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Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Office of Secretary Of Defense									DATE: February 2010		
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)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	9.176	13.534	20.556	0.000	20.556	27.045	30.132	31.431	33.019	Continuing	Continuing
P002: Insensitive Munitions Advanced Technology	9.176	13.534	16.979	0.000	16.979	21.621	23.440	23.818	24.248	Continuing	Continuing
P301: Enabling Fuze Advanced Technology	0.000	0.000	3.577	0.000	3.577	5.424	6.692	7.613	8.771	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 (IM) 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 Program Executive Office (PEO) IM Strategic Plans. In this way, promising formulations, ingredients, case technologies, liners and coatings can be integrated into a munition configuration and its ability to improve the IM response can be validated. Mature IM technology can be transitioned, thereby decreasing their program costs and schedule risk, and facilitating their spin-off into other non-compliant munitions within their portfolios.											
This 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.											

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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*

Under the Joint IM Technology Program (JIMTP), investments are focused on specific munition areas that have been identified by the S&T community and validated by the technology needs identified in the IM Strategic Plans submitted by the PEOs. These five munitions areas are: 1) high performance rocket propulsion, 2) minimum smoke rocket propulsion, 3) large caliber gun propulsion, 4) anti-armor warheads, and 5) blast and fragmentation warheads.

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 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, 4) and Enabling Fuze Technologies and Common Architecture.

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-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 PEOs for insertion in their IM Strategic Plans / Fuze Technology Development Plan, and 4) interfacing with other MATGs / FATGs and IM / fuze science and technology projects as appropriate. The JIMTP and 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.

B. Program Change Summary (\$ in Millions)

	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011 Base</u>	<u>FY 2011 OCO</u>	<u>FY 2011 Total</u>
Previous President's Budget	9.970	23.538	0.000	0.000	0.000
Current President's Budget	9.176	13.534	20.556	0.000	20.556
Total Adjustments	-0.794	-10.004	20.556	0.000	20.556
• Congressional General Reductions		0.000			
• Congressional Directed Reductions		-9.894			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-0.679	0.000			
• SBIR/STTR Transfer	-0.041	0.000			
• Program Review Adjustment	-0.074	0.000	20.556	0.000	20.556
• Other	0.000	-0.110	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense								DATE: February 2010			
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 P002: <i>Insensitive Munitions Advanced Technology</i>			
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P002: <i>Insensitive Munitions Advanced Technology</i>	9.176	13.534	16.979	0.000	16.979	21.621	23.440	23.818	24.248	Continuing	Continuing

A. Mission Description and Budget Item Justification

This RDT&E effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions (IM) 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 Program Executive Officer (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 Joint Insensitive Munitions Program (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 (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 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 Program (\$ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Insensitive Munitions Advanced Technology Development	9.176	13.534	16.979	0.000	16.979
This RDT&E effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions (IM) 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 Program Executive Officer (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.					

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Under the Joint Insensitive Munitions Program (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 (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 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. <i>FY 2009 Accomplishments:</i> (1) High Performance/Minimum Signature Rocket Propulsion: Fabricated and performed initial structural and baseline IM tests on demonstration rocket motors for minimum signature and high-performance rocket applications. Scaled-up high-performance composite propellant (transitioned from 6.2 program), for Tomahawk class motors, to 30 gallon batch for producibility. Feasibility of including mitigation technologies has been demonstrated on Phase 1 Air-to-Air Missile Rocket Motor Case. Demonstrated high-performance composite propellant IM response and ballistic performance in sub-scale analogue motors. (2) Blast Fragment Warheads: Completed IM and performance demonstration and transitioned IM compliant TNT replacement explosive for artillery applications. Conducted full-scale 500-lb size environmental testing on the reactive liner concept. Down-selected explosive formulation and conducted sub-scale IM demonstrations showing reactive liner benefit for preventing sympathetic detonation. Demonstrated novel warhead concept to reduce response level to impact by fragments, transitioning to BA6.4. (3) Anti-Armor Warheads: Completed proof of principal IM testing for liner venting of anti-armor warhead. Testing completed to verify that liner venting did not adversely impact warhead performance. Preliminary design for fragment impact mitigation technology finalized for Javelin warhead.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: (1) High Performance Rocket Propulsion: Demonstrate venting technology in minimum signature and high-performance 5-10 inch class motors. Scale up high-performance composite propellant to 150-gal batch, and successfully process in redundant 30 gal quantities. Demonstrate IM improvement and ballistic performance from high-performance propellant in 20-inch analog and 70-lb motors respectively. Complete venting design and begin IM demonstration for small-diameter minimum signature rocket motors. (2) Minimum Signature Rocket Propulsion: Conduct IM baseline tests, fabricate and extrude new low-blast propellant and conduct IM tests on new propellant. Conduct rocket motor cook-off characterization studies and begin shaped memory alloy design testing. Conduct performance and IM full scale testing of two minimum signature propellant candidates in standard motor configuration for direct comparison with baseline propellant. Design, fabricate and conduct initial tests to determine viability of rocket motor thermal ring venting mechanism. (3) Blast and Fragmentation Warheads: Complete full-scale liner environmental tests and IM and performance demonstration of reactive liner in full-scale 500-lb bomb. Conduct series of full-scale environmental tests (thermal cycling, vibration, and drop tests) with the reactive liner and an inert fill. Tests will determine the effects that these types of environments have on items using liners, to ensure that the liner does not flow, shift or crack. Begin demonstration of new initiation system for very insensitive main charge explosive fills. Conduct performance and IM evaluations on castable explosives for bombs and warheads. (4) Anti-Armor Warheads: Demonstrate IM characteristic with no degradation in performance with liner venting and fragment impact mitigation sleeve technology on anti-armor missile warhead. Complete venting modeling and simulation work, for fast and slow cook-off, as well as fragment impact testing on Navy warhead. Conduct Army warhead particle impact mitigation sleeve concept design and testing, ensuring no impact on warhead effectiveness. (5) Large Caliber Gun Propulsion: Optimize propellant formulations and conduct initial IM and gun tests using new propellant formulation.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: (1) High Performance Rocket Propulsion: Conduct venting technology demonstrations in minimum signature and high-performance 10-25-inch class motors. Scale up new less-sensitive high-performance propellants for larger diameter demonstrations. (2) Minimum Signature Rocket Propulsion: Design and test modifications to the motors igniter, rocket nozzle, and blow-out plug to exploit the lessons learned in the first year. Conduct IM baseline tests, fabricate and extrude new low-blast propellant and conduct IM tests on new propellant. Demonstrate shaped memory cook-off solution for minimum signature propellant in analog motors. Conduct performance and IM full scale testing of two MSP propellant candidates in composite motor configuration for direct comparison with baseline propellant, and down-select to final propellant formulation. Conduct aging, environmental and full-scale IM tests of rocket motor thermal ring venting mechanism. (3) Blast and Fragmentation Warheads: Complete demonstration of low-sensitivity main-charge fill to prevent sympathetic detonation in 500-lb and greater bombs. Begin integrated demonstration of new initiation system with less-sensitive explosive fills. Conduct system level IM and performance demonstration on castable explosives for bombs and warheads, and conduct program risk reduction studies. Begin initiation system design validation tests, feasibility demonstration and environmental survivability testing. Perform initiation system reliability demonstrations in small scale tests, then perform system level IM and performance tests. (4) Anti-Armor Warheads: Complete vented liner demonstration for large Naval warhead. Complete integrated demonstration of venting, fragment mitigation, and less-sensitive explosive. Particle impact mitigation sleeve design concept will be finalized, and the best available materials will be integrated into a Multi-Purpose hardened anti-armor warheads and the final design will be demonstrated against a fragment impact threat. In addition, limited warhead performance tests shall be conducted to ensure that performance has not been degraded. (5) Large Caliber Gun Propulsion: Conduct propellant initial and final IM and gun testing with full scale representative articles.						
Accomplishments/Planned Programs Subtotals		9.176	13.534	16.979	0.000	16.979

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C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 0602000D8Z P000: BA2 Insensitive Munitions	14.820	14.990	14.615		14.615	14.786	14.971	15.241	15.529	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) Project 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 conducted as part of Joint Army/Navy/NASA/Air Force meetings.											
7) Technology Transition Agreements in place with Munition programs.											

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COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P301: <i>Enabling Fuze Advanced Technology</i>	0.000	0.000	3.577	0.000	3.577	5.424	6.692	7.613	8.771	Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a new project under Joint Munitions Advanced Technology.

This RDT&E effort will also 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 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 Program Executive Officers (PEOs) and the Heads of the Service S&T communities. Mature demonstrated fuze technology can 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 Program Executive Officers (PEOs) and 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, 4) and Enabling Fuze Technologies and Common Architecture.

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

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Enabling Fuze Advanced Technology This RDT&E effort will also 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 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 Program Executive Officers	0.000	0.000	3.577	0.000	3.577

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B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
(PEOs) and the Heads of the Service S&T communities. Mature demonstrated fuze technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other munitions within their portfolios. FY 2011 Base Plans: Hard Target Fuzing (Addressing fuze survivability in harsh environments ranging from gun launch to hard target penetration): 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. Tailorable Effects Fuze (Addressing scalable effects weapons that will optimize lethal effects on target while minimizing collateral damage): Apply initiation architecture and control concepts for development of candidate effects and yield candidate warheads. Two Army Technology Objectives (ATOs) related to tailorable effects will benefit from the 6.2 and 6.3 JFTP efforts. (Scalable Technology for Adaptable Response (STAR) ATO and the Sensor Warhead Fuze Technology for Integrated Combined Effects (SWFTICE) ATO.) High Reliability (Addressing need for 99% fuze reliability in cluster munitions and increasing overall fuze reliability for increased weapon effectiveness and reduced unexploded remnants of war): Develop and test 1st phase high reliability fuze architecture technology prototypes that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures. Enabling Technologies (Addressing fuze subcomponents and technologies that provide capability across the fuzing domain): Fabricate 1st phase MEMS retard and impact sensors and conduct functional testing in simulated environments. Complete common fuze architecture concepts to provide enhance fuze modularity, common components and packaging for lower cost and manufacturing ease.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.577	0.000	3.577

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C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 0602000D8Z P204: BA2 Enabling Fuze Technology	0.000	3.818	7.833		7.833	7.393	5.796	6.748	7.448	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) 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 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 in place with Munition programs.											

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