| Exhibit R-2, PB 2010 Defense Threat Reduction Agency RDT&E Budget Item Justification | | | | | | | | | DATE: May 2009 | |
|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | |
| **COST ($ in Millions)** | **FY 2008 Actual** | **FY 2009 Estimate** | **FY 2010 Estimate** | **FY 2011 Estimate** | **FY 2012 Estimate** | **FY 2013 Estimate** | **FY 2014 Estimate** | **FY 2015 Estimate** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 211.146 | 218.958 | 233.203 | | | | | | Continuing | Continuing |
| RA: Systems Engineering and Innovation | 22.844 | 6.372 | 5.394 | | | | | | Continuing | Continuing |
| RE: Counter-Terrorism Technologies | 44.576 | 45.211 | 61.268 | | | | | | Continuing | Continuing |
| RF: Detection Technology | 38.140 | 46.357 | 66.977 | | | | | | Continuing | Continuing |
| RG: Advanced Energetics & Counter WMD Weapons | 20.029 | 20.550 | 21.396 | | | | | | Continuing | Continuing |
| RI: Nuclear Survivability | 21.432 | 18.654 | 13.935 | | | | | | Continuing | Continuing |
| RL: Nuclear & Radiological Effects | 0.300 | 0.000 | 0.000 | | | | | | Continuing | Continuing |
| RM: WMD Battle Management | 36.198 | 55.621 | 31.939 | | | | | | Continuing | Continuing |
| RT: Target Assessment Technologies | 26.442 | 26.193 | 32.294 | | | | | | Continuing | Continuing |
| RU: *Fundamental Research for Combating WMD | 1.185 | 0.000 | 0.000 | | | | | | Continuing | Continuing |

**Note**

*Project title change from Basic Research for WMD Knowledge Gaps starting in FY 2010.

**A. Mission Description and Budget Item Justification**

The Proliferation, Prevention and Defeat program reduces Weapons of Mass Destruction (WMD) proliferation and enhances WMD defeat capabilities through advanced technology development. To accomplish this objective, seven project areas were developed: RA - Systems Engineering and Innovation, RE - Counter-Terrorism Technologies, RF - Detection Technology, RG - Advanced Energetics and Counter WMD Weapons, RI - Nuclear Survivability, RM - WMD Battle

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Management and RT - Target Assessment Technologies. This revision supports technology requirements in line with the Joint Functional Concepts (Chairman, Joint Chiefs of Staff Instruction 3170.01). The missions and plans of these projects are described below in the R-2a Budget Exhibits.

**B. Program Change Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| Previous President's Budget | 215.609 | 211.325 | 215.254 | |
| Current BES/President's Budget | 211.146 | 218.958 | 233.203 | |
| Total Adjustments | -4.463 | 7.633 | 17.949 | |
| Congressional Program Reductions | 0.000 | -0.687 | | |
| Congressional Rescissions | 0.000 | 0.000 | | |
| Total Congressional Increases | 0.000 | 8.320 | | |
| Total Reprogrammings | -3.843 | 0.000 | | |
| SBIR/STTR Transfer | -0.620 | 0.000 | | |
| Realignment | 0.000 | 0.000 | 17.949 | |

| **Congressional Increase Details ($ in Millions)** | **FY 2008** | **FY 2009** |
|---|---|---|
| **Project:** RF, **Next Generation Intelligent Portable Radionuclide Detection & Identification System** | 0.000 | 1.600 |
| **Project:** RF, **ALED IED Electronic Signature Detection** | 0.000 | 3.200 |
| **Project:** RF, **Continuation of Advanced Materials Research for Nuclear Detection, CP and Imaging for CBRNE Special Ops** | 0.000 | 0.800 |
| **Project:** RA, **NNSA Metals Declassification for Reuse by DoD in Armaments** | 0.000 | 2.720 |

**Change Summary Explanation**

The increase in FY 2010 is to refocus research and development efforts to meet the 21st century combating weapons of mass destruction needs. Efforts within the program element are re-balanced to enhance corporate capabilities in the Defense Threat Reduction Agency Basic Research Initiative (PE 0601000BR) and the WMD Defeat Technologies (PE 0602718BR) programs.

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| **COST ($ in Millions)** | **FY 2008 Actual** | **FY 2009 Estimate** | **FY 2010 Estimate** | **FY 2011 Estimate** | **FY 2012 Estimate** | **FY 2013 Estimate** | **FY 2014 Estimate** | **FY 2015 Estimate** | **Cost To Complete** | **Total Cost** |
| RA: Systems Engineering and Innovation | 22.844 | 6.372 | 5.394 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project provides the research and development operations analysis support to the Agency in understanding, analysis, integration and execution of Defense Threat Reduction Agency (DTRA) operational missions. This includes analysis of National, Department of Defense (DoD) and other Federal agencies' strategic guidance and plans in the combating Weapons of Mass Destruction (WMD), Combating Terrorism and Homeland Defense arenas through analytical political-military and technical studies, workshops and conferences. It also provides DTRA on-site support to North Atlantic Treaty Organization (NATO) and Supreme Headquarters Allied Powers, Europe (SHAPE) with a current primary focus on support to U.S. European Command, NATO, and SHAPE in combating WMD and maintaining the NATO nuclear deterrent. A significant element of this project includes support to Command Elements and the warfighting Combatant Commands (COCOMs) on strategies in the COCOMs Areas of Responsibility and also provides for the solution to the Secretary of Defense mandate for DTRA to account, maintain, report, and track the National Nuclear Weapons Stockpile & Nuclear Weapon-Related Materiel during peacetime, crisis, and wartime. In support of national requirements necessary to maintain a viable nuclear deterrent, the Defense Integration and Management of Nuclear Data Services provide a platform to ensure continued sustainability and viability of the nuclear weapon stockpile.

| **B. Accomplishments/Planned Program ($ in Millions)** | **FY 2008** | **FY 2009** | **FY 2010** | **FY 2011** |
|---|---|---|---|---|
| RA: Systems Engineering and Innovation | 22.844 | 6.372 | 5.394 | |
| *FY 2008 Accomplishments:*<br>- Supported development of institutionalized plans for national response to pandemic flu.<br>- Completed development of all DTRA Security Cooperation Planning and associated annexes to support DoD nonproliferation, counter proliferation, and consequence management activities in selected nations within COCOMs Areas of Responsibility.<br>- Completed gap analysis roadmap of combating WMD mission and attendant issues with Combating Terrorism and Homeland Defense mission areas.<br>- Continued to support development and update of Defense Threat Reduction Agency (DTRA) annexes to the U. S. European Command (USEUCOM) Theater Security Cooperation Plans to insure DTRA assets are used to further combating Weapons of Mass Destruction (WMD) mission in that theater. | | | | |

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| **B. Accomplishments/Planned Program ($ in Millions)** | | **FY 2008** | **FY 2009** | **FY 2010** | **FY 2011** |
| - Continued to work with Supreme Headquarters Allied Powers, Europe (SHAPE) J3 and J6 for survivable, reliable communications to assure command, control and positive control of the nuclear mission with the goal of North Atlantic Treaty Organization (NATO) Infrastructure Committee procurement.<br>- Completed strategic analyses on Iran's Nuclear Potential and NATO Strategic Relevance.<br>- Organized/conducted senior Combatant Commands (COCOMs), Interagency, and International workshops, symposiums, and table top exercises to address key national/international strategies for reducing/combating the WMD threat.<br><br>*FY 2009 Plans:*<br>- Institutionalize development of Combating WMD lessons learned in regional COCOMs theaters and with appropriate international staffs.<br>- Continue to support development and update of DTRA annexes to USEUCOM Theater Security Cooperation Plans to insure DTRA assets are used to further Combating WMD mission in that theater.<br>- Institutionalize linkage with NATO/SHAPE and USEUCOM in international research and development collaboration.<br>- Continue to work with SHAPE J3 and J6 for survivable, reliable communications to assure command, control and positive control of the nuclear mission with the goal of NATO Infrastructure Committee procurement.<br>- Continue to conduct strategic analyses and assessments on emerging WMD threats.<br>- Continue to organize/conduct senior COCOMs, Interagency, and International workshops, symposiums, and table top exercises to address key national/international strategies for reducing/combating the WMD threat.<br><br>*FY 2010 Plans:*<br>- Institutionalize development of Combating WMD lessons learned in regional COCOMs theaters and with appropriate international staffs.<br>- Continue to support development and update of DTRA annexes to USEUCOM Theater Security Cooperation Plans to insure DTRA assets are used to further Combating WMD mission in that theater. | | | | |

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Institutionalize linkage with NATO/SHAPE and USEUCOM in international research and development collaboration.<br>- Continue to work with SHAPE J3 and J6 for survivable, reliable communications to assure command, control and positive control of the nuclear mission with the goal of NATO Infrastructure Committee procurement.<br>- Continue to conduct strategic analyses and assessments on emerging WMD threats.<br>- Continue to organize/conduct senior COCOMs, Interagency, and International workshops, symposiums, and table top exercises to address key national/international strategies for reducing/combating the WMD threat. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 20/0602718BR/WMD Defeat Technologies | 50.500 | 28.342 | 55.857 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Development of a DoD annex to the National Response plan for a pandemic flu and subsequent national-level exercises to test plan.

Development of Defense Threat Reduction Agency (DTRA) Security Cooperation Plans for all regional Combatant Commands (COCOMs).

Development of a DTRA gap analysis of Combating Weapons of Mass Destruction (WMD) mission vice Homeland Defense and Combating Terrorism mission areas to provide way ahead for DTRA operational and research and development planning.

Robust lessons learned process that incorporates new, workable operational and technical solutions into DoD and with allies.

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Incorporation of at least three new technologies by FY 2013 as a result of International research and development collaboration.

Number of strategic analyses and assessments conducted on emerging WMD threats.

Number of senior Combatant Commands (COCOMs), Interagency and/or International Workshops/Conferences organized/conducted to address national/international strategies for reducing the weapons of mass destruction threat.

Manage the strategic weapons stockpile and Nuclear Weapon-Related Materiel; maintain 100% accountability.

Support the Office of Secretary of Defense, Joint Staff, COCOMs, Services, Nuclear Weapon Custodial Units, and Department of Energy.

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| COST ($ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| RE: Counter-Terrorism Technologies | 44.576 | 45.211 | 61.268 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The Counter-Terrorism Technologies Project is an over-arching project that has three distinct functional areas in support of Joint U.S. Military Forces, specifically U.S. Special Operations Command (USSOCOM). The research and development support to USSOCOM is one of the highest priority mission areas in the Overseas Contingency Operations and a top priority for Defense Threat Reduction Agency (DTRA). The following efforts are included in this project:

The Device Defeat effort develops innovative technologies, energetic materials, and software programs to identify, defeat, contain and mitigate Weapons of Mass Destruction (WMD) capable Improvised Explosive Devices. Device Defeat began with minimal funding in FY 2008 and receives full funding in FY 2010. DTRA has been delegated the responsibilities and authority to act as Task Lead on behalf of DoD to provide leadership, integration, development, and testing as the primary U.S. Government coordinator for the National Implementation Plan WMD-Terrorism Task 5.4.4.

Develop and transition the full spectrum of new technologies for Joint U.S. Military Forces to counter WMD, enabling warfighters, specifically Special Operations Forces, to improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, nuclear production, storage, and weaponization facilities.

Provide oversight for Counter-proliferation (CP) research and development resources sent directly to USSOCOM that are used to develop SOF-unique technologies in support of USSOCOM's CP mission. New CP technologies are developed under USSOCOM management that provides SOF with the operational capability to counter WMD threats.

The Counter WMD-Terrorism Support Cell and Arctic Mist are two new efforts that begin in FY 2010. Arctic Mist builds upon the collaborative effort with the warfighter that delivered a proof of concept to USSOCOM in June 2007 and provides a multi-mission oriented critical capability that may be applied throughout the entire spectrum of warfare while significantly eliminating collateral damage. It will develop technologies to enable the warfighter to locate, identify, characterize and access WMDs, their production and storage facilities and associated enablers anywhere within the terrorist pathway to disrupt, delay, degrade, destroy or deny Chemical, Biological, Radiological and Nuclear WMDs while minimizing risk to US forces in support of Counter Proliferation and Counter-Terrorism Offensive operations. Arctic Mist specifically addresses USSOCOM Directive 70-1 Appendix C, Special Mission Area Programs and 71-4 Force Development Special Operations Forces Capabilities Integration and Development Systems.

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RE: Counter-Terrorism Technologies | 44.576 | 45.211 | 61.268 | |
| *FY 2008 Accomplishments:*<br>- Researched and developed technologies to enhance the capabilities of U.S. Forces in the Overseas Contingency Operations (OCO) to counter Weapons of Mass Destruction (WMD) and improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, and nuclear production, storage, and weaponization facilities.<br>- Delivered Special Operations Forces (SOF)-unique technologies. Projects completed: Non-intrusive Detection, Gellants Phase I, Chemical Detection and Identification, Phase II of Integrated Micro-Climatization System (IMCS).<br>- Provided management oversight and technical assistance for SOF-unique technologies, and develop enhanced SOF capabilities in coordination with U.S. Special Operations Command (USSOCOM).<br>- Initiated terrorist pathway counter proliferation Advanced Technology Demonstrations (ATD).<br>- Conducted Military Unit Assessment/Independent Validation and Verification of proven technologies.<br><br>*FY 2009 Plans:*<br>- Continue to support research and development of technologies to enhance the capabilities of U.S. Forces in the OCO to counter WMD and improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, and nuclear production, storage, and weaponization facilities.<br>- Deliver SOF-unique technologies under the SOF Venture program. Projects planned for completion: Gellants Phase II, Global Positioning Systems-Denied Navigation and Mapping, Phase III (final) of Integrated IMCS, NanoCatalysts.<br>- Continue development of various SOF-unique technologies under the SOF Venture program.<br>- Continue terrorist pathway counter proliferation ATD.<br>- Conduct Military Unit Assessment/Independent Validation and Verification of proven technologies. Provide management oversight and technical assistance for SOF-unique technologies, and develop enhanced SOF capabilities in coordination with USSOCOM.<br>- Develop WMD/Improvised Explosive Device anti-terrorism technologies that will increase Explosive Ordnance Disposal capabilities to identify, defeat and contain a radiological dispersal devise.<br>- Initiate Pilot Phase to establish the Counter Weapons of Mass Destruction – Terrorism Support Cell. | | | | |

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| *FY 2010 Plans:*<br>- Continue development and then transition new technologies for Joint U.S. Military Forces to counter Weapons of Mass Destruction (WMD), enabling warfighters, specifically Special Operations Forces (SOF), to improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, and nuclear production, storage, and weaponization facilities.<br>- Characterize networks.<br>- Characterize material properties of Ultra-High Performance Concrete.<br>- Initiate funding for three 48-month technology solutions.<br>- Knowledge Management Objectives: Threat Assessment, acquire emergent fireset design and build; characterization & testing; classified Research and Development programs to counter emergent threat(s).<br>- Integrate and federate national intelligence with operations research systems analysis capabilities to support planning and operations. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Number of technologies developed and delivered, and/or proof of concept, or successful Military Utility Assessments conducted that increase the potential mission success and reduces the number of current gaps in SOF capabilities to counter weapons of mass destruction when conducting Overseas Contingency Operations.

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| COST ($ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| RF: Detection Technology | 38.140 | 46.357 | 66.977 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project develops technologies, systems and procedures to detect, identify, track, tag, locate, monitor and interdict strategic and improvised nuclear and radiological weapons, components, or materials in support of Department of Defense requirements for combating terrorism, counter- and non-proliferation, homeland defense, and international initiatives and agreements. This project researches, develops, demonstrates, and transitions advanced technologies to improve: operational capability to detect and identify nuclear and radiological weapons; post-detonation National Technical Nuclear Forensics capabilities; and to support the attribution process. Efforts under this project also support international peacekeeping and nonproliferation objectives, on-site and aerial inspections and monitoring, on-site sampling and sample transport, and on- and off-site analysis to meet forensic, verification, monitoring and confidence-building requirements.

The Detection Technology project under Weapons of Mass Destruction Proliferation Prevention and Defeat emphasizes the advanced technology development and engineering portion of the overall effort.

Efforts within the program element are re-balanced beginning in FY 2010 to support the nuclear forensics Joint Capability Technology Demonstration to employ mature technologies and to improve procedures to address gaps identified by the National Technical Nuclear Forensic (NTNF) Capabilities Based Assessment to advance capabilities across the entire post detonation NTNF system.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RF: Detection Technology | 38.140 | 46.357 | 66.977 | |
| *FY 2008 Accomplishments:*<br>- Developed integrated detection systems exploiting advances in solid state nuclear detectors, processing electronics, analysis software, identification technology, and integrated nuclear/biological/chemical sensor technology, eliminating the logistical burden of cryogenic cooling as well as bulky gas detectors.<br>- Completed a Joint Capability Technology Demonstration (JCTD) effort demonstrating a modular nuclear radiation detection system capable of being mounted on multiple platforms (vehicular, aerial, marine, and handheld) and being deployed in both overt and covert situations and that can be seamlessly integrated into a sensor network to provide battle space awareness for the theater commander. This JCTD should result in transitioning a viable modular nuclear detection system to Combatant Commands. | | | | |

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Completed development of a baseline Department of Defense large standoff Bremsstrahlung active interrogation system to provide a reference standard for evaluating progress and capabilities in standoff detection and warning of hidden and shielded nuclear material.<br>- Demonstrated standoff detection of nuclear material in a field environment. Stimulated fissions in nuclear material from 300 meters standoff using a Bremsstrahlung x-ray generator.<br>- Executed evaluation of distributed sensor systems, their communications, and their signal processing to support a prioritized development program of networks for defense, security and tracking.<br>- Prepared for and executed Inter-Agency end-to-end exercise/demonstration of global National Technical Nuclear Forensics for Attribution capabilities.<br>- Developed sensors to detect Weapons of Mass Destruction (WMD) threats as far forward as possible and in all operational environments. Develop the capability to integrate data with future interagency comprehensive, all-domain WMD detection architecture from collection to dissemination.<br>- Provided enhanced technical support and analysis to the Nuclear Weapons Council and Nuclear Weapons Council Standing and Safety Committee and other high-level committees and senior decision-makers to transform the nuclear stockpile and infrastructure.<br>- Maintained the Domestic Nuclear Event Attribution legacy and development of National Technical Nuclear Forensics thru monthly notification drills, quality assurance/quality control testing, and successfully conducted three table top exercises and five Field Training Exercises (FTX), the last being an external evaluation. The last FTX demonstrated a limited ground collection capability.<br>- Improved the ANDROS robot via several modifications to improve range and ability to perform improved sampling, maneuverability, logistic requirements, and communications.<br>- Developed an initial Concept of Operations and Standard Operating Procedures for ground sample collection.<br>- Enhanced/maintained the Sentry/Sniper databases. Integrated chemical and biological weapon information and a decision matrix into a comprehensive WMD database.<br>- Continued hardware and software improvements based on laboratory and user training sessions for the Hand Held Chemical Detector for Special Operation Forces. Began development at a library suite consisting of Chemical Warfare Agents, precursor, and Homemade Explosives. | | | | |

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| **B. Accomplishments/Planned Program ($ in Millions)** | | **FY 2008** | **FY 2009** | **FY 2010** | **FY 2011** |
| - Developed equipment that is waterproof, shockproof and resistant to extreme conditions and sustained employment without significant operational degradation. Developed smaller, lighter-weight detection systems for more adverse field employment.<br>- Successfully transitioned eight near-term nuclear detection technologies to generate prototypes and design packages to assist ground forces.<br><br>*FY 2009 Plans:*<br>- Continue program for developing integrated detection systems exploiting advances in solid state nuclear detectors, processing electronics, analysis software, identification technology, and integrated nuclear/ biological/chemical sensor technology.<br>- Initiate a full scale test and evaluation campaign for Compton imagers and a second generation effort to develop more integrated and compact imagers with enhanced capability. These second generation imagers will be more optimized to operate with an active excitation source directed at the target item.<br>- Continue program to develop systems that enable consequence management, to include the protection of forces.<br>- Perform field demonstrations of new detector technologies for handheld detectors, distributed sensors, and vehicle-mountable detector systems, to improve the ability of fielded forces to detect, locate, and identify nuclear materials in the battle space. Continue to improve performance of new detector materials, imaging and spectroscopy systems, and signals analysis methods through rigorous field testing.<br>- Continue the extensive effort begun in the Joint Capability Technology Demonstration (JCTD) to integrate solid state detectors, communications, and processors into a robust self-configuring sensor network for detecting, identifying, and tracking nuclear materials in transit.<br>- Complete a testing and evaluation program to assess the capabilities of biomarker expression for monitoring acute radiation exposure in Messenger Ribonucleic Acid and proteins utilizing voluntary human subjects, probably oncology patients, to evaluate the ability of the biodosimeter to accurately measure exposure.<br>- Continue to develop upgraded technical capabilities for prompt and debris sample collection, sample analysis, and integration of design modeling and forensic data to support development of technical conclusions. | | | | | |

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Develop technical information to support programmatic decisions regarding next-generation ground sampling capabilities, marine sampling capability, and next-generation Unmanned Aerial Systems for air and for ground sampling. Support potential development/conduct of a Nuclear Forensics JCTD.<br>- Continue to provide enhanced technical support and analysis to the Nuclear Weapons Council and Nuclear Weapons Council Standing and Safety Committee and other high-level committees and senior decision-makers to transform the nuclear stockpile and infrastructure.<br>- Commence an initial JCTD effort demonstrating portable stand off Bremsstrahlung active interrogation system capable of being mounted on an aerial platform that can be seamlessly integrated into a bi-static or mono-static detector network to provide battle space awareness for hidden and shielded nuclear material the theater commander. This JCTD should result in transitioning a viable stand off active interrogation system to Combatant Commands.<br>- Demonstrate active interrogation as a safe method of stand off detection where dose to people and cargo are below the allowable limits.<br>- Continue cooperation and acceptance of Research and Development Enterprise developed detection technologies for operational development.<br>- Continue cooperation and acceptance of Research and Development Enterprise developed post nuclear event collection technologies for operational development.<br>- Continue transitioning multiple near term technologies to generate prototypes and design packages to assist ground forces.<br>- Exercise developmental collection capabilities with table top exercises, command post exercises, and field training exercises.<br>- Continue Enhancement/maintenance of the Sentry/Sniper databases. Integrate chemical and biological weapon information and a decision matrix into a comprehensive weapons of mass destruction database.<br>- Continue robotic ground sample collection improvements.<br>- Continue development Techniques, Tactics, and Procedures of a nuclear forensics ground sample collection team.<br>- Conduct modeling, simulation and experiments to evaluate the feasibility of using muons and protons to stimulate fissions in nuclear materials from standoff ranges.<br>- Conduct/support Inter-Agency end-to-end exercise/demonstration of global National Technical Nuclear Forensics for attribution capabilities. | | | | |

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Continue refinement of the Concept of Operations (CONOPS) and Standard Operating Procedures (SOP) for ground sample collection.<br>- Continue to enhance/maintain the Sentry/Sniper databases. Continue integrating chemical and biological weapon information and a decision matrix into a comprehensive weapons of mass destruction database.<br><br>*FY 2010 Plans:*<br>- Complete design for a baseline Department of Defense large standoff proton active interrogation system to provide a reference standard for evaluating progress and capabilities in standoff detection and warning of hidden and shielded nuclear material.<br>- Continue the extensive effort begun in the stand off Bremsstrahlung active interrogation system Joint Capability Technology Demonstration to develop a system capable of detecting hidden and shielded nuclear material.<br>- Perform field demonstrations of new detector technologies for handheld detectors, distributed sensors, and vehicle-mountable detector systems, to improve the ability of fielded forces to detect, locate, and identify nuclear materials in the battle space. Continue to improve performance of new detector materials, imaging and spectroscopy systems, and signals analysis methods through rigorous field testing.<br>- Continue to develop and field (prototype) upgraded technical capabilities for prompt and debris sample collection, sample analysis, and integration of design modeling and forensic data to support development of technical conclusions.<br>- Provide enhanced technical support and analysis to the Nuclear Weapons Council and Nuclear Weapons Council Standing and Safety Committee and other high-level committees and senior decision-makers to transform the nuclear stockpile and infrastructure.<br>Investigate the use of muon and proton beams for standoff stimulation of fission in nuclear materials. Conduct experiments to validate the feasibility of the approach.<br>- Continue refinement of the CONOPS and SOP for ground sample collection.<br>- Continue to enhance/maintain the Sentry/Sniper databases. Continue integrating chemical and biological weapon information and a decision matrix into a comprehensive weapons of mass destruction database. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RF |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 26/0602718BR/WMD Defeat Technologies | 47.087 | 39.498 | 48.073 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Use an active interrogation system to interrogate and differentiate Special Nuclear Materials and an inert material in the field.

Conduct/support end-to-end National Technical Nuclear Forensics capabilities exercise and supporting demonstration(s).

Successfully develop data integration capability with future interagency comprehensive, all domain weapons of mass destruction detection architecture.

Continue to develop upgraded technologies for sample collection, sample analysis, and data analysis; develop plan for faster diagnostics based on technology demonstrations; formulate program direction for advanced forensic sampling concepts.

Detection standoff distance: handheld identification of 1 kilogram of shielded Highly Enriched Uranium at five meters.

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | | | | | | | DATE: May 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | PROJECT NUMBER<br>RG | |
| **COST ($ in Millions)** | **FY 2008 Actual** | **FY 2009 Estimate** | **FY 2010 Estimate** | **FY 2011 Estimate** | **FY 2012 Estimate** | **FY 2013 Estimate** | **FY 2014 Estimate** | **FY 2015 Estimate** | **Cost To Complete** | **Total Cost** |
| RG: Advanced Energetics & Counter WMD Weapons | 20.029 | 20.550 | 21.396 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project provides advanced technology development and demonstration for defeating Weapons of Mass Destruction (WMD) targets (including facilities with biological and chemical agents) while minimizing collateral damage and release of those agents when using air, land and sea assets brought to the theater by the warfighters. These objectives will be accomplished by a combination of developing and/or maturing technologies, weapon systems, weapon concepts and methods. Supported products are: (1) advanced counter-WMD weapons, fuzing technology, and robotics; (2) counter force agent defeat weapons and methods; and (3) disruptive payloads and delivery systems.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RG: Advanced Energetics & Counter WMD Weapons | 20.029 | 20.550 | 21.396 | |
| *FY 2008 Accomplishments:*<br>- Continued development of advanced Counter-WMD weapons and counter-force agent defeat weapons.<br>- Completed GSI33 robustness test series.<br>- Completed successfully kinetic fireball test series.<br>- Continued matrix testing of WMD simulants.<br>- Continued diagnostics development for WMD defeat<br>- Conducted high speed munitions warhead component level tests supporting demonstration of improved penetration over fielded weapons.<br>- Characterized and develop defeat mechanisms for ultra-hard target materials.<br>- Initiated development of Directed Energy payload for demonstration of a counter WMD deny/disrupt mission concept.<br>- Completed static detonation of Bomb, Live Unit (BLU)-121 in tunnel (Midway Indigo 21) for weapons effects.<br>- Completed integration of BLU-121 warhead with Guided Bomb Unit-24 guidance kit.<br>- Completed Alternate BLU-121 Manufacturing Process Qualification Testing. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RG |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Continued development of deployable weapon-borne Battle Damage Information sensor for use on conventional weapons.<br>- Conducted Advanced Fuzing sled tests at Holloman Air Force Base.<br><br>*FY 2009 Plans:*<br>- Continue development of advanced counter-Weapons of Mass Destruction (WMD) weapons and counter-force agent defeat weapons.<br>- Integrate/test Insensitive Munitions Agent Defeat Bomb, Live Unit (BLU)-109 payload supporting U.S. Air Force tactics, techniques and procedures for the Shredder program.<br>- Complete Joint Direct Attack Munitions Guidance Kit Integration and Demonstration with BLU-121.<br>- Produce BLU-121 technical data package for transition to program of record.<br>- Conduct sub-scale testing of counter-WMD kinetic and non-kinetic based payloads.<br>- Continue development of non-kinetic payloads and novel materials.<br>- Support the Acquisition Transition Program Support and Weapon Effects Targeting Analysis for BLU-121.<br>- Support Thermobaric Advanced Concept Technology Demonstrations All Up Round Penetration Sled Test.<br>- Continue Integrated Precision Ordnance Delivery System (IPODS) Production Decision Review and contractor down select.<br>- Develop penetrating munitions concepts to defeat ultra-hard targets.<br>- Conduct full-scale sled tests of advanced void-sensing fuze for a 1000 pound penetrator system.<br><br>*FY 2010 Plans:*<br>- Conduct Massive Ordnance Penetrator validation tests for Advance Payloads.<br>- Conduct IPODS Concept Design (aero & warhead).<br>- Conduct IPODS scaled lethality/effects test.<br>- Initiate Modular Autonomous Counter WMD System Concept Development trade studies.<br>- Continue development of non-kinetic based counter-WMD process modeling capability and apply it to specific counter-WMD targets<br>- Continue development of novel thermal based payloads. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RG |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Conduct live stimulant matrix testing. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 26/0602718BR/WMD Defeat Technologies | 24.744 | 30.435 | 32.381 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Percent increase of counter Weapons of Mass Destruction (WMD) weapon performance compared to fielded weapons (e.g. Bomb, Live Unit (BLU)-109 and BLU-113).

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | | | | | | | DATE: May 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | PROJECT NUMBER<br>RI | |
| COST ($ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| RI: Nuclear Survivability | 21.432 | 18.654 | 13.935 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project develops and demonstrates Radiation Hardened Microelectronics (RHM) for nuclear hardening and survivability of Department of Defense (DoD) systems on the Radiation Hardened Oversight Council Technology Roadmap and provides for the execution of force-on-force evaluations and nuclear weapons surety efforts to enhance the protection of nuclear resources.

The RHM program responds to DoD space and missile system requirements for RHM and photonics technology to support mission needs. This program develops and demonstrates radiation-hardened, high performance prototype microelectronics to support the availability of RHM and photonics for DoD missions from both private sector and government organizations.

Mighty Guardian Force-on-Force tests aid in satisfying requirements for the U.S. Air Force and U.S. Navy by providing denial of access to nuclear weapons in all environments; operational, storage and in transit. The results of the evaluations identify security vulnerabilities to weapons systems that are then addressed through targeted application of research and development projects requested by the U.S. Air Force and U.S. Navy resource owners. These projects are designed to demonstrate, test, and evaluate security enhancement systems prior to service procurement.

Nuclear Weapons Surety, as tasked by the DoD Nuclear Weapon System Safety Program, provides Combatant Commands (COCOMs), Services, and Joint Chiefs of Staff with technical analyses, studies, research, and experimental data necessary to identify and quantify risks of plutonium dispersal and Loss of Assured Safety due to accidents, fires or natural causes during peacetime operations of the nation's nuclear weapon systems. Additionally, this will provide studies necessary to quantify the probability of success against targeted terrorist attacks on DoD facilities, while leveraging these risk assessment advances. It also provides new and innovative technologies for the protection of nuclear resources in support of COCOMs and Services.

Funding in this project reflects the re-balancing of efforts within the research and development portfolio to augment the Radiation Hardened Microelectronics Program and enabling technologies to enhance the Nuclear Weapons Effects experimentation capability in Program Element 0602718BR.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RI: Nuclear Survivability | 21.432 | 18.654 | 13.935 | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RI |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| *FY 2008 Accomplishments:*<br>- Demonstrated bulk silicon 90 nanometer (nm) radiation hardened by design (RHBD) technology and design libraries.<br>- Demonstrated intermediate RHBD 90nm digital, analog and mixed-signal System on a Chip (SOC).<br>- Performed initial characterization of single event effects in 90nm technology and 65nm technologies.<br>- Demonstrated that greater than 4 gigahertz high speed radiation effects test capability.<br>- Demonstrated radiation hardened 90/150nm analog/mixed-signal Phased/Delay Lock Loop circuits.<br>- Demonstrated 150nm radiation hardened bulk silicon & silicon-on-insulator libraries and electronic design automation technology.<br>- Conducted exploratory research on physical security equipment and technology designed to enhance protection of the nuclear stockpile as determined by the Services.<br>- Completed Mighty Guardian XI at White Sands Missile Range, NM in December 2007 to evaluate nuclear security policy as it applies to Fast Burn Reactor Security.<br>- Planned, started and executed Mighty Guardian at Minot Air Force Base, ND in March 2008 to evaluate nuclear security policy as it applies to Launch Facility Security. The exercise was postponed; and will be re-scheduled, location to be determined.<br>- Planned Mighty Guardian XIII Force-On-Force test at Naval Base Kitsap, WA to evaluate nuclear security policy as it applies to weapons movement convoys from the limited area to the explosives handling wharf.<br><br>*FY 2009 Plans:*<br>- Demonstrate final RHBD 90nm digital, analog and mixed signal SOC.<br>- Demonstrate radiation hardened 150nm combined digital and analog/mixed signal Application-Specific Integrated Circuit.<br>- Demonstrate bulk silicon 90nm RHBD digital and analog/mixed signal libraries and SOC electronic design automation technology.<br>- Demonstrate intermediate RHBD 90nm reconfigurable Field Programmable Gate Array.<br>- Demonstrate 90nm radiation hardened by process development structure and methods. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RI |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Conduct Mighty Guardian XII Force-On-Force test at Naval Base Kitsap, WA to evaluate nuclear security policy as it applies to weapons movement convoys from the limited area to the explosives handling wharf.<br>- Planning Mighty Guardian XI Force-On-Force test to evaluate nuclear security policy as it applies to bomber generation at a location to be determined in the Air Combat Command area of operations.<br>- Conduct exploratory research on physical security equipment and technology designed to enhance protection of the nuclear stockpile as determined by the Services.<br><br>*FY 2010 Plans:*<br>- Perform initial characterizations of single event effects in commercial 45nm bulk and silicon-on-insulator technology.<br>- Conduct Mighty Guardian XIII Force-On-Force test to evaluate nuclear security policy as it applies to bomber generation at a location to be determined in the Air Combat Command area of operations.<br>- Planning Mighty Guardian XIV Force-On-Force test at Kings Bay, GA, to evaluate nuclear security policy as it applies to Launch Facility Security.<br>- Planning Mighty Guardian to evaluate nuclear security policy as it applies to the waterfront.<br>- Conduct exploratory research on physical security equipment and technology designed to enhance protection of the nuclear stockpile as determined by the Services. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 25/0602718BR/WMD Defeat Technologies | 13.063 | 10.414 | 18.660 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RI |

**E. Performance Metrics**

Achieve Radiation Hardened (RH) 150nm, RH 150nm 16 meters Static Random Access Memory and Radiation Hardened by Design 90nm reconfigurable Field Programmable Gate Array.

Achieve RHBD 90nm digital, analog and mixed signal System-On-a-Chip and digital and analog/mixed signal libraries.

Successful completion of Mighty Guardian exercises is measured by completing all necessary planning and logistics steps, troops arriving when required, training completed, execution of the exercise, redeployment of forces, and publishing a final report within 90 days of completion.

Successful completion of exploratory research for physical security equipment and technology is determined by performers completing the project on-time and within budget, all stated tasks in the statement of objectives being met, proper reporting and coordination of decision areas, receipt of final reports closing out the project, and transitioning the project to the requesting Service.

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | | | | | | | DATE: May 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | PROJECT NUMBER<br>RL | |
| COST ($ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| RL: Nuclear & Radiological Effects | 0.300 | 0.000 | 0.000 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

Nuclear and Radiological Effects develops nuclear and radiological assessment modeling tools to support military operational planning, weapon effects predictions, and strategic system design decisions; consolidate validated Defense Threat Reduction Agency modeling tools into net-centric environment for integrated functionality; predict system response to nuclear and radiological weapons producing electromagnetic, thermal, blast, shock and radiation environments - key systems include Nuclear Command and Control System, Global Information Grid, missiles, structures, humans and environment; provide detailed adversary nuclear infrastructure characterization to enhance counterforce operations and hazard effects; conduct analyses in support of nuclear and radiological Science and Technology and address the priority needs of Combatant Commands and Department of Defense.

Efforts in the areas of advanced modeling systems and survivability technology are re-balanced to increase corporate capabilities in systems engineering and analysis support across all other projects within the research and development portfolio. The impacts delay full 3-D modeling and simulation efforts for electromagnetic pulse response and consequence management predictions, to include second and third order effects.

FY 2008 Funds were applied and executed as 6.3 Project RL funding. All future funding for this effort will be in 6.2 Project RM.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RL: Nuclear Survivability | 0.300 | 0.000 | 0.000 | |
| *FY 2008 Accomplishments:*<br>- Continued technical revisions to Redbook Volumes I-IV, Effects Manual-1, and further publishing of Joint Radiation Effects documentation. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RL |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 115/0605000 /WMD Defeat Capabilities | 15.296 | 15.896 | 8.735 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | | | | | | | DATE: May 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | PROJECT NUMBER<br>RM | |
| COST ($ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| RM: WMD Battle Management | 36.198 | 55.621 | 31.939 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project develops, integrates, demonstrates and transitions emerging/innovative technologies to support the counter Weapons of Mass Destruction (WMD) Mission. This activity specifically focuses on two critical components in countering the WMD threat:

Develop end-to-end planning capabilities including weaponeering tools to aid the Combatant Commander's targeting and weapons officers in choosing the proper weapon, fuze, and employment parameters to optimize the defeat of WMD and related hard targets. Deliver modernized, validated and fast running attack planning tools and integrating software. Leverage attack planning tools to support force protection planners and vulnerability assessment teams.

Develop, integrate, demonstrate and transition emerging/innovative technologies to provide the warfighter with an enhanced near real-time combat and battle damage assessment capability. Capability is achieved through the development of Unmanned Aerial Systems and weapon-based sensors, platforms, taggants, seekers and other innovative technologies to; remotely sense, identify, track and target WMD-related threats; perform battle damage assessment/indication of strikes against these threats; and locate, track, collect, detect, selectively identify, and characterize Chemical Weapon and Biological Weapon aerosol agents released during these WMD counterforce strikes.

Funding in this project is realigned as part of the Agency decision to re-balance efforts within its research and development portfolio to realize the Department of Defense investment goal for basic research of 10-12% of Total Obligation Authority. The reductions are in the areas of advanced modeling systems and survivability technology. The impacts are delayed full 3-D modeling and simulation efforts for electromagnetic pulse response and consequence management predictions to include third order effects.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RM: WMD Battle Management | 36.198 | 55.621 | 31.939 | |
| *FY 2008 Accomplishments:*<br>- Continued development of WMD reconnaissance technologies and WMD planning tools.<br>- Conducted demonstration to validate tunnel facility defeat using optimized inventory weapons attack on Capitol Peak Tunnel facilities, White Sands Missile Range. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RM |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Developed an enhanced capability to launch and control FINDER Unmanned Aerial Vehicle MQ-1 Predator to address U.S. Air Force Special Operations Command requirement for off-board, below the weather imagery for pre-strike target identification and post-strike battle damage assessment.<br>- Conducted Spiral 1 demonstration of the Biological Combat Assessment System.<br>- Conducted full scale static testing of taggant technology in Bomb, Live Unit-116 Advanced Unitary Penetrator.<br>- Conducted risk reduction studies for Weapons of Mass Destruction (WMD) Aerial Collection System (WACS).<br>- Delivered Integrated Munitions Effects Assessment (IMEA) with improved groundshock model.<br>- Delivered Vulnerability Assessment and Protection Option (VAPO) with improved models for global response of framed structures.<br>- Integrated advanced command and control capabilities into Defense Threat Reduction Agency (DTRA) Operations Center such as the Army's Command Post of the Future (CPoF) and Joint Forces Command's “Joint” variant of CPoF for improved situational awareness.<br>- Integrated WMD data from the Intelligence Community, Combatant Commands (COCOMs), Services, and Agencies into the WMD Common Operating Picture and continued research and development to provide that information to existing command, control, communications, computers, and intelligence systems.<br>- Started transition of technologies demonstrated under the Tunnel Target Defeat Advanced Concept Technology Demonstrations to U.S. Strategic Command and Defense Intelligence Agency.<br><br>*FY 2009 Plans:*<br>- Continue development of WMD reconnaissance technologies and WMD planning tools.<br>- Study/develop prototype dispense delivery mechanisms for high speed weapons in support of Global Strike combat assessment requirements.<br>- Complete developmental testing of sensor suite for real-time, weapon-borne Battle Damage Indication system.<br>- Award integration contract for the WMD WACS.<br>- Develop IMEA with integration of additional net-centric components for weaponeering.<br>- Develop VAPO integrating a computational fluid dynamic capability. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
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| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RM |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Conduct demonstration to validate command, control and communications tunnel facility defeat using optimized inventory weapons attack on Hard Target Defeat Facility 2 tunnel (Nevada Test Site).<br>- Continue to integrate advanced command and control capabilities into DTRA Operations Center including the Global Command and Control System version 4 software suites which will allow DTRA to seamlessly share information between COCOMs and the inter-agency community.<br>- Integrate improved geospatial information, such as that provided by National Geospatial-Intelligence Agency, National Reconnaissance Office, and Wide Field of View Electro-Optical/Infra red data, into the WMD Common Operating Picture and other Command and Control capabilities for enhanced decision support.<br>- Enable Data discovery of WMD related activity propagating from all sources and data repositories using the Persistent Surveillance Test bed, Network Intelligence Surveillance and Reconnaissance, and Smart Agent technologies.<br>- Provide common standards to network sensors, and data sources into common operating pictures providing WMD intelligence fusion.<br>- Characterize Hyperspectral sensors and data for proactively identifying WMD precursor activity and post strike Battle Damage Assessment.<br>- Develop near real time Concept of Operations (CONOPS) for Constant Hawk and enable on board processing of the camera upgrade Electro-Optical sensor with Chemical, Biological, Radiological, Nuclear, and Explosive Incidents and sensor overlay functionality.<br>- Complete transition of technologies demonstrated under the Tunnel Target Defeat Advanced Concept Technology Demonstrations to U.S. Strategic Command and Defense Intelligence Agency.<br><br>*FY 2010 Plans:*<br>- Complete Global Strike battle damage assessment Phase 2 field demonstration.<br>- Continue development of WMD Aerial Collection System.<br>- Operationalize Tactical Microsatellite Experiment 3's Hyperspectral Imaging sensor for Counter WMD using Counter WMD Analysis Cell exploitation.<br>- Identify signatures and establish test beds for sensors to find fix and track WMD related items and people.<br>- Validate and transition the near real time CONOPS for Constant Hawk to the warfighter. | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
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| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RM |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Enable High Altitude Long Endurance Unmanned Aerial Vehicles (UAV) to relay sensor data.<br>- Demonstrate capability to control FINDER UAV from an airborne control station and demonstrate FINDER auto-recovery capability.<br>- Promulgate collaboration and decision support tool solutions into the Defense Threat Reduction Agency (DTRA) Operations Center through identification and procurement of cutting-edge technologies, completion of security accreditation, installation upon approval, and implementation of a comprehensive training program for the user community.<br>- Administer situational awareness solutions into the DTRA Operations Center through an analysis of alternatives of government off-the-shelf and commercial off-the-shelf products for next-generation data analysis and visualization.<br>- Deliver Integrated Munitions Effects Assessment 2010 with Advanced Targeting Assessment Capability 1.0 integrated engine.<br>- Perform annual cycle of requirements collection, challenge proposals, resource allocation and tech support through High Performance Computing.<br>- Provide Targeting and Weaponeering Analysis Cell academics and targeting support. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 20/0602718BR/WMD Defeat Technologies | 17.374 | 29.137 | 13.240 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Stand off detection range of WMD reconnaissance system.

Number of new capabilities delivered to Combatant Commanders (COCOMs).

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
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| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RM |

Number of weaponeering solutions delivered to COCOMs.

Increase automation of the analytic process used by Defense Threat Reduction Agency Reachback, DTRA Operations Center and the U.S. Strategic Command Center for Combating WMD.

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | | | | | | | DATE: May 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | PROJECT NUMBER<br>RT | |
| COST ($ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| RT: Target Assessment Technologies | 26.442 | 26.193 | 32.294 | | | | | | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

For some hard and deeply buried targets, physical destruction is neither possible, nor practical, with current conventional weapons and employment techniques. It may be possible, however, to achieve target defeat objectives by denying or disrupting the mission or function of the target facility. Functional defeat, however, requires more information, more detailed analysis of the target. The functional defeat process includes finding and identifying a facility, characterizing its function and physical layout, determining its vulnerabilities to available weapons, planning and executing an attack, assessing damage, and if necessary, suppressing reconstitution efforts and re-attacking the facility. Target Assessment Technologies provides the Combatant Commands and the Intelligence Community with technologies and processes to find and characterize hard and deeply buried targets and then assess the results of attacks against those targets. Overall objectives are to develop new methodologies, processes and technologies for detecting, locating, identifying, physically and functionally characterizing, modeling, and assessing new and existing hard and deeply buried targets to support full dimensional defeat operations. Extending this activity and applying these processes to Weapons of Mass Destruction (WMD) target characterization and threat analysis presents the next technical challenge. The Target Assessment Technologies project now consists of three subordinate and related activities: (1) Targeting and Intelligence Community Technology Development; (2) Find, Characterize, Assess Technology Development; and (3) the newly added WMD Analysis Cell Technology Support.

The increase in funding within this project is due to the re-balancing of efforts from Project RM – WMD Battle Management to enhance the Combating WMD Analysis Cell effort, which is patterned after the Hard Target Research and Analysis Center model to develop and integrate new software, engineering, and modeling methodologies, technology, and vulnerability support.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RT: Target Assessment Technologies | 26.442 | 26.193 | 32.294 | |
| *FY 2008 Accomplishments:*<br>- Enhanced the Underground Targeting and Analysis System software capability to model additional Underground Facility structural details and WMD functional features.<br>- Conducted a Underground Facility (UGF) vulnerability assessment exercise with the operations and intelligence participants to gauge the effectiveness of target characterization tools and processes. | | | | |

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| **B. Accomplishments/Planned Program ($ in Millions)** | | **FY 2008** | **FY 2009** | **FY 2010** | **FY 2011** |
| - Developed additional geological models and enhanced site-specific geological characterization processes to increase the fidelity and accuracy of UGF characterizations.<br>- Continued to provide target characterization training to increase the size and expertise of the UGF and Weapons of Mass Destruction (WMD) target defeat communities.<br>- Started prototype development and testing of an Integrated Sensor System for support of Combatant Commands (COCOMs) and Intelligence Community UGF characterization and assessment needs.<br>- Continued development of a UGF signatures database to facilitate functional characterization of UGF targets by the COCOMs and Intelligence Community.<br>- Established the Counter WMD Analysis Cell activity in collaboration with Defense Intelligence Agency.<br><br>*FY 2009 Plans:*<br>- Deliver enhanced Underground Targeting and Analysis System (UTAS) special operations mission planning capabilities to the special operations community.<br>- Analyze and report the findings of the UGF vulnerability assessment exercise conducted in FY 2008 to evaluate the effectiveness of our tools and processes to support the characterization of UGF and WMD targets.<br>- Continue to provide target characterization training to the UGF and WMD target defeat communities.<br>- Continue development of a UGF signatures database to facilitate functional characterization of UGF targets for the COCOMs and Intelligence Community.<br>- Continue development of enhanced site-specific geological characterization processes and foreign geology templates to increase the fidelity and accuracy of our UGF characterizations.<br>- Continue development and testing of the prototype Integrated Sensor System to support the UGF and WMD target characterization and assessment processes.<br>- Demonstrate the capability of the Counter WMD Analysis Cell to model and analyze nuclear weapons threats and issues.<br><br>*FY 2010 Plans:*<br>- Deliver UTAS functional process modeling and point mensuration capability to the COCOMs and Intelligence Community. | | | | |

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| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| - Fully integrate UTAS modeling capability into the DIA Underground Facility Analysis Center target characterization process and products.<br>- Continue to provide target characterization training for the UGF and WMD target defeat communities.<br>- Demonstrate the capabilities of a prototype Integrated Sensor System to support the Underground Facility and Weapons of Mass Destruction (WMD) target characterization and assessment processes of the Combatant Commands (COCOMs) and Intelligence Community.<br>- Demonstrate added Counter WMD Analysis Cell capabilities to model and analyze biological weapons threats in support of COCOMs Command and Intelligence Community needs.<br>- Research and develop models for analysis and assessment of weapons effects on WMD related equipment and systems for use by the Intelligence Community. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Incorporation of Defense Threat Reduction Agency (DTRA) Underground Targeting and Analysis System (UTAS) 3-D models into Defense Intelligence Agency (DIA) standard targeting products by the end of FY 2010.

Attainment of final National Geospatial Intelligence Agency certification of UTAS geospatial information functionalities by the end of FY 2010.

Demonstration of an end-to-end hand emplaced Integrated Sensor System prototype by the end of FY 2010.

Demonstration against a realistic test target of the capability of a deployed sensor system to decrease uncertainty and improve fidelity of characterization and near-real-time damage assessment.

By FY 2009, demonstrate an initial Counter Weapons of Mass Destruction (CWMD) Analysis Cell capability to perform analysis of nuclear threats in response to Combatant Command and Intelligence Community needs.

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|---|---|---|
| **APPROPRIATION/BUDGET ACTIVITY**<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | **R-1 ITEM NOMENCLATURE**<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | **PROJECT NUMBER**<br>RT |

By FY 2010, demonstrate an initial CWMD Analysis Cell capability to perform analysis of biological weapons threats in response to COCOMs and Intelligence Community needs.

Demonstrate CWMD Analysis Cell capability to perform technical analysis of nuclear, biological or chemical weapons threats in response to COCOMs and Intelligence Community needs.

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|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | | | | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | | | | | PROJECT NUMBER<br>RU | |
| **COST ($ in Millions)** | **FY 2008 Actual** | **FY 2009 Estimate** | **FY 2010 Estimate** | **FY 2011 Estimate** | **FY 2012 Estimate** | **FY 2013 Estimate** | **FY 2014 Estimate** | **FY 2015 Estimate** | **Cost To Complete** | **Total Cost** |
| RU: *Fundamental Research for Combating WMD | 1.185 | 0.000 | 0.000 | | | | | | Continuing | Continuing |

**Note**

*Project title change from Basic Research for WMD Knowledge Gaps starting in FY 2010

**A. Mission Description and Budget Item Justification**

To foster and enable farsighted, high payoff research focused on the unique challenges related to reducing, eliminating, countering and mitigating the effects of weapons of mass destruction (WMD) by advancing the fundamental knowledge and understanding in the sciences, facilitating the transition of basic research to the applied research stakeholders, and complimenting agency applied research efforts with university research capabilities. These 6.3 funds represent an artifact of internal reprogramming actions within Defense Threat Reduction Agency (DTRA) to support the new basic research (6.1) program that DTRA initiated in FY 2007. Creation of the DTRA 6.1 program required internal programming from multiple sources in FY 2007 and FY 2008.

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| RU: Fundamental Research for Combating WMD | 1.185 | 0.000 | 0.000 | |
| *FY 2008 Accomplishments:*<br>- Expanded the FY 2007 basic research portfolio to 80 basic research initiatives dedicated to advancing knowledge across a broad spectrum of science and multi-disciplined research areas. The initial 30 FY 2007 grantees were composed of universities and the FY 2008 portfolio expanded the portfolio to include research by Service and National Laboratories, as well as non-profit entities with university partners.<br>- Conducted a technical review of each grant to assess the scientific advancements and progress in meeting the award's technical objectives and to foster collaborations and build relationships within the scientific community.<br>- Conducted an external panel review of the basic research program, open to Department of Defense (DoD) research stakeholders, to assess the focus and scope of the program with respect to the counter WMD challenges, and to assess the coordination of counter WMD basic research across DoD mission | | | | |

| Exhibit R-2a, PB 2010 Defense Threat Reduction Agency RDT&E Project Justification | | DATE: May 2009 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD) | R-1 ITEM NOMENCLATURE<br>PE 0603160BR Counterproliferation Initiatives - Proliferation, Prevention and Defeat | PROJECT NUMBER<br>RU |

| B. Accomplishments/Planned Program ($ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|
| space and across broader basic research community to avoid unintended duplication and ensure successful partnerships.<br>- Identified and hired three university Post-Docs in the areas of Nuclear Detection, Biosciences, and Social Sciences to provide technical expertise and to facilitate transition of university-based research to advanced applied research programs.<br>- Award of three grants supporting DTRA combating WMD basic research needs. | | | | |

**C. Other Program Funding Summary ($ in Millions)**

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/0601000 /DTRA Basic Research Initiative | 14.708 | 22.329 | 48.544 | | | | | | Continuing | Continuing |

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Project performance is measured via a combination of statistics including the number of publications generated, number of students trained in sciences and engineering supporting Department of Defense educational goals, number of research organizations participating, and percentage of participating universities on the US News & World Report “Best Colleges” list.