Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Office of Secretary Of Defense										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	18.109	22.448	21.592	-	21.592	20.267	21.520	22.558	23.220	Continuing	Continuing
P000: *Insensitive Munitions*	14.291	14.735	14.425	-	14.425	14.611	14.916	15.246	15.696	Continuing	Continuing
P204: *Enabling Fuze Technology*	3.818	7.713	7.167	-	7.167	5.656	6.604	7.312	7.524	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program addresses applied research 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 Officers (PEOs) for insertion in their Insensitive Munitions (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 Technology Program (JIMTP) and Joint Fuze Technology 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 IM effort will demonstrate enabling technologies needed to develop weapons in compliance with 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. 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.

The Enabling Fuze Technology 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 (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

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Office of Secretary Of Defense	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*

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 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.

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	22.669	22.448	22.179	-	22.179
Current President's Budget	18.109	22.448	21.592	-	21.592
Total Adjustments	-4.560	-	-0.587	-	-0.587
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.550	-			
• SBIR/STTR Transfer	-0.121	-			
• Other	-3.889	-	-	-	-
• Defense Efficiency - Reports, Studies, Boards, and Commissions	-	-	-0.557	-	-0.557
• Economic Assumptions	-	-	-0.030	-	-0.030

Change Summary Explanation

Defense Efficiency – Report, Studies, Boards and Commissions. As part of the Department of Defense reform agenda, reflects a reduction of in the number and cost of reports, studies, DoD Boards and DoD Commissions below the aggregate level reported in the previous budget submission.

Includes a reduction of $0.030 M for economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
P000: *Insensitive Munitions*	14.291	14.735	14.425	-	14.425	14.611	14.916	15.246	15.696	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Insensitive Munitions (IM) Technology Program (JIMTP) is aimed at developing the enabling technologies needed to build weapons in compliance with requirements established in statute (United States Code, Title 10, Chapter 141, Section 2389) and regulation (DoDI 5000.1 and CJCSI 3170.01F). Using technology available today, the Department has incrementally improved the IM response of our current munitions. New munitions which have fully implemented current IM technology and design practices have been able to achieve IM compliance. However, these have been the most easily solved problems. Without new technology, future variants of current weapon systems will have the same, or worse, response to IM stimuli (i.e., they will not improve with the technology available today). New weapon developments will face similar challenges.

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 (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. The program is structured around these five areas with clear cross-cutting tasks.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: High Performance Rocket Propulsion	2.103	2.648	2.697
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 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 5-10-15 year goals of the High Performane Propulsion 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 2010 Accomplishments: -Continued development of extinguishable high performance rocket propellants, started characterization and propellant formulation down-selection work.			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
-Conducted large rocket motor flight termination design trade and analysis tests with inert propellants. -Conducted large rocket motor fast cook-off mitigation system conceptual design trade and analysis, as well as propellant confinement characterization studies to gain insight into the remaining material strength as well as mitigation system activation criteria -Completed energetic material coating process at 500 gram level, as well as characterization and subscale evaluations to determine the coating's influence on responses to IM thermal threats. -Scaled up reduced smoke propellant at the 1 pint scale with acceptable processing, safety, mechanical and sub scale slow cook-off properties and conduct sub scale IM tests. -Conducted electrochemical manufacturing feasibility study for novel salts, producing 100 gram sample size and developed analytical methods to determine the concentration levels of novel salt in ammonium perchlorate matrices. ***FY 2011 Plans:*** -Complete scale up of extinguishable high performance rocket propellants to 1 gallon size batches and conduct IM tests on down-selected formulation. -Conduct sub-scale fast cook-off testing to demonstrate mitigation methodology. -Complete sensor network design and conduct fast cook-off testing; select sensor network technologies for BA 6.3 demonstration. -Scale up reduced smoke propellant to the 1 and 5 gallon scale with acceptable processing, safety, mechanical properties to enable small-scale motor testing and IM tests. -Formulate and refine the processing of impregnated fibers in composite cases. Conduct safety and environmental testing. -Complete scale up of high performance rocket propellants to 1 pint size batches and conduct mechanical and ballistic properties testing. -Scale up formulation to 5 pound scale quantity and conduct safety and mechanical properties testing. ***FY 2012 Plans:*** -Complete reduced smoke propellant evaluation and IM tests. Conduct propellant formulation efforts to produce burn or no-reaction response for fragment impact and fast cook-off events. -Study thermal and mechanical responses of composite cases to slow cook-off and aerodynamic heating. -Complete scale up of high performance rocket propellants to 1 gallon size batches, refine processing procedures and conduct sensitivity and safety testing. -Design, analyze and build small scale motors ready for testing.			
Title: Minimum Signature Rocket Propulsion ***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	2.955	3.593	3.640

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012

minimum signature (MS) rocket technologies, that 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 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 5-10-15 year goals Miniature Signature Propulsion MATG are concentrated on solving the IM response of missile propulsion systems due to Fragment Impact, Slow Cook-Off, and Shaped Charge Jet threats.

FY 2010 Accomplishments:

-Incorporated novel high-nitrogen ingredients, that exhibit reduced sensitivity in various propellant formulations to determine best candidate and down-selected to two candidates for further study and optimization. Used modeling and simulation to predict basic molecular properties and bond types to predict molecular stability.
-Demonstrated several case venting designs in composite and new cases to determine feasible approaches.
-Produced 1.0 kg of novel ingredient, to evaluate material purity and assess safety, compatibility and stability with the selected propellant binder system.
-Continued binder system alternatives assessment and scaled up production to 1 pint size mix. Conducted small-scale tests to determine IM performance.
-Synthesized and evaluated various bonding agents' mechanical properties to improve impact response and performance. Scaled-up formulations to pint size mixes for burning rate testing.
-Synthesized novel ingredients in multi-gram quantities for hazard analysis and ingredient compatibility testing, and generated small propellant samples for testing.
-Synthesized and produced 10 gram quantity new propellant formulation to enable initial characterization testing to be completed.

FY 2011 Plans:

-Conduct small scale IM tests and compare against prior baseline and candidate results to provide down-selected formulations for further study The resultant down-selected propellant formulations will then be optimized and subjected to various tests.
-Demonstrate passive venting design for slow cook-off IM test.
-Complete binder system alternatives assessment and down-select formulation for scale up to 1 gallon size mix.
-Scale-up to gallon mix batches and evaluate bonding agents in impact and shock tests to determine effectiveness. Manufacture analogue motors with selected bonding agent and conduct impact testing. Select best candidate for transition to PE 0603000D8Z.
-Scale up novel ingredients to pint scale mixes and conduct mechanical, aging and thermal testing to determine propellant characteristics.
-Synthesize and characterize new propellant to 100-gram scale to support initial IM evaluation testing

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
-Synthesize and produce material to 5-gram quantity batches to conduct thermal stability studies. ***FY 2012 Plans:*** -Optimized candidates will be scaled-up to further characterize their initial ballistic performance and sensitivity properties, ballistics and performance verification via 7" baseline motor configuration and full scale IM tests. Conduct sub-scale motor performance tests and larger scale IM tests with final formula down-selection and transition to 0603000D8Z for demonstration. -Complete binder system alternatives full scale test using 1 gallon size mixes for transition to 0603000D8Z. -Scale-up to 1 pint mixes and conduct impact and cook-off testing to determine IM responses of formulation. -Scale up and synthesize to 25-gram scale and conduct small-scale IM tests.			
Title: Blast and Fragmentation Warheads ***Description:*** Blast and Fragmentation Warheads is focused 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 5-10-15 year goals of the Blast and Fragmentation Warhead MATG are concentrated on solving the IM response of blast fragment warheads to the Sympathetic Detonation, Fast Cookoff and Shaped Charge Jet threats. ***FY 2010 Accomplishments:*** -Completed characterization studies on first generation of eutectic based-insensitive explosives. -Optimized synthesis process to produce 1.2 kg batches of a melt castable explosive and completed characterization studies. -Produced 10 kg quantities of liquid energetic material for characterization of detonation properties. -Conducted large scale initiation experiments with insensitive materials, to successfully demonstrate the ability to initiate the materials. -Completed production work of novel ingredient for subscale IM tests and novel ingredient formulation development efforts for synthesis to 5 gram scale mixes. -Completed development of general purpose bomb main-charge explosive formulations and sensitivity assessments in laboratory environment.	3.825	4.082	3.801

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
-Accomplished sensitivity testing and performance testing on specially coated materials. Scaled up production to 100 gram size batches. -Identified optimal processing conditions and critical factors affecting scale-up of unique formulation, enabling production of 10 pound scale batches of mixture completing testing of safety characteristics, performance and shock sensitivity for transition to 0603000D8Z. -Started proof of concept and manufacturing assessment for unique missile warhead explosive. -Completed materials characterization work in order to quantitatively understand the interaction of a unique sensitization method with the various materials to assist in the experimental apparatus design. ***FY 2011 Plans:*** -Complete initiation studies and transition efforts to 0603000D8Z.. -Scale up novel ingredient formulation to 150 gram batches and conduct safety and sensitivity testing. Complete sub-scale IM testing on optimized formulation using novel ingredient. -Scale up specially coated materials to 100 gram production capability in order to characterize material and conduct variable confinement testing. Conduct characterization and IM testing to validate improvements in reactions to stimuli. -Conclude proof of concept and manufacturing studies, begin weaponization study, and demonstration of IM characteristics of unique missile warhead explosive. -Design and fabrication of a unique sensitization method application fixture. ***FY 2012 Plans:*** -Down-select novel ingredient material formulation and complete sub-scale testing and begin transition to 0603000D8Z. -Conclude weaponization study, and demonstration of IM characteristics of unique missile warhead explosive material. -Down-select materials and sensitization process in order to conduct device scale testing to validate the process and transition to 0603000D8Z.			
Title: Anti-Armor Warheads	2.655	2.347	1.953
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			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
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 5-10-15 year goals of the Anti-Armor Warhead MATG are concentrated on solving the IM response of anti-armor warheads to the Fragment Impact and Slow Cookoff threats and a 5 year goal of solving Sympathetic Detonation threats, with a 10-15 year goal of resolving the IM response to the Shaped Charge Jet threat. ***FY 2010 Accomplishments:*** -Assessed IM characteristics and demonstrated gallon size mix processability of additional emerging binder approaches for cast cured explosives for use in anti-armor IM warheads. -Completed evaluation of pressed explosives to include fragment and bullet impact testing. -Conducted characterization tests and developed screening test for use on pressed explosives. Scaled-up most promising formulation to 5 pound quantity. -Conducted scale-up and shock sensitivity testing on energetic binders enabling validation of new small scale test process to determine binder effectiveness. -Continued initial formulation development of less-sensitive combined effects explosives and completed initial IM tests. -Started novel coating technique evaluation for explosive materials. ***FY 2011 Plans:*** -Optimize processing procedure and complete characterization studies for cast cured explosives. Conduct accelerated aging study and various safety and IM tests to ensure acceptable aging properties of explosive material. -Complete fragment impact screening test analysis and prepare for transition to 0603000D8Z. -Complete characterization testing for formulation candidates, down-select, scale-up formulations, and complete IM/performance tests for two candidates. -Continue IM tests for novel coating technique evaluation for explosive materials. ***FY 2012 Plans:*** -Conduct IM technology studies in the areas of initiation/booster technology, explosive formulations, and warhead venting to develop warheads capable of producing deflagration and explosive type reactions for shaped charge jet and fragment impact threats.			
Title: Large Caliber Gun Propulsion ***Description:*** Large Caliber Gun Propulsion is focused on the development and demonstration of technologies in the area of Gun Propulsion Technologies. The development and demonstration of gun propulsion technologies, that 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	2.753	2.065	2.334

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
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 5-10-15 year goals of the Large Caliber Gun Propulsion MATG are concentrated on solving the IM response of gun propulsion munitions to Fragment Impact, Shaped Charge Jet, and Slow Cookoff threats. ***FY 2010 Accomplishments:*** -Completed phase III evaluation of sensitivity in laboratory environment of novel propellant formulation less sensitive to thermal and shock stimuli. -Completed phase III propellant formulation and scale-up efforts, as well as IM testing. Transitioned selected propellant to 0603000D8Z program. -Completed full-scale primer design and demonstration testing. Manufactured large-scale quantities and completed characterization and propellant formulation mixes of novel propellant binder. -Started small-scale characterization and propellant formulation optimization mixes using novel propellant binder. -Conducted instrumented ballistic simulator tests and began modification of required modeling and simulation tools for fragment impact studies. ***FY 2011 Plans:*** -Conduct small-scale testing and characterization efforts, as well as formulation down-selection effort. -Conduct instrumented ballistic simulator tests and complete modification of required modeling and simulation tools for slow cookoff studies. -Synthesize and scale-up energetic salts to 500 gram quantity and conduct characterization testing to support formulation and go/no-go decision. ***FY 2012 Plans:*** -Manufacture large-scale quantities and complete full-scale and IM tests of down-selected propellant formulation mixes of novel propellant binder. -Conduct sub-scale ballistic and IM testing. -Conduct instrumented ballistic simulator tests, fabricate hardware and finalize venting solution for fragment impact and slow cook off.			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P000: *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
-Continue formulation development to produce optimum IM properties and scale-up to manufacture 3 kilogram batches. Conduct various tests to validate IM properties and suitability for gun propellant.			
Accomplishments/Planned Programs Subtotals	14.291	14.735	14.425

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• 0603000D8Z P002: *BA 3 Insensitive Munitions Advanced Technology*	13.534	16.720	19.720		19.720	21.360	21.384	23.086	23.779	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.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P204: *Enabling Fuze Technology*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
P204: *Enabling Fuze Technology*	3.818	7.713	7.167	-	7.167	5.656	6.604	7.312	7.524	Continuing	Continuing

A. Mission Description and Budget Item Justification

This RDT&E effort will demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development of the Force (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 develop enabling technologies at the laboratory scale and transition them into 6.3 demonstration programs for weapons where priority capabilities and technology needs have been identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service S&T communities. Mature 6.2 fuze technologies 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 2010	FY 2011	FY 2012
Title: Hard Target Fuzing	1.145	1.880	1.670
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 2010 Accomplishments: - Started projects on hard target penetration weapon systems based modeling and simulation tool to determine fuze response to the weapon dynamics. - Initiated solid mechanics modeling and simulation technology projects to provide accurate material properties. - Began project to create a series of experimental and modeling capabilities that will form the basis of a high speed fuze survivability protocol for testing fuzes in the boosted and high speed penetration regimes.			
FY 2011 Plans: - Develop underlying technologies and testing methods to define the high-speed penetration environment.			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P204: *Enabling Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
- Begin verification of hydrocode/EPIC 22 modeling and simulation tools via hard target weapon instrumented testing. - The hard target weapon community plans to integrate the testing protocol in future boosted and high speed penetrator development programs. - Develop survivable modular fuze technology for multi-role common miniature munitions with distributed/embedded fuzes. ***FY 2012 Plans:*** - Develop and validate modeling and simulation code using high fidelity, multi-scale simulation techniques. - Adapt JFTP developed testing protocol in boosted and high speed penetrator development programs. - Apply survivable modular fuze technology for multi-common miniature munitions with distributed/embedded fuzes.			
Title: Tailorable Effects Fuzing ***Description:*** This area focuses on developing 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 to include electronic safe and arm based multi-point initiators for tunable output – scalable yield warheads; 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 2010 Accomplishments:*** - Began development of tailorable initiation technologies including a) multi-point plug-n-play, b) lower energy detonators/initiators and c) miniaturized explosive trains and d) multi-point initiation using energetic tracks, traces or deposition. - Started efforts in low-voltage command/arm system for distributed fuzing systems to enable tailorable ***FY 2011 Plans:*** - Demonstrate and transition miniature fire-set components for 6.3 tailorable effects initiation warhead systems. - Begin development of controllable explosive sensitivity technologies that provide the ability to selectively vary the sensitivity of energetic materials. - Apply initiation architecture and control technologies for development of candidate effects and yield candidate warheads. ***FY 2012 Plans:*** - Test and demonstrate detonator, initiation and fireset technologies. - Develop Tailorable Effects modeling and simulation using hydrocode. - Develop harden, Tailorable Effects firing systems for missile and projectile warheads to survive the high-g shock environments associated with impact with Military Operations in Urban Terrain (MOUT) targets.	0.764	2.083	1.953
Title: High Reliability Fuzing	1.145	1.875	1.766

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P204: *Enabling Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Description: Develop high reliability fuzing architectures, fuzing components, and Unexploded Ordance (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 reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies. ***FY 2010 Accomplishments:*** - Developed concepts for high reliability fuze architecture for cluster munitions fuzing. - Began development of target detection sensor and safety and arming device that would provide an increase in the overall fuze reliability. ***FY 2011 Plans:*** Research and development of novel technologies for UXO reduction features including fuze mechanisms and initiation energetics to eliminate any unexploded ordnance. - Build high reliability fuze architecture technology components that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures. - Next generation cluster munition fuze design and architecture will be down selected, brassboard submunition fuzes will be fabricated and evaluated; explosive train tests, static expulsion tests and engineering tests will be conducted. ***FY 2012 Plans:*** - Demonstrate high reliability fuze architecture concepts that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures. - Next generation cluster munition fuze design and architecture will be updated, component prototypes will be produced and performance and reliability tests conducted in ballistic and harsh environment testing.			
Title: Enabling Fuze Technologies ***Description:*** 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. ***FY 2010 Accomplishments:*** - Began development for proximity fuze sensors and electronics for detecting targets, impact, voids, and media which are highly resistant to exploitation.	0.764	1.875	1.778

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P204: *Enabling Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
- Initiated efforts for thin film/conformal thermal batteries for fuzing which will result in cheaper, conformal, smaller, cooler thermal batteries with higher energy/power densities. ***FY 2011 Plans:*** - Develop and build exploitation resistant proximity fuze sensors and electronics technology hardware for detecting targets, impact, voids, and media. - Develop fuze power source technology and concepts that include functionality that precludes the inadvertent release of "stored energy" such as Micro power sources and energy harvesting components. - Conduct assessments of common fuze architecture technologies: safety components, modular electronics, sensors, interfaces, and packaging. ***FY 2012 Plans:*** - The establishment of a modular, open fuze architecture is a technology enabling product that would establish a defined system interface architecture between various fuze subsystems. - Evaluate proximity fuze sensor, electronics and algorithm technologies in performance and functional testing in air-gun and ballistic environments.			
Accomplishments/Planned Programs Subtotals	3.818	7.713	7.167

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• 0603000D8Z P301: *BA 3 Enabling Fuze Advanced Technology*	0.000	3.522	4.947		4.947	6.098	6.835	8.350	8.606	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.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Office of Secretary Of Defense		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602000D8Z: *Joint Munitions Technology*	PROJECT P204: *Enabling Fuze Technology*

6) Technology Transition Agreements in place with Munitions programs.