Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Defense Threat Reduction Agency										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	221.471	238.773	295.163	0.000	295.163	302.977	312.230	313.098	314.580	Continuing	Continuing
RA: *Systems Engineering and Innovation*	17.447	7.314	7.270	0.000	7.270	7.342	7.346	5.937	5.859	Continuing	Continuing
RE: *Counter-Terrorism Technologies*	40.270	61.268	102.395	0.000	102.395	110.987	112.267	113.675	113.380	Continuing	Continuing
RF: *Detection Technology*	60.622	70.627	90.688	0.000	90.688	89.700	89.898	90.993	91.374	Continuing	Continuing
RG: *Advanced Energetics & Counter WMD Weapons*	26.412	21.396	17.386	0.000	17.386	18.486	25.508	25.962	26.413	Continuing	Continuing
RI: *Nuclear Survivability*	9.749	13.935	14.052	0.000	14.052	13.962	13.878	14.062	14.252	Continuing	Continuing
RM: *WMD Battle Management*	37.647	31.939	28.260	0.000	28.260	26.907	27.914	28.200	28.482	Continuing	Continuing
RT: *Target Assessment Technologies*	29.324	32.294	35.112	0.000	35.112	35.593	35.419	34.269	34.820	Continuing	Continuing

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 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Defense Threat Reduction Agency	DATE: February 2010
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B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	218.958	233.203	0.000	0.000	0.000
Current President's Budget	221.471	238.773	295.163	0.000	295.163
Total Adjustments	2.513	5.570	295.163	0.000	295.163
• Congressional General Reductions		-1.150			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		6.720			
• Congressional Directed Transfers		0.000			
• Reprogrammings	11.316	0.000			
• SBIR/STTR Transfer	-3.303	0.000			
• Realignment / Internal Functional Transfer	-5.500	0.000	56.153	0.000	56.153
• Inflation Reduction	0.000	0.000	-1.249	0.000	-1.249
• Other Program Adjustment	0.000	0.000	240.259	0.000	240.259

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2009	FY 2010
Project: RA: *Systems Engineering and Innovation*		
Congressional Add: *Recovery, Recycle and Reuse (R3) of DOE Metals for DoD Applications*	0.000	1.920
Congressional Add Subtotals for Project: RA	0.000	1.920
Project: RF: *Detection Technology*		
Congressional Add: *Next Generation Intelligent Portable Radionuclide Detection and Identification Systems*	1.600	0.000
Congressional Add: *AELED IED Electronic Signature Detection*	3.200	4.800
Congressional Add: *Continuation of Adv Materials Research for Nuc Detection, CP and Imaging*	0.800	0.000
Congressional Add Subtotals for Project: RF	5.600	4.800
Congressional Add Totals for all Projects	5.600	6.720

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Change Summary Explanation

The FY 2009 increase from the previous budget submission reflects the net effect of two reprogramming actions; the FY09-04 PA reprogramming action to accelerate ongoing DTRA efforts for advanced nuclear and radiological detection systems, and the FY 09-26 PA reprogramming in support of higher priority Department needs.

The DoD did not estimate FY 2011 cost when the FY 2010 President's Budget was prepared. The FY 2011 Agency's RDT&E budget reflects increased investment in several areas which respond directly to DoD and Presidential CWMD strategic priorities. The budget adjustments close critical investment and sustainment gaps across the DTRA CWMD spectrum. Specific focus areas are: 1) Counter WMD-Terrorism (CWMD-T), 2) Joint Intelligence Preparation of the Operational Environment (JIPOE), 3) Nuclear Forensics, 4) Arms Control Monitoring, 5) Helium-3 replacement technology, and 6) Counter-WMD Analysis Cell (C-WAC). The CWMD-T develops technologies to enable the warfighter to locate, identify, characterize, and access WMDs and their production and storage facilities. It also focuses efforts to disrupt, delay, degrade, destroy or deny Chemical, Biological, Radiological, and Nuclear WMDs, all while minimizing risk to U.S. forces. The JIPOE integrates, federates, and analyzes intelligence information to forecast plausible terrorist threats for planning and conducting operations to combat WMD terrorism. Nuclear Forensics increases support post-detonation data collection and analysis to support national decision making. Arms Control Monitoring and Verification Technologies will revitalize arms control technologies to support treaty verification regimes by developing systems to improve capabilities to be more responsive to the new security environment without compromising sensitive U.S. information. Helium-3 Replacement Technology develops technologies and components for systems to reduce reliance on Helium-3 technology. C-WAC will conduct the analysis required to accelerate spiral development and deployment of new modeling capabilities across Nuclear, Biological Warfare (BW) and Chemical Warfare (CW) threat areas, enhancing fusion of R&D and intelligence support for the Combatant Commands. Sustaining these RDT&E budget increases are key to meeting national and DoD CWMD priorities.

These increases are partially offset by the internal functional transfer of advisory and assistance services from DTRA's Research, Development, Test & Evaluation, Defense-Wide account to the Operation and Maintenance, Defense-Wide account. The transfer to Operation and Maintenance reflects the internal functional realignment of advisory and assistance services and other business-related costs that were formerly captured under DTRA's Research, Development, Test & Evaluation, Defense-Wide account to the Operation and Maintenance, Defense-Wide account. As part of DTRA's continued effort to integrate and refine its functions and activities, this transfer more appropriately aligns this funding to the proper appropriation. At the Agency level, this functional transfer between appropriations will have a zero sum impact to these budget line items. An additional decrease of $1.249 million is associated with changes in the inflation rates and therefore is a price change, not a program change.

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RA: *Systems Engineering and Innovation*	17.447	7.314	7.270	0.000	7.270	7.342	7.346	5.937	5.859	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Systems Engineering and Innovation 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 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 (USEUCOM), 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 for reducing/countering the WMD threat in the COCOMs Areas of Responsibility. This project 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 provides a platform to ensure continued sustainability and viability of the nuclear weapon stockpile.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RA: Systems Engineering and Innovation	17.447	5.394	7.270	0.000	7.270
FY 2009 Accomplishments: - Organized/convened workshops for the Special Operations Command Commander (Nov 2008 on Security Force Assistance using Pakistan as a case study) and the Air Force Chief of Staff (Jun 2009 on the Air Force's Nuclear Mission and the Future of Deterrence Planning). - Institutionalized development of Combating WMD lessons learned in regional COCOMs theaters and with appropriate international staffs. - Continued 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Defense Threat Reduction Agency		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued to institutionalize linkage with NATO/SHAPE and USEUCOM in international research and development collaboration. - 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. - Continued to conduct strategic analyses and assessments on emerging Weapons of Mass Destruction (WMD) threats. - Continued to organize/conduct 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. *FY 2010 Plans:* - Institutionalize development of Combating WMD lessons learned in regional COCOMs theaters and with appropriate international staffs. - Continue to support development and update of Defense Threat Reduction Agency (DTRA) annexes to U. S. European Command (USEUCOM) Theater Security Cooperation Plans to insure DTRA assets are used to further Combating WMD mission in that theater. - Institutionalize linkage with NATO/SHAPE and USEUCOM in international research and development collaboration. - 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. - Continue to conduct strategic analyses and assessments on emerging WMD threats. - 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.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: - Continue to conduct strategic analyses and assessments on emerging WMD threats. - Continue to organize/conduct senior COCOM, Interagency, and International workshops, symposiums, and table top exercises to address key national/international strategies for reducing/ combating the WMD threat. - Continue to refine and enhance WMD lessons learned process with international staff and across the other COCOM, incorporating lessons learned from partner activities. - Continue to develop and update Defense Threat Reduction Agency (DTRA) Campaign Support Plan as directed in the Global Employment of Forces (GEF) to further Combating WMD mission across all theaters while balancing DTRA assets and managing risks as prioritized within the GEF. - Utilize institutionalized linkage with NATO/SHAPE and USEUCOM in international research and development collaboration to further develop similar international research and development collaboration within the Pacific Region in accordance with the GEF.					
Accomplishments/Planned Programs Subtotals	17.447	5.394	7.270	0.000	7.270

	FY 2009	FY 2010
Congressional Add: Recovery, Recycle and Reuse (R3) of DOE Metals for DoD Applications	0.000	1.920
FY 2010 Plans: - Funding will be used toward continued development of an efficient low cost method of obtaining lightweight specialty metals for use by the DoD. - DTRA believes this add was misdirected again in FY10. DTRA is working with Army and OSD to have this add reprogrammed to the Army.		
Congressional Adds Subtotals	0.000	1.920

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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	55.281	55.857	50.914		50.914	53.231	52.905	51.754	53.164	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 (CWMD) 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.

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 WMD threat.

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

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

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RE: *Counter-Terrorism Technologies*	40.270	61.268	102.395	0.000	102.395	110.987	112.267	113.675	113.380	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 Counterproliferation (CP) research and development resources sent directly to USSOCOM that are used to develop Special Operations Forces (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 requested increase builds upon the FY 2010 request in support of the Combating WMD-Terrorism (CWMD-T) Support Program and Arctic Mist efforts. 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 Counterproliferation and Counterterrorism 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. The Counter Weapons of Mass Destruction – Terrorism (CWMD T) Support Program integrates and federates all-source intelligence products and information with operational analysis to support the Joint Intelligence Preparation of the

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Operational Environment (JIPOE) process to forecast plausible terrorist WMD threats for planning and conducting operations to combat WMD terrorism. The CWMD-T Support Program specifically addresses a USSOCOM Statement of Requirements for Combating WMD – Terrorism.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RE: Counter-Terrorism Technologies	40.270	61.268	102.395	0.000	102.395
FY 2009 Accomplishments: - Continued to support research and development of technologies to enhance the capabilities of U.S. Forces in the OCO in countering 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. - Delivered SOF-unique technologies under the SOF Venture program. Projects completed: Gellants Phase II, Global Positioning Systems-Denied Navigation and Mapping, Phase III (final) of Integrated IMCS, NanoCatalysts, Stir Device, and Generation I Thermal Agent Defeat. - Continued development of various SOF-unique technologies under the SOF Venture program. - Continued terrorist pathway counterproliferation Advanced Technology Development (ATD). - Conducted Military Unit Assessment/Independent Validation and Verification of proven technologies. Provided management oversight and technical assistance for SOF-unique technologies, and developed enhanced SOF capabilities in coordination with USSOCOM. - Developed plans for WMD/Improvised Explosive Device anti-terrorism technologies that will increase Explosive Ordnance Disposal capabilities to identify, defeat and contain a radiological dispersal devise (FY 2010 increase in funding will enable research and development to begin resulting in an initial delivery of the short-term solutions). - Initiated Pilot Phase to establish the Combating Weapons of Mass Destruction – Terrorism Support Cell. - Initiated efforts to explore Counter-Smuggling Network development, and utilized University Strategic Partnership to develop a Black Sea Regional Academic Network in support of the Global Initiative to Combat Nuclear Terrorism.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: - Continue development and then transition new technologies for Joint U.S. Military Forces to counter 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. - Characterize networks. - Characterize material properties of Ultra-High Performance Concrete. - Initiate funding for three 48-month technology solutions. - Knowledge Management Objectives: Threat Assessment, acquire emergent fireset design and build; characterization & testing; classified Research and Development programs to counter emergent threat(s). - Integrate and federate national intelligence with operations research systems analysis capabilities to support planning and operations. - Continue Counter-Smuggling Network development, and utilize University Strategic Partnership to develop a Black Sea Regional Academic Network in support of the Global Initiative to Combat Nuclear Terrorism. *FY 2011 Base Plans:* - Continue development and then transition new technologies for Joint U.S. Military Forces to counter Weapons of Mass Destruction (WMD), enabling warfighters, specifically SOF, to improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, and nuclear production, storage, and weaponization facilities. These efforts use innovative technologies utilizing energetic, mechanical and alternative energies to improve the efficiencies and effectiveness of Joint U.S. Military Ground Force's offensive operations against CBRNE WMD production facilities. - Develop test articles for development of Ultra High-Performance Concrete tactics, techniques, and procedures. - Develop tools to enable the warfighter to combat against WMDs, their production and storage facilities and associated enablers anywhere within the terrorist pathway.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate funding for three 48-month technology solutions. - Continue work on following Knowledge Management Objectives: Threat Assessment, acquire emergent fireset design and build; charactization & testing; classified R&D programs to counter emergent threat(s). - CWMD-T Support Program achieves Full Operational Capability. Develop advanced IT infrastructure and capabilities for processing, analysis, modeling, simulation and planning; and begin development of methodologies for anticipating rare events. - Develop and transition innovative counter-WMD tools designed to locate, identify, characterize, assess and attack WMD production and storage facilities with minimal to no collateral damage or loss of life (Tempest Edge). - Conduct surreptitious Sensitive Site exploitation of high priority WMD facilities through the use of highly effective tools designed to defeat WMD production systems and enabling technologies (Tempest Edge). - This project implements the acquisition strategy contained in USSOCOM Directive 70-1, Appendix C, Special Mission Area Programs and Directive 71-4 Force Development Special Operations Forces Capabilities Integration and Development Systems (Tempest Edge). - Explosive Ordnance Disposal Device Defeat: Develop technologies and tools that characterize and identify the electronic environment and any improvised electronic triggering and firing system (Explosive Ordnance Disposal (EOD) Device Defeat). - Develop tools to enable warfighters to locate, identify and render safe improvised WMD systems (EOD Device Defeat). - Enhance the threat assessment to replicate WMD triggering designs to be reproduced and tested in order to develop render safe procedures (EOD Device Defeat). - Barrier Defeat will develop tools which enhance defeat solutions to “breach” a variety of WMD barriers (perimeter, external, internal) using a range of breaching techniques, equipment and material (Target Defeat). - Production Defeat will develop tools that enable ground forces to destroy “critical nodes” used in the production and support of WMD (Target Defeat).					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Structural Defeat will provide tools for the destruction of key entry points while collapsing the structure or rendering it unusable (Target Defeat). - Continue Counter-Smuggling Network development, and utilize University Strategic Partnership to develop a Black Sea Regional Academic Network in support of the Global Initiative to Combat Nuclear Terrorism.					
Accomplishments/Planned Programs Subtotals	40.270	61.268	102.395	0.000	102.395

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 Special Operations Forces (SOF) capabilities to counter weapons of mass destruction when conducting Overseas Contingency Operations.

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RF: *Detection Technology*	60.622	70.627	90.688	0.000	90.688	89.700	89.898	90.993	91.374	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Detection Technology 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, counterproliferation and nonproliferation, 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 rebalanced 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.

The FY 2011 budget increase predominately reflects funding increases for Nuclear Forensics. This accelerates development and implementation of accurate, rapid, and reliable global nuclear forensic capabilities to collect, analyze, and evaluate post-detonation prompt data and ground debris from a nuclear or radiological event to support attribution and National decision-making. It also funds Helium-3 replacement to develop technologies and components that serve as one-for-one replacements for systems that rely on He-3 technology. Additionally, it supports Arms Control Monitoring & Verification Technology to develop systems and technologies to improve monitoring and verification capabilities that are responsive to the new security environment without compromising sensitive US information in the international arena for the arms control treaty regime.

B. Accomplishments/Planned Program ($ in Millions)

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RF: Detection Technology	55.022	65.827	90.688	0.000	90.688

FY 2009 Accomplishments:

- Continued 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.
- Initiated 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.
- Continued program to develop systems that enable consequence management, to include the protection of forces.
- Performed 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.
-Continued 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.
-Conducted rigorous independent technical testing of developed sensors to include environmental and radiological performance.
-Continued to improve performance of new detector materials, imaging and spectroscopy systems, and signals analysis methods through rigorous field testing.
- Conducted four operational demonstrations utilizing the Smart Threads Integrated Radiological Sensors Joint Capability Technology Demonstration (JCTD) capabilities which integrate solid state detectors, communications, and processors into a robust self-configuring sensor network for detecting, identifying, and tracking nuclear materials in transit.
- Completed 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

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
human subjects, probably oncology patients, to evaluate the ability of the biodosimeter to accurately measure exposure. - Continued 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. - Developed prototype ground sampling systems and continue to develop sample collection equipment for manual and robotic supportability. - Continued enhancements to ground sample collection tools and integration of tools with robotic platforms. -Developed 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. - Continued 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. - Commenced an initial JCTD effort to develop a 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 for the theater commander. This Joint Capability Technology Demonstration (JCTD) should result in transitioning a viable standoff active interrogation system to Combatant Commands. - Continued to investigate active interrogation as a safe method of standoff detection where dose to people and cargo are below the allowable limits. - Continued cooperation and acceptance of DTRA developed detection technologies for operational development. - Continued cooperation and acceptance of DTRA developed post nuclear event collection technologies for operational development.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued transitioning multiple near term technologies to generate prototypes and design packages to assist ground forces. Transitioned 8 of 10 EOD specific tools to supported forces for the defeat of Weapons of Mass Destruction. - Exercised developmental collection capabilities with table top exercises, command post exercises, and field training exercises. - Continued Enhancement/maintenance of the Sentry/Sniper databases. Integrated chemical and biological weapon information and a decision matrix into a comprehensive WMD database. Incorporated Home Made Explosives (HME) data base into Sniper data base. - Continued development Techniques, Tactics, and Procedures of a nuclear forensics ground sample collection team. - Conducted modeling, simulation and experiments to evaluate the feasibility of using muons and protons to stimulate fissions in nuclear materials from standoff ranges. - Conducted/supported multiple Inter-Agency end-to-end exercise/demonstration of global National Technical Nuclear Forensics for attribution capabilities. - Continued refinement of the Concept of Operations (CONOPS) and Standard Operating Procedures (SOP) for ground sample collection. -Continued development of unattended sensor technologies for rapid detection and identification of radiological material. - Development of contour mapping technologies for radiation field analysis. - Continued to enhance/maintain the Sentry/Sniper databases. Continued integrating chemical and biological weapon information and a decision matrix into comprehensive weapons of mass destruction database. -Transitioned eight of 10 Explosive Ordinance Disposal (EOD) specific tools to supported forces for the defeat of WMD.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: - 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. - Continue the extensive effort begun in the stand off Bremsstrahlung active interrogation system JCTD to develop a system capable of detecting hidden and shielded nuclear material. - 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. - 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. - 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. - 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. - Continue refinement of the Continuity of Operations and Standard Operating Procedures for ground sample collection. - Continue to enhance/maintain the Sentry/Sniper databases. Continue integrating chemical and biological weapon information and a decision matrix into a comprehensive WMD database. - Continue the development and transition of prototypes and technical data packages to supported forces. - Begin operational characterization of select shape charges in support of WMD defeat technologies. - Begin operational testing of classified defeat capability against specific WMD targets.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Defense Threat Reduction Agency		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continue update/enhancement and maintenance of SNIPER family of data bases. - Begin development of next generation of man portable battery powered X-ray systems for diagnostics of WMD. - Begin development of next generation of Timed Delay Firing Device (TDFD). - Begin development of Next Generation Metal Detector. - Continue development of next generation ground sample collection platforms for IND and RDD collections. - Continue development of prototype UAV with sensor suite for mapping rad field in support of ground sample collections. - Continue cooperation and acceptance of DTRA developed detection technologies for operational development. - Continue cooperation and acceptance of DTRA developed post nuclear event collection technologies for operational development. - Continue transitioning multiple near term technologies to generate prototypes and design packages to assist ground forces. - Exercise developmental collection capabilities with table top experiment, command post exercise, and field test experiment. - Continue robotic ground sample collection improvements. - Continue development techniques, tactics, and procedures of a nuclear forensics ground sample collection team. - Continued development of unattended sensor technologies for rapid detection and identification of radiological material. - Continued development of contour mapping technologies for radiation field analysis. *FY 2011 Base Plans:* - Complete development of a fielded standoff active interrogation system for standoff detection and warning of hidden and shielded nuclear material.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Complete development of a baseline Department of Defense large standoff monoenergetic or wakefield accelerator active interrogation system to provide a new reference standard for evaluating progress and capabilities in standoff detection and warning of hidden and shielded nuclear material. - 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. - 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. - Begin development of fieldable (integrated and deployable) enhanced/rapid separation, dissolution and analysis laboratory capabilities and prototype novel technologies to shorten the analysis timeline. - 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. - 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. - Investigate alternative methods to stimulate fissions in nuclear materials from standoff ranges, including the use of high-energy lasers to generate beams of mono-energetic x-rays. - Develop methods to rapidly determine nuclear weapon yields post-event, by investigating alternative prompt nuclear weapons effects on the environment. Complete development, validation and transition of seismic/air blast model to improve yield accuracy. - Complete development of contour mapping technology prototype for radiation field analysis. - Develop improved correlation tools, signature databases, and modeling of device/production design space to increase confidence, decrease uncertainties and timelines, to better support production of consensus technical forensics results. Field improved debris diagnostic codes; accelerate design signatures database development and baselining of weapon design analysis capability.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Complete operational characterization of select shape charges in support of WMD defeat technologies. - Complete operational testing of classified defeat capability against specific WMD targets. - Continue update/enhancement and maintenance of SNIPER family of data bases. - Complete development of next generation of man portable battery powered X-ray systems for diagnostics of WMD. - Complete development of next generation Timed Delay Firing Device. - Complete development of Next Generation Metal Detector. - Continue Concept of Operations development & Standard Operating Procedures development for more complex Outside the Continental United States (OCONUS) demonstrations for detection, and collection capabilities. - Continue cooperation and acceptance of DTRA developed detection technologies for operational development. - Continue cooperation and acceptance of DTRA developed post nuclear event collection technologies for operational development. - Continue transitioning multiple near term technologies to generate prototypes and design packages to assist ground forces. - Exercise developmental collection capabilities with table top experiment, command post exercise, and field test experiment. - Continue robotic ground sample collection improvements. Begin development of enhanced autonomous/semi-autonomous collection capabilities as well as improved/new collection capabilities (e.g., water). - Continue development techniques, tactics, and procedures of a nuclear forensics ground sample collection team. - Continue development and testing of remote information awareness capability for radiation sensor systems and data integration for increased area of detection capability. - Complete operational characterization of select shape charges in support of Weapons of Mass Destruction (WMD) defeat technologies.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Complete operational testing of classified defeat capability against specific WMD targets. - Continue update/enhancement and maintenance of SNIPER family of data bases. - Complete development of next generation of man portable battery powered X-ray systems for diagnostics of WMD. - Complete development of next generation Timed Delay Firing Device. - Investigate capability gaps and opportunities for insertion of technology for treaty monitoring and verification. - Develop experiment to determine the seismic effects of device coupling. - Begin to develop a manufacturing capability for boron and lithium based replacements to helium based neutron detectors.					
Accomplishments/Planned Programs Subtotals	55.022	65.827	90.688	0.000	90.688

	FY 2009	FY 2010
Congressional Add: Next Generation Intelligent Portable Radionuclide Detection and Identification Systems *FY 2009 Accomplishments:* - Efforts are focused on technology development for high resolution, uncooled detectors. eV Microelectronics delivered low power electronics for a handheld detector and improved CZT processing techniques with the last congressional. This year, they will focus on an improved low cost/ high yield method for growing CZT. eV is currently the largest supplier of CZT in the United States.	1.600	0.000
Congressional Add: AELED IED Electronic Signature Detection *FY 2009 Accomplishments:* - Continued to develop both an active and passive Improvised Explosive Device (IED) detection signature system.	3.200	4.800

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
- Frequency agile source prototype design components have been identified and characterized along with filtering approaches to reduce source emissions has been accomplished. - Defined prototype antenna design and identified commercial-off-the-shelf (COTS) availability along with defined prototype software architecture. - Preliminary testing and evaluation (T&E) was completed on the ground and airborne system in July'09 and the formal T&E of the airborne system is being coordinated. - The airborne effort has focused on evaluating system performance and identifying methods to reduce the effects of external and internal electromagnetic interference sources. - The airborne system sensor performance successfully met threshold performance requirements; objective performance requirements are being addressed. *FY 2010 Plans:* - Continue active source technology development and integration with passive capability. - Continue frequency agile source development and integration. - Build next-generation active source and integrate with receiver. - Research and develop phenomenology for better assessment of target responses to illumination. - Develop phenomenology for WMD/IED applications for signature detection and evaluation of underground facilities and for WMD/IED triggers. - Develop advanced receiver and algorithm enhancement for detection of evolving signatures to improve DSP (digital signal processing) capability specific to this application and the identification/ design of emerging hardware for electronics detection.		
Congressional Add: Continuation of Adv Materials Research for Nuc Detection, CP and Imaging *FY 2009 Accomplishments:* - Efforts are focused on technology development for high resolution, uncooled detectors. The anticipated accomplishment for the Constellation Technology Corporation (CTC) $800k will be an improved, low cost/high yield method for growing mercuric iodide crystals. CTC is currently the world's sole supplier of mercuric iodide.	0.800	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Congressional Adds Subtotals	5.600	4.800

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 26/0602718BR: *WMD Defeat Technologies*	38.766	47.008	52.649		52.649	48.406	45.660	46.345	47.046	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

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.

Successful maritime demonstration of neutron sensitive panel detector.

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RG: *Advanced Energetics & Counter WMD Weapons*	26.412	21.396	17.386	0.000	17.386	18.486	25.508	25.962	26.413	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Energetics & Counter WMD Weapons 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 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RG: Advanced Energetics & Counter WMD Weapons	26.412	21.396	17.386	0.000	17.386
FY 2009 Accomplishments: - Continued development of advanced countering Weapons of Mass Destruction (WMD) weapons and counter-force agent defeat weapons. - Integrated/tested Insensitive Munitions Agent Defeat Bomb, Live Unit (BLU)-109 payload supporting U.S. Air Force tactics, techniques and procedures for the Shredder program. - Completed Joint Direct Attack Munitions Guidance Kit Integration and Demonstration with BLU-121. - Produced BLU-121 technical data package for transition to program of record. - Conducted sub-scale testing of counter-WMD kinetic and non-kinetic based payloads. - Continued development of non-kinetic payloads and novel materials. - Supported the Acquisition Transition Program Support and Weapon Effects Targeting Analysis for BLU-121. - Supported Thermobaric Advanced Concept Technology Demonstrations All Up Round Penetration Sled Test.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued Integrated Precision Ordnance Delivery System concept development and Concept of Operations. - Developed penetrating munitions concepts to defeat ultra-hard targets. *FY 2010 Plans:* - Conduct Massive Ordnance Penetrator validation tests for Advance Payloads. - Conduct IPODS Concept Design (aero & warhead). - Conduct IPODS scaled lethality/effects test. - Initiate Modular Autonomous Countering Weapons of Mass Destruction (WMD) System Concept Development trade studies. - Continue development of non-kinetic based countering WMD process modeling capability and apply it to specific countering WMD targets - Continue development of novel thermal based payloads. - Conduct live stimulant matrix testing. *FY 2011 Base Plans:* - Complete IPODS concept design and initiate scaled model tests of selected design. - Finalize Modular Autonomous Countering Weapons of Mass Destruction (WMD) System Concept Development Studies and initiate technology maturation efforts. - Evaluate Defense Advanced Research Projects Agency Strategic Hardened Facility Defeat technology maturity. - Continue development of enhancements to Weapons Effects Modeling for Agent Defeat and integrate non-kinetic based Countering WMD capabilities. - Initiate improvements for soft target Countering WMD capability. - Conduct initial full-scale flight test against a multi-story test structure. - Initiate advancements in Bulk Neutralization Payload Development.					
Accomplishments/Planned Programs Subtotals	26.412	21.396	17.386	0.000	17.386

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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 26/0602718BR: *WMD Defeat Technologies*	21.265	32.381	29.139		29.139	27.522	26.483	26.883	27.282	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

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

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RI: *Nuclear Survivability*	9.749	13.935	14.052	0.000	14.052	13.962	13.878	14.062	14.252	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Nuclear Survivability project develops and demonstrates Radiation Hardened Microelectronics (RHM) for nuclear hardening and survivability of Department of Defense's (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.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RI: Nuclear Survivability	9.749	13.935	14.052	0.000	14.052

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: - Demonstrated final Radiation hardened by Design (RHBD) 90nm digital, analog and mixed signal Systems-on-Chips (SOC). - Demonstrated radiation hardened 150nm combined digital and analog/mixed signal Application-Specific Integrated Circuit. - Demonstrated bulk silicon 90nm RHBD digital and analog/mixed signal libraries and SOC electronic design automation technology. - Demonstrated intermediate RHBD 90nm reconfigurable Field Programmable Gate Array. - Demonstrated 90nm radiation hardened by process development structure and methods. - Conducted 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. - Planned Mighty Guardian XIII Force-On-Force test to evaluate nuclear security policy as it applies to missile launch facility security Minot AFB, ND. - Conducted exploratory research on physical security equipment and technology designed to enhance protection of the nuclear stockpile as determined by the Services. *FY 2010 Plans:* - Perform initial characterizations of single event effects in commercial 45nm bulk and silicon-on-insulator technology. - Conduct Mighty Guardian XIII Force-On-Force test to evaluate nuclear security policy as it applies to missile launch facility security Minot AFB, ND. - Planning Mighty Guardian XIV Force-On-Force test to evaluate bomber generation operations at an Air Force Global Strike Command installation. - Planning a Mighty Guardian test to evaluate nuclear security policy as it applies to the waterfront restricted areas and submarines in transit at the Naval Base, Kings Bay, GA. - Conduct exploratory research on physical security equipment and technology designed to enhance protection of the nuclear stockpile as determined by the Services.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: - Develop mitigation techniques for 45nm Radiation Hardened by Design Technology - Develop initial Technology Computer-Aided Design modeling for 45nm - Demonstrate 45nm Radiation Hardened by Design (RHBD) Test Circuit Vehicle. - Conduct Mighty Guardian XIV Force-On-Force test at a location to be determined by Global Strike command to evaluate nuclear security policy as it applies to bomber generation. -Planning Mighty Guardian XV Force-on-Force test to evaluate nuclear security policy for waterfront restricted areas and submarines in transit at Naval Base Kings Bay, GA. - Conduct exploratory research on physical security equipment and technology designed to enhance protection of the nuclear stockpile as determined by the Services.					
Accomplishments/Planned Programs Subtotals	9.749	13.935	14.052	0.000	14.052

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 25/0602718BR: *WMD Defeat Technologies*	29.359	18.660	17.902		17.902	17.788	17.695	17.962	18.250	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

Achieve Radiation Hardened 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.

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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, RDT&E Project Justification: PB 2011 Defense Threat Reduction Agency			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	PROJECT RM: *WMD Battle Management*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RM: *WMD Battle Management*	37.647	31.939	28.260	0.000	28.260	26.907	27.914	28.200	28.482	Continuing	Continuing

A. Mission Description and Budget Item Justification

The WMD Battle Management 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.

The FY 2009 to FY 2010 funding decreases reflects the Agency’s decision to rebalance efforts within its research and development portfolio to achieve the Department of Defense’s 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 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RM: WMD Battle Management	37.647	31.939	28.260	0.000	28.260

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: - Continued development of Weapons of Mass Destruction (WMD) reconnaissance technologies and WMD planning tools. - Studied/developed prototype dispense delivery mechanisms for high speed weapons in support of Global Strike combat assessment requirements. - Completed developmental testing of sensor suite for real-time, weapon-borne Battle Damage Indication system. - Conducted WMD Aerial Collection System (WACS) payload integration and flight testing of autonomous plume tracking, chemical detection/collection and biological detection sub-systems. - Developed Integrated Munitions Effects Assessment (IMEA) with integration of additional net-centric components for weaponeering. - Developed Vulnerability Assessment Protection Option (VAPO) 4.0 which integrated a computational fluid dynamic capability into the planning tool. - Continued to integrate advanced command and control capabilities into Defense Threat Reduction Agency (DTRA) Operations Center including the Global Command and Control System version 4 software suites which will allow DTRA to seamlessly share information between Combatant Commands (COCOMs) and the inter-agency community. - Integrated 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. - Enabled 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. - Provided common standards to network sensors, and data sources into common operating pictures providing WMD intelligence fusion.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Characterized the Tactical Satellite (TACSAT)-3 hyper spectral sensor and data for proactively identifying WMD precursor activity and post strike Battle Damage Assessment. - Developed near real time Concept of Operations (CONOPS) for Constant Hawk and enable on board processing of the camera upgrade Electro-Optical sensor with Chemical and Explosive Incidents and sensor overlay functionality. - Completed transition of the high-fidelity, damage predicting code EXCALIBUR (Explicit Calculations of Interacting Blocks Under Rapid Loading) demonstrated under the Tunnel Target Defeat Advanced Concept Technology Demonstrations to U.S. Strategic Command and Defense Intelligence Agency. - Performed annual cycle of requirements collection, challenge proposals, resource allocation and tech support through High Performance Computing - Provided Targeting and Weaponeering Analysis Cell academics and targeting support to 38 groups. *FY 2010 Plans:* - Complete Global Strike battle damage assessment Phase 2 field demonstration. - Continue development of WMD Aerial Collection System. - Operationalize Tactical Microsatellite Experiment 3's Hyperspectral Imaging sensor for Countering Weapons of Mass Destruction (WMD) using Countering WMD Analysis Cell exploitation. - Identify signatures and establish test beds for sensors to find fix and track WMD related items and people. - Validate and transition the near real time Contingency Operations (CONOPS) for Constant Hawk to the warfighter. - Enable High Altitude Long Endurance Unmanned Aerial Vehicles (UAV) to relay sensor data. - Demonstrate capability to control FINDER UAV from an airborne control station and demonstrate FINDER auto-recovery capability. - 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.					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- 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. - Deliver Integrated Munitions Effects Assessment 2010 with Advanced Targeting Assessment Capability 1.0 integrated engine. - Perform annual cycle of requirements collection, challenge proposals, resource allocation and tech support through High Performance Computing. - Provide Targeting and Weaponeering Analysis Cell academics and targeting support. *FY 2011 Base Plans:* - Conduct demonstration of the WMD Aerial Collection System. - Validate implemented solutions for command and control, collaboration, decision support, and situational awareness and identify any necessary support base for further enhancement. - Perform integration testing and begin Dynamic Toolset development for Advance Targeting Assessment Capability. - Perform annual cycle of requirements collection, challenge proposals, resource allocation and tech support through High Performance Computing. - Begin development of algorithms for Dynamic Toolset support using High Performance Computing. - Provide Targeting/Weaponeering Analysis Cell academics and targeting support. - Deliver Vulnerability Assessment Protection Option (VAPO) version with Critical Infrastructure Protection modeling and vulnerability analysis. - Commence development of Phase 3 of the Global Strike battle damage assessment system (system optimization). - Design prototype capability for precision delivery of unattended ground sensors from a small UAV. - Enhance Wide Area Aerial Surveillance technology to produce persistent coverage of WMD targets to predict and counter threats from Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE).					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Develop, integrate and demonstrate miniaturized CBRNE sensors with radio frequency tags in support of Combating Weapons of Mass Destruction (CWMD) Tag, Track and Locate. - Develop CWMD P-ISR integration framework for the fusion of data from multiple sources that provide activity based intelligence - Complete system assessment and flight test of the Phase 2 Global Strike battle damage assessment system, to include the Chemical, Acoustic, Nuclear and Seismic sensor capabilities, mesh networking with two or more hubs, relay of BDA data via a long haul (satellite) interface and display on a Warfighter Interface.					
Accomplishments/Planned Programs Subtotals	37.647	31.939	28.260	0.000	28.260

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	25.210	14.440	10.899		10.899	10.303	11.435	11.727	12.107	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

Standoff detection range of Weapons of Mass Destruction (WMD) reconnaissance system.

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

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, RDT&E Project Justification: PB 2011 Defense Threat Reduction Agency			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	PROJECT RT: *Target Assessment Technologies*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
RT: *Target Assessment Technologies*	29.324	32.294	35.112	0.000	35.112	35.593	35.419	34.269	34.820	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 FY 2009 to FY 2010 increase in funding within this project is due to the rebalancing of efforts from Project RM – WMD Battle Management to enhance the Combating WMD Analysis Cell (C-WAC) 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.

The FY 2010 to FY 2011 increase is in support of the DoD and Presidential CWMD strategic priorities and will fill critical investment and sustainment gaps across the DTRA CWMD spectrum. This increase is in support of the C-WAC cell and will accelerate spiral development and deployment of new modeling capabilities across Nuclear, Biological Warfare (BW) and Chemical Warfare (CW) threat areas, enhancing fusion of R&D and intelligence support for the Combatant Commands.

B. Accomplishments/Planned Program ($ in Millions)

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
RT: Target Assessment Technologies	29.324	32.294	35.112	0.000	35.112

FY 2009 Accomplishments:

- Delivered enhanced Underground Targeting and Analysis System (UTAS) special operations mission planning capabilities to the special operations community.
- Analyzed and reported the findings of the Underground Facility (UGF) vulnerability assessment exercise conducted in FY 2008 to evaluate the effectiveness of our tools and processes to support the characterization of Underground Facility and Weapons of Mass Destruction (WMD) targets.
- Continued to provide target characterization training to the UGF and WMD target defeat communities. Taught five, one week classes reaching over 135 students from across DoD, the Intelligence Community and the defense industry.
- Continued development of a UGF signatures database to facilitate functional characterization of UGF targets for the Combatant Commands (COCOMs) and Intelligence Community.
- Continued development of enhanced site-specific geological characterization processes, completing one foreign geology template and 20 Geotechnical site characterizations to increase the fidelity and accuracy of our UGF characterizations.
- Maintained a trained and experienced cadre of 26 highly specialized engineers and produced over 100 UGF characterization reports for Defense Intelligence Agency and the COCOMs.
- Continued development and testing of the prototype Integrated Sensor System to support the UGF and WMD target characterization and assessment processes.
- Demonstrated the capability of the Combating WMD Analysis Cell to model and analyze nuclear weapons threats and issues.

FY 2010 Plans:

- Deliver Underground Targeting and Analysis System (UTAS) functional process modeling and point mensuration capability to the COCOMs and Intelligence Community.
- Fully integrate UTAS modeling capability into the DIA Underground Facility Analysis Center target characterization process and products.
- Continue to provide target characterization training for the UGF and WMD target defeat communities.

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- 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. - Demonstrate added Combating Weapons of Mass Destruction (CWMD) Analysis Cell capabilities to model and analyze biological weapons threats in support of COCOMs Command and Intelligence Community needs. - Research and develop models for analysis and assessment of weapons effects on WMD related equipment and systems for use by the Intelligence Community. *FY 2011 Base Plans:* - Add WMD systems and process characterization modeling and assessment capabilities to the UTAS functionality for support of the COCOMs and Intelligence Community targeting and weaponeering requirements. - Fully integrate models for analysis and assessment of weapons effects on WMD related equipment and systems into UTAS for use by the Intelligence Community. - Continue target characterization training for the Underground Facility (UGF) and WMD target defeat communities. - Design, develop and test on-node data fusion to enhance Integrated Sensor System surveillance capabilities for support of Combatant Commands (COCOMs) and Intelligence Community target characterization and assessment needs. - Demonstrate Combating Weapons of Mass Destruction (WMD) Analysis Cell initial capabilities to model and analyze chemical weapons threat development processes in response to COCOMs and Intelligence Community counter WMD requirements.					
Accomplishments/Planned Programs Subtotals	29.324	32.294	35.112	0.000	35.112

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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.

Demonstrate an initial Combating Weapons of Mass Destruction (CWMD) Analysis Cell capability to perform analysis of nuclear threats in response to COCOMs and Intelligence Community needs.

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 Combatant Command and Intelligence Community needs.