item two (10-3-10) IM Focused Energy Initiation - Begin integrated demonstration of new initiation system with less-sensitive explosive fills. • Loaded various mortars with down-selected formulation candidates and conducted IM tests using various manufacturing methods, comparing results to current fielded munitions. • Completed fabrication and environmental testing of new initiation system for very insensitive main charge explosive fills. Started validation testing using unique explosives to ensure functionality of initiator. • Scaled-up and manufactured explosive booster materials in 30-40 pound batches and conducted pressing study to prepare pellets for testing. FY 2012 Plans: • Conduct full scale IM and performance tests on unique 500 pound bombs and complete manufacturing study to prepare for selection of final candidate for transition to responsible program manager. • Complete validation testing using unique explosives to ensure functionality of initiator.		4.933	3.141
			7.203

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2011	FY 2012	FY 2013
• Complete initiation system environmental survivability testing and prepare for IM tests using system level hardware. • Conduct characterization tests to ensure purity and particle size of materials. Conduct environmental and IM tests to include full scale slow cookoff test in various warhead sizes. • Perform high explosive testing to compare subject materials against baseline bomb fill materials. Use sympathetic reaction models to assess new IHE fills and select appropriate formulation for refinement. • Prepare and conduct 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.				
Title: Anti-Armor Warheads Description: Anti-Armor Warheads is focused on the development and demonstration of explosive ingredients, explosives, warhead and fuze technologies for improving IM of Anti-Armor Warhead 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. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, reliability may be critically important depending on the intended munition application. 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. 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. 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 Cookoff 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 2011 Accomplishments: • Completed fragment impact testing on tactical hardware using impact mitigation technology proving validity of the technology. • Conducted modeling and simulation on candidate barrier materials and down-selected barrier material candidates to test.		1.174	2.521	2.457

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2011	FY 2012	FY 2013
- Integrated design and test hardware selection to complete explosive candidate selection and began subscale testing preparations. FY 2012 Plans: - Load hardware and conduct IM and performance tests to validate performance and finalize recommended solutions for transition to a program of record. - Optimize phase one designs based upon small and large warhead tests. Conduct modeling and simulation of phase two designs and optimize design for fast and slow cookoff and bullet and fragment impact testing. FY 2013 Plans: - Fabricate optimized design, and conduct engineering and penetration testing. Load large and small warheads and conduct full scale fragment and bullet impact and fast and slow cookoff tests using selected explosives. - Conduct modeling and simulation down-selection of candidate technologies to determine fragment impact technologies suitable for higher velocity munition requirements.					
Title: Large Caliber Gun Propulsion Description: Large Caliber Gun Propulsion (LCGP) is focused on the development and demonstration of technologies in the area of Gun Propulsion Technologies. 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. Topics 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. 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 LCGP MATG are concentrated on solving the IM response of gun propulsion munitions to Fragment Impact, Shaped Charge Jet, and Slow Cookoff threats. FY 2011 Accomplishments: Optimized propellant formulations, manufactured propellant, and conducted initial safety tests using new propellant formulation. Optimized and manufactured primer and conducted aging studies. Conducted propellant initial IM and gun testing with full scale representative articles. FY 2012 Plans:			1.145	2.421	2.298

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B. Accomplishments/Planned Programs (\$ in Millions)							FY 2011	FY 2012	FY 2013		
- Conduct 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 cookoff. <i>FY 2013 Plans:</i> - Conduct initial container venting design, manufacture, and tests. - Develop tactical primer designs based upon unique primer tube technologies and conduct initial IM tests. - Integrate novel insensitive propellant technologies to develop propellant charge for new gun system.											
Accomplishments/Planned Programs Subtotals							13.302	14.529	20.819		
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
• 0602000D8Z P000: BA2 <i>Insensitive Munitions</i>	14.177	14.495	14.216		14.216	14.449	14.858	15.466	15.675	Continuing	Continuing
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 Review 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)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
P301: Enabling Fuze Advanced Technology	1.041	1.077	4.793	-	4.793	6.518	8.018	8.231	8.512	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 Technical Readiness Level (TRL) five and demonstrate the technologies to a TRL-6 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, 4) and Enabling Fuze Technologies and Common Architecture.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2011	FY 2012	FY 2013
Title: Hard Target Fuzing	0.324	0.328	1.123
Description: The Hard Target Fuzing challenges are grouped into three Technology Areas. Improved modeling and simulation capabilities provide the validated computational tools necessary for hard target applications. 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 Hardware Development - Next Generation Fuzing. This technology area aims 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 2011 Accomplishments: - Continued development of a survivable post-impact intelligent module and fire-set that would become part of a miniaturized fuze for next generation penetrating weapons. This Hardened Miniature Fuze Technology (HMFT) module possesses the capability of media discrimination (concrete, soil, air, etc.) as the penetrator host progresses through the target.			
FY 2012 Plans: - Build HMFT technology hardware for survivability and functionality evaluation in sled testing against complex penetration targets.			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2011	FY 2012	FY 2013
- Start to develop test, redesign and demonstrate recorders in high speed (2500-4000 fps). Start to develop survivable modular fuze technology for multi-role common miniature munitions with distributed/embedded fuzes. FY 2013 Plans: - Incorporate and demonstrate fuze recorders in high speed and boosted penetration weapon tests. - Continue to develop 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 2011 Accomplishments: - Developed selectable yield warhead multi-point initiation architecture and control concepts including: a) architectures utilizing lower energy detonators/initiators and b) non-conventional multi-point initiation architectures such as energetic multi-points. FY 2012 Plans: - Apply yield warhead initiation architecture and control technologies into candidate warheads designs. - Complete development of advanced micro-transformer technology and transition into miniature high voltage firing systems. FY 2013 Plans: - Conduct demonstration tests of selectable yield warhead initiation architecture and control technologies into warheads. In particular, Army Technology Objectives (ATOs) related to tailorable effects will benefit from the 6.3 JFTP efforts. They are Scalable Technology for Adaptable Response ATO and the Sensor Warhead Fuze Technology for Integrated Combined Effects ATO.		0.388	0.430	1.220
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% 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		-	0.119	1.310

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APPROPRIATION/BUDGET ACTIVITY 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603000D8Z: <i>Joint Munitions Advanced Technology</i>	PROJECT P301: <i>Enabling Fuze Advanced Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2011	FY 2012	FY 2013
reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies.				
<i>FY 2011 Accomplishments:</i> - Researched, developed and demonstrated MEMS device components and fabrication processes for future cluster munitions fuze applications. - Developed and build test phase one high reliability fuze architecture technology prototypes that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures.				
<i>FY 2012 Plans:</i> - Continue research, development and demonstration of MEMS device components and fabrication processes for future cluster munitions fuze applications. - Continue development and build test phase one high reliability fuze architecture technology prototypes that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures.				
<i>FY 2013 Plans:</i> - Develop and build phase two high reliability fuze architecture technology 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.				
<i>Title:</i> Enabling Fuze Technologies <i>Description:</i> Develop common / modular fuze architecture; 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.		0.329	0.200	1.140
<i>FY 2011 Accomplishments:</i> - Fabricated and tested first phase MEMS retard and impact sensors and conduct functional testing in simulated environments. - Applied common fuze architecture technology concepts in bomb, missile, and artillery fuze applications to provide enhance fuze modularity, common components and packaging for lower cost and manufacturing.				
<i>FY 2012 Plans:</i> - Build and test second phase miniature retard and impact sensors for bomb and air dropped munitions. Testing will be in relevant environments simulating bomb deployment.				

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Exhibit R-2A, RDT&E Project Justification: PB 2013 Office of Secretary Of Defense							DATE: February 2012				
APPROPRIATION/BUDGET ACTIVITY 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603000D8Z: <i>Joint Munitions Advanced Technology</i>			PROJECT P301: <i>Enabling Fuze Advanced Technology</i>					
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2011	FY 2012	FY 2013		
- Conduct functional and safety assessment and testing of common fuze architecture technologies: safety components, modular electronics, sensors, interfaces, and packaging. <i>FY 2013 Plans:</i> - Conduct air-drop demonstration testing miniature retard and impact sensors. Transition sensor technology into bomb fuzing applications. - Begin advanced, exploitation resistant proximity sensor advanced technology development.											
Accomplishments/Planned Programs Subtotals							1.041	1.077	4.793		
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
• 0602000D8Z P204: <i>BA2 Enabling Fuze Technology</i>	5.740	5.833	6.398		6.398	6.367	7.028	7.211	7.418	Continuing	Continuing
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.											