

<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2		<b>R-1 ITEM NOMENCLATURE:</b> WMD Defeat Technology; 0602716BR

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete
<b>Total 0602716BR Cost</b>	<b>228.8</b>	<b>184.1</b>	<b>249.8</b>	<b>259.0</b>	<b>257.9</b>	<b>255.2</b>	<b>258.4</b>	<b>Continuing</b>
Project BB Small Business Innovative Research	0*	1.9	2.2	2.3	2.3	2.3	2.3	Continuing
Project BD Weapons Effects Technologies	83.0	62.9	67.8	73.3	75.7	76.6	77.9	Continuing
Project BE Testing Technologies & Integration	11.3	11.9	11.6	12.4	12.5	12.7	13.0	Continuing
Project BF CP Operational Warfighter Support	51.6	45.9	94.2	101.1	101.0	102.2	103.8	Continuing
Project BG Nuclear Operations	82.9	61.5	74.0	69.9	66.4	61.4	61.4	Continuing

\*In year of execution, funding executed under PE 0605502BR "Small Business Innovative Research"

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

The mission of the Defense Threat Reduction Agency (DTRA) is to safeguard America and its friends from weapons of mass destruction (WMD) by reducing the present threat and preparing for the future threat. This mission directly reflects several national and DoD-level documents to include the National Military Strategy, support to the Global War on Terrorism (GWOT), the dictates of the Quadrennial Defense Review (QDR), the Nuclear Posture Review (NPR), changes to the Unified Command Plan (UCP), the implementation of the Defense Transformation Planning Guidance (TPG) and is specifically directed by the Joint Chiefs of Staff (JCS) in the Joint Strategic Capabilities Plan (Nuclear Annex). To achieve this mission, DTRA has identified principal objectives along with strategies and tasks to ensure the objectives are met. Three of these objectives are to deter the use of WMD, reduce the present threat and prepare for the future threat. A focused, strong threat reduction technology base is critical to achieving these objectives and is closely tied with the operational programs that make up its combat support mission. DTRA has taken the steps to develop this technology base and provide a foundation for transformational activities within the WMD arena as delineated in the TPG. Technologies being developed support one or more of the Joint Functional Concepts (JFC) being refined during implementation of the Joint Capabilities Integration and Development System (JCIDS).

DTRA is the Department of Defense (DoD) focal point for programs and activities to reduce the threats posed by WMD proliferants. New, forward-thinking activities have been identified and prioritized to support the DTRA mission and the DoD Counterproliferation (CP) strategy for responding to the full spectrum of crises and preparing now for an uncertain future. The WMD Defeat Technology programs support national guidance, the DTRA strategic vision, and Service and Combatant Command operational customers.

This program element provides the innovative technologies and concepts underpinning all counterproliferation programs. It includes manpower authorizations, special equipment, necessary facilities, test bed operations, and all other associated costs in support of the development of the technology base needed to support the defeat of current and future WMD. Initiatives supported include, but are not limited to, such activities as follow:

- Supporting civil and military response to WMD use;

<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	<b>R-1 ITEM NOMENCLATURE:</b> WMD Defeat Technology; 0602716BR	

- Developing technologies and operational concepts to defeat nuclear terrorism in the form of an improvised nuclear device or radiological dispersal device, and to provide a capability to rapidly attribute a domestic nuclear event;
- Examining U.S./Allied capabilities to hold at risk all enemy targets, including hardened, deeply buried targets at risk; evaluating capabilities against known or projected potential targets; and evaluating new technologies for possible application against known shortfalls;
- Providing warfighters with physical and functional vulnerability assessments of hostile foreign systems;
- Developing technologies and capabilities to find and characterize underground facilities and assess battle damage to underground targets;
- Developing WMD analysis and simulation tools for the warfighter including target planning and assessment; hazardous materials transport and collateral effects prediction; consequence assessment; and antiterrorism/force protection;
- Developing and applying state-of-the-art nuclear weapons effects models to support nuclear weapon stewardship and system hardness design;
- Developing, improving and engineering the unique DoD test and simulation facilities (to include infrastructure) and enabling technologies that are used to evaluate the impact of hostile environments from conventional, nuclear, and other special weapons on military or civilian systems or targets.

WMD Defeat Technology projects comprise a critical component of the ability of the Department to meet the technology challenges posed by the emerging international environment and the National Military Strategy. The coverage of the projects ranges from counterterrorism through conventional conflict through countering WMD threats.

In addition, the Advanced Systems and Concepts Office (ASCO) develops and maintains an evolving analytical vision of necessary and sufficient capabilities to protect the United States and allied forces and citizens from nuclear, biological, and chemical (NBC) attack. ASCO is also charged with identifying gaps in these capabilities and initiating programs to fill them.

<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	<b>R-1 ITEM NOMENCLATURE:</b> WMD Defeat Technology; 0602716BR	

**B. Program Change Summary:**

<b>(\$ in Millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Previous President's Budget</b>	<b>162.6</b>	<b>183.2</b>	<b>247.9</b>
<b>Current President's Budget</b>	<b>228.8</b>	<b>184.1</b>	<b>249.8</b>
<b>Total Adjustments</b>	<b>66.2</b>	<b>.9</b>	<b>1.9</b>
<b>Congressional program reduction</b>			
<b>Congressional rescissions</b>		<b>-2.0</b>	
<b>Congressional increases</b>		<b>2.9</b>	
<b>Reprogrammings</b>			
<b>Internal Transfers (DoD-Wide)</b>	<b>66.9</b>		<b>5.1</b>
<b>Internal Transfers (within DTRA)</b>	<b>1.2</b>		<b>-3.2</b>
<b>SBIR/STTR Transfer</b>	<b>-1.9</b>		

**Change Summary Explanation:**

- The overall increase in the FY 2003 funding profile from the previous President's Budget to the current President's Budget is attributed to the Department providing DTRA funding for a classified program. There were also internal below-threshold reprogramming actions done in support of the Nuclear Phenomenology Program and the University Partnership Program. During the year of execution, SBIR funding is consolidated into PE 0605502BR "Small Business Innovative Research" for execution.
- The overall increase in FY 2004 from the previous President's Budget is attributed to Congressional adds in the amount of \$2.9 (+1.5M Project Ancile, and +\$1.4M George Mason University National Center for Blast Mitigation and Projection). The FY 2004 DoD Appropriation Bill (P.L. 108-87) contained several Congressional rescissions that were proportionally applied to the entire DTRA RDT&E program. This particular PE received a \$2M reduction (-\$400K Section 9094-Management Improvements, and -\$1.6M Section 8126-Savings from Outsourcing, Management Efficiencies, and Revised Economic Assumptions).
- The overall increase in FY 2005 from the previous President's Budget to the current President's Budget is associated with two actions. This first action is DTRA's transfer of funding and program management of the Defense Threat Reduction Information Analysis Center (DTRIAC) internally within the Agency, from the RDT&E Appropriation to O&M, DW. This transfer facilitates the availability and use of data archival, retrieval, and analysis across the Agency. The second action was the Departmental decision to increase funding in FY 2005 by \$5.1M in support of the Terrorist Device Defeat program.
- The resulting program provides for a flexible combat support structure; focused science and technology investments, to include such critical areas as WMD target defeat and nuclear weapons effects technologies; enhanced consequence management capabilities; force protection, infrastructure protection and dual-use homeland security initiatives; as well as the streamlining and transformation of the supporting business practices and workforce.

<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	<b>R-1 ITEM NOMENCLATURE:</b> WMD Defeat Technology; 0602716BR	

**C. Other Program Funding Summary:** see Exhibit R-2a

**D. Acquisition Strategy:** N/A

**Exhibit R-2a, RDT&E Project Justification**

Date: February 2004

<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BB - Small Business Innovative Research (SBIR)
--	-----------	---

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete
Project BB – Small Business Innovative Research (SBIR)	0	1.9	2.2	2.3	2.3	2.3	2.3	Continuing

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

- This project provides the means for stimulating technological innovation in the private sector, strengthens the role of small business in meeting DoD research and development needs; fosters and encourages participation of minority and disadvantaged businesses in technological innovation; and increases the commercial application of DoD supported research and development results. These efforts are responsive to PL 106-554.

**B. Accomplishments/Planned Program:**

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Small Business Innovative Research (SBIR)	0	1.9	2.2

**FY 2003 Accomplishments**

- In year of execution, funding is executed under PE 0605502BR “Small Business Innovative Research”.

**FY 2004 Plans**

- Support the Small Business Administration (SBA) National Direction by actively seeking small business contractors to perform innovative research.
- Execute Agency-approved SBIRs.

**FY 2005 Plans**

- Support the Small Business Administration (SBA) National Direction by actively seeking small business contractors to perform innovative research.
- Execute Agency-approved SBIRs.

**C. Other Program Funding Summary: N/A**

**D. Acquisition Strategy: N/A**

**E. Major Performers: N/A**

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2		<b>PROJECT NAME AND NUMBER:</b> 0602716BR Project BD - Weapon Effects Technologies

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete
Project BD – Weapons Effects Technologies	83.0	62.9	67.8	73.3	75.7	76.6	77.9	Continuing

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

- Project BD provides development and application of products and services to meet Weapons of Mass Destruction (WMD) and other special weapon effects challenges using state-of-the-art science and engineering capabilities, including advanced first principles analysis, engineering modeling, simulation and networking technologies, and precision laboratory scale and field testing capabilities (supported by Project BE-Testing Technologies and Integration). This project will develop an over-arching framework for all Chemical, Biological, Radiological, Nuclear and high Explosive (CBRNE) related modeling and simulation tools. Initially, the focus will be on producing the Integrated WMD Toolset (IWMDT) that will provide DoD users access to valid WMD tools in a consistent fashion and provide for standardized Configuration Management and Verification, Validation and Accreditation (VV&A) of all included model components and systems. Initiatives supported by this project include, but are not limited to, such activities as follow:
  - Integrating and applying advanced capabilities to improve decision making effectiveness in the face of rapidly evolving WMD threats in both military and civilian sectors. Products being developed include CBRNE target planning and assessment tools, CBRNE hazardous materials transport and collateral effects prediction tools, tools and technologies to mitigate and assess the effects of hazardous material on facilities and people, and consequence assessment/management tools to evaluate and respond to such events. Models and tools developed support Project BK-Counterforce in PE 0603160BR, Proliferation Prevention Defeat;
  - Developing technologies to support force protection assessments, forensic analysis of terrorist events and advanced blast mitigation/retrofit techniques. Tools developed in this project support other projects including Project BC-Force Protection and Technology Applications in PE 0602717BR, WMD Defense Technologies, and Project BF-CP Operational Warfighter Support, as well as civilian, antiterrorism and disaster response support organizations;
  - Providing, maintaining and applying the weapons of mass destruction technology base. The technology base applies expertise developed originally for nuclear weapon detonation(s) phenomenology (subsurface through exo-atmospheric), the evolution of the resulting disturbed environment, and the effects of that environment on systems. The expertise has expanded to all weapons of mass destruction. This is accomplished by providing weapons effects technology and information to U.S. and Allied weapon systems developers, government planners, operators, doctrine authors, and decision makers;
  - Developing and maintaining the technical capability to predict the impact of the effects of weapons of mass destruction on all aspects of warfighting, to include communications, radar and optical sensor systems and to support DoD components in the analysis and prediction of the response of systems that must operate in nuclear and naturally disturbed environments.
- An integral component of this project is the provision of access to state-of-the-art high-performance computing (HPC) machines, high-speed connectivity, and superior technical support to DTRA researchers nationwide.
- DTRA is the Department of Defense center of excellence for nuclear weapon burst phenomenology and the resulting interaction with military and civilian systems. Starting with weapon output calculations, DTRA develops the tools for predicting the subsequent evolution of all nuclear weapon

<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	0602716BR Project BD - Weapon Effects Technologies

induced effects including the blast and shock interactions for low-altitude, surface and sub-surface nuclear explosions; electromagnetic pulse (EMP); prompt, delayed, and trapped radiation; plasma and radioactive debris history. These efforts rely on ready access to high-performance computing (HPC) resources to enable the efficient solution of the resultant large-scale numerical simulations.

- DTRA shares a stewardship responsibility with the special weapons related defense community to maintain the Nation’s core nuclear competencies and to successfully pass on this knowledge base and critical skills to the next generation of defense oriented scientists, engineers and weapon system developers. This is provided through the Knowledge Application project, a tight integration of three efforts - Defense Threat Reduction Information Analysis Center (DTRIAC), Data Archival and Retrieval Enhancement (DARE), and Graybeard – dedicated to the collection and preservation of the data and knowledge derived during more than 50 years of nuclear weapons effects testing and studies; and a fourth effort, the Knowledge Applications component, that capitalizes on the expertise derived from these three programs by applying it to current Agency technical programs. Today this research is based on simulations and high fidelity calculations requiring correlation with this "legacy" data for validation.
- Assist in the development of a National Center for Blast Mitigation which will comprise of predictions of blast effects on structures, development of blast mitigation/protection techniques, the development of forensic techniques to obtain intelligence and aid in policy making and strategic decisions in the areas of building codes and safe perimeter certification.

**B. Accomplishments/Planned Program:**

<b>Cost (\$ in millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Targeting Support	13.5	20.8	21.3

**FY 2003 Accomplishments**

- Delivered expanded Integrated Target Planning Tool Set (ITPTS) Version 2.0 that included a full spectrum of targets and weapons to the warfighter (PE 0603160BR, Project BK).
- Demonstrated interoperability of intelligence, weaponeering, and collateral effects tools using ITPTS v2.0 during Divine Canberra Chemical Combat Assessment System demonstration.
- Developed a demonstration prototype of the Integrated Weapons of Mass Destruction Toolset (IWMDT) to provide the warfighter with a web-based weaponeering and consequence assessment capability.
- Enhanced existing DTRA planning tools into a Rapid Targeting System that manipulates intelligence information and WMD computational tools to conduct targeting and operational analyses on mobile missiles/WMD.
- Improved the agent defeat modeling for the CRASHPAD system in the Integrated Munitions Effects Assessment (IMEA) software tool in support of Project BF-CP Operational Warfighter Support.
- Continued development of a nuclear weapons effects module and additional weaponeering capabilities in the buildings, bunkers, and tunnels modules for the IMEA v.5.0.
- Validated the IMEA system-level Lethality/Vulnerability models for fixed, above ground WMD targets using Divine Canberra test data.
- Developed an engineering and semi-empirical model that accounts for traditional damage modes, to include cratering and breach, as well as flexural damage for buried bunkers to be integrated in IMEA version 6.0.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BD - Weapon Effects Technologies

- Began development of a fragmentation model for IMEA.
- Developed an initial prototype of the Vulnerability Assessment and Protection Option (VAPO) tool to perform vulnerability assessments on structures with or without anti-terrorism design.
- Began high-velocity penetration tests to develop and validate a penetration model for emerging high-velocity weapons.

**FY 2004 Plans**

- Develop payload performance prediction models for baseline payloads against targets containing dry biological agents in support of Project BF-CP Operational Warfighter Support.
- Provide automated access to the technology contained within the Design and Analysis of Hardened Structures to Conventional Weapons Effects (DAHS CWE) manual through incorporation of the data and methods in the VAPO tool.
- Begin development of the Integrated Comprehensive Weaponing Capability (ICWC) version 1.0 that will include a full-range of intelligence and targeting tools, to include targeting with nuclear weapons.
- Change the architecture of the IMEA tool to fit into the Integrated Weapons of Mass Destruction Toolset (IWMDT) framework.
- Improve the kinetic reaction parameters for agent defeat modeling in the Integrated Munitions Effects Assessment (IMEA) software tool to support Project BF-CP Operational Warfighter Support.
- Deliver a nuclear module and additional capabilities in the buildings, bunkers, and tunnels modules for IMEA v.5.0.
- Continue conducting high-velocity penetration tests to develop and validate a penetration model for emerging high-velocity weapons.
- Develop an IWMDT prototype for the combatant commands to use for operational implementation of the new technology.
- Develop PC-based tool to more accurately predict blast effects on structures in urban settings. The tool will be used to develop blast mitigation solutions and to conduct forensic studies.

**FY 2005 Plans**

- Validate the high-velocity penetration module in IMEA version 6.0
- Deliver enhanced weapons systems and modeling capabilities, including a multi-hit module, with IMEA version 6.0.
- Begin independent verification and validation of Integrated Comprehensive Weaponing Capability 1.0 and submit the accreditation support package.
- Deliver an integrated intelligence, conventional and nuclear weaponing and assessment capability for version 1.0 of the ICWC to the warfighter.
- Develop additional lethality/vulnerability models for damage from enhanced lethality weapons (i.e. high temperature incendiaries).
- Deliver explosive blast, chemical and biological hazards mission protection capabilities in VAPO version 1.0 for use by the Joint Service Integrated Vulnerability Assessment (JSIVA) community.
- Deliver an IWMDT capability that provides planning and assessment capability for conventional and nuclear targeting along with WMD analysis for net centric warfare.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BD - Weapon Effects Technologies

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Nuclear Phenomenology	31.4	13.6	22.1

**FY 2003 Accomplishments**

- Distributed updated/documented nuclear phenomenology and nuclear effects on systems modeling software.
- Completed review of atmospheric nuclear effects knowledge base; identified shortfalls for system hardening and effects mitigation.
- Obtained Nuclear Weapons Effects (NWE) experts’ review/approval of atmospheric nuclear effects knowledge base.
- Demonstrated a family of systems simulation capability. Incorporated suite of system-level tools into visualization suite.
- Continued revision of high altitude and underground burst nuclear weapon codes and their incorporation into large, scalable parallel computers.
- Continued support for STRATCOM and Missile Defense Agency (MDA) functions by providing training workshops for the use of High Altitude Nuclear phenomenology tools related to MDA and STRATCOM operations.
- Completed first phase of numerical simulation code modernization effort.
- Continued to enhance DARE usability and functionality through adaptation and integration of current web technologies.
- Completed electronic guides to the data and knowledge for use in DARE.
- Disseminated Knowledge Applications research findings and lessons learned (e.g., from the FY 2002 Underground Testing (UGT) review, Ground Vulnerability Number (GVN) improvements, Safeguard C – Test Readiness).
- Began work on Volume 2 of Redbook and output from terrorist devices. Redbook is a classified volume on adversaries' nuclear weapons.
- Carried out analysis of effects of low-yield nuclear weapon in modern city.
- Identified a synergistic effect that greatly enhances biological agent kill mechanisms

**FY 2004 Plans**

- Complete initial calculations to understand and establish bounds for selected uncertainties in “first principle” codes.
- Complete initial modeling of Global Positioning System operation in a nuclear environment.
- Continue dissemination of nuclear effects predictions and system interaction tools to DoD users.
- Continue support for STRATCOM and MDA functions by providing nuclear weapons effects tool support.
- Initiate development of an advanced 3-Dimensional Near Surface Effects Computational System for unique effects assessments including structures, transportation infrastructure and WMD hazardous agents.
- Initiate advanced combined effects simulation system for near surface low-yield nuclear effects in city (terrorist use of nuclear weapons).
- Initiate the incorporation of nuclear-weapon-in-city analysis into fast-running algorithms for Hazard Prediction and Assessment Capability/Consequence Assessment Tool Set (HPAC/CATS).
- Complete the validation of the nuclear and non-nuclear Electromagnetic Pulse tools developed for STRATCOM.

**Exhibit R-2a, RDT&E Project Justification**

Date: February 2004

<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	0602716BR Project BD - Weapon Effects Technologies

- Populate the EMP Tools with adequate and appropriate test databases.
- Complete the Full Operational Capability (FOC) for the Strategic C4 Assessment Tool (STRATCAT) tool for STRATCOM.
- Continue work on Volume 2 of Redbook and output from terrorist devices.
- Carry out analysis of effects of low-yield nuclear weapon in modern city.
- Quantify enhanced agent kill mechanism.

**FY 2005 Plans**

- Calculate weapon output for improvised nuclear devices to better characterize future potential threats.
- Continue work on Volume 2 of Redbook and output from terrorist devices.
- Refine methods for bio-agent defeat by persistent effects in nuclear fireballs and incorporate as tool in IWMDT.
- Develop weapon system-specific characterization of radioactive weapon debris for use in fallout modeling.
- Deliver Full Operational Capability (FOC) nuclear cloud lofted dust module for STRATCOM.
- Demonstrate high-fidelity dispersion of materials in urban areas.
- Continue development of an advanced 3-Dimensional Near Surface Effects Computational System for unique effects assessments including structures, e.g., buildings, bunkers, etc., transportation infrastructure, e.g., subways, bridges, etc., and WMD agents.
- Continue advanced combined effects simulation system for near surface low-yield nuclear effects in city (terrorist use of nuclear weapons).
- Continue the incorporation of nuclear-weapon-in-city analysis into fast-running algorithms for HPAC/CATS.
- Develop concepts and tools to employ enhanced biological agent kill mechanism.

<b>Cost (\$ in millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Hazard Prediction and Assessment Capability (HPAC)/Consequence Assessment Tool Set (CATS)	18.9	18.3	16.6

**FY 2003 Accomplishments**

- Delivered HPAC 4.0.3 to Central Command (CENTCOM), Strategic Command (STRATCOM), European Command (EUCOM) and other Combatant Commands and service organizations. Developed industrial hazardous material source models for industrial facilities and transportation incidents. This version met the final deliverable for the CP2 ACTD demonstration (PE 0603160BR, Project BK).
- Continued integration into HPAC 4.1 of industrial hazardous material source terms from attacks or incidents on industrial facilities and transportation. This version includes urban transport, initial capability for building infiltration and interior dispersion, and casualty tables based on dynamic population.
- Completed demonstration of prediction of industrial chemical source terms as required for planning exercises. Continued validation of industrial chemical source terms to include kinetic chemistry.
- Continued to provide and enhance training of Combatant Command Staff personnel on the use of HPAC.

**APPROPRIATION/BUDGET ACTIVITY**

RDT&amp;E, Defense-Wide/Applied Research - BA2

0602716BR

**PROJECT NAME AND NUMBER:**

Project BD - Weapon Effects Technologies

- Delivered HPAC-CATS (Nuclear) operational version to STRATCOM to replace legacy nuclear fallout assessment software.
- Leveraged existing Geographical Interface System (GIS)-based infrastructure, consolidated consequence assessment tools (HPAC/CATS), and demonstrated client-server architecture for a forward deployable consequence assessment system (Consequence Hazard Analysis and Response Tool Set – CHARTS) in which the server performs most processing.
- Continued to support integration of hazard prediction tools into Office of the Secretary of Defense (OSD) Joint Effects Module Block 1.
- Initiated integration of sensor data into hazard prediction models and assessed feasibility of source term backtracking using this data.
- Demonstrated integration of GIS-based sensor data into hazard prediction models during Biological Defense Initiative (BDI).
- Completed initial independent validation of urban dispersion modeling software and continued collaboration with the United Kingdom (UK).
- Conducted full-scale urban dispersion test in collaboration with Department of Energy (DOE), UK, and various other agencies and educational institutions.
- Continued collaboration with Air Force Combat Climatology Center (AFCCC) to allow HPAC weather data servers access to their climatology database server.
- Completed algorithm and design plans for enhancement of HPAC treatment of radiological and nuclear source term isotopic decay, enabling long-term health and environmental assessments.
- Provided technical and operational support to OSD, Joint Staff, and Combatant Command contingency operations and exercises as required.
- Supported combating terrorism through consequence management and recovery. Successfully used consequence tools in Operation Iraqi Freedom.

**FY 2004 Plans**

- Complete HPAC 4.04 with industrial facility and transportation hazard release and urban atmospheric transport capabilities.
- Complete data synthesis, archive, and begin conducting scientific validation of urban dispersion model using data from FY 2003 full-scale urban test.
- Initiate integration of population movement and evacuation algorithms for improved casualty estimation.
- Complete implementation for enhanced radiological decay in HPAC.
- Initiate development of water transport model in collaboration with US Navy. Water transport model will encompass rivers, ports, and oceans (littoral region).
- Continue assessment of littoral-region mesoscale weather forecasting model performance and implement recommended improvements.
- Initiate development of economic and environmental assessment algorithms/methods resulting from nuclear or radiation contamination.
- Link HPAC's atmospheric transport to the Oak Ridge National Laboratory's Hydrologic Transport Assessment System (HYTRAS) water borne transport model via US Navy funded support of the United States Coast Guard (USCG) homeland security - counterterrorism mission in rivers and estuarine areas (littoral region).
- Initiate development of CBRNE Decision Support Tool to assist Combatant Commands, Services, and installation commanders with consequence management planning and decision-making.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BD - Weapon Effects Technologies

- Deliver initial validated capability of interior building hazard transport model to Northern Command (NORTHCOM) and service organizations.
- Integrate weather data from multiple sources and format for use in HPAC to provide operational hazard predictions that more fully account for uncertainty in weather observations and forecasts.
- Provide technical and operational support to OSD, Joint Staff, and Combatant Command contingency operations and exercises as required.
- Continue integration of hazard prediction tools into OSD Joint Effects Module Block 1.
- Complete linkage of Air Force Combat Climatology Center climatological weather server to HPAC weather data servers for general user access.
- Continue to support GIS-based infrastructure and web-based technologies in support of integrated WMD planning and assessment tools and systems.

**FY 2005 Plans**

- Complete HPAC 4.1. Provide full HPAC/CATS functionality for Integrated WMD Toolset (IWMDT), a web-based access to all consequence assessment tools.
- Complete validation of urban dispersion modeling capability using data from FY 2003 full-scale urban test.
- Complete integration of population movement (day and night) and evacuation algorithms with casualty estimation models.
- Continue development of water transport model in collaboration with US Navy.
- Complete littoral-region mesoscale weather forecasting model and demonstrate integrated capability.
- Continue development of economic and environmental assessment algorithms/methods resulting from nuclear or radiation contamination.
- Continue development of CBRNE Decision Support Tool to assist Combatant Commands, Services, and installation commanders with consequence management planning and decision making.
- Expand capability of interior building hazard transport model to include buildings and data of interest for NORTHCOM and service organizations.
- Continue to provide integrated weather data from multiple sources for use in HPAC to provide operational hazard predictions that more fully account for uncertainty in weather observations and forecasts.
- Provide technical and operational support to OSD, Joint Staff, and combatant command contingency operations and exercises as required.
- Initiate integration of hazard prediction tools into OSD Joint Effects Module Block 2.

**Exhibit R-2a, RDT&E Project Justification**

Date: February 2004

<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BD - Weapon Effects Technologies
--	-----------	---

<b>Cost (\$ in millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Advanced Systems and Concepts Office (ASCO)	10.3	7.2	7.8

**FY 2003 Accomplishments**

- Stimulated, identified, and executed high-impact studies that encourage new thinking, address technology gaps, and improve the operational capabilities of DoD, DTRA, and other Government Agencies.
- Commissioned and performed a wide array of study efforts to address areas of force protection and operations; homeland defense and countering terrorist attacks; strategic issues; and other unconventional threats and vulnerabilities.
- Finalized the conceptual plan for an integrated national bio-forensics capability.
- Accomplished broad spectrum WMD intelligence collection gaps and needs assessment.

**FY 2004 Plans**

- Perform systems analysis studies to predict new WMD threats.
- Stimulate, identify, and execute high-impact projects to address long-term resolution of WMD issues.
- Provide long-range analytical support to the warfighter.
- Develop architectures and capabilities to reduce current and emerging threats.
- Emphasize crosscutting integration and alternative thinking and strategies.

**FY 2005 Plans**

- Continue systems analysis studies to predict new WMD threats.
- Continue to stimulate, identify, and execute high-impact projects to address long-term resolution of WMD issues.
- Continue to provide long-range analytical support to the warfighter.
- Continue to develop architectures and capabilities to reduce current and emerging threats.
- Continue to emphasize cross-cutting integration and alternative thinking and strategies

<b>Cost (\$ in millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Infrastructure	8.9	3.0	0

**FY 2003 Accomplishments**

- Provided for Payment of Civilian Salaries, Training and Information Technology Support.

**FY 2004 Plans**

- Civilian Salaries transferred to O&M.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b>		<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	Project BD - Weapon Effects Technologies

- Funding provided for the Defense Threat Reduction Information Analysis Center (DTRIAC) continues the collection and preservation of the data and knowledge derived during more than 50 years of nuclear weapons effects testing and studies. In FY 2004 management of this program transfers internally from the Technology Directorate to the Business Directorate and funding transfers in FY 2005 to O&M, to facilitate the availability and use of data archival, retrieval and analysis across the agency.

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** Approximately \$10M of FY 2003 funding was obligated with Science Applications International Corporation with locations in California and Virginia. Work performed was in direct support of Project BD-Weapon Effects.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BE – Testing Technologies and Integration

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete
Project BE – Testing Technologies & Integration	11.3	11.9	11.6	12.4	12.5	12.7	13.0	Continuing

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

- This project provides a unique national test-bed capability for Weapons of Mass Destruction (WMD) facility characterization, weapon-target interaction, and WMD facility defeat testing to respond to operational needs.
- The project develops, provides and maintains test-beds used by the DoD, the Services, the Combatant Commanders and other federal agencies to evaluate the implications of WMD, conventional, and other special weapon use against U.S. military or civilian systems and targets.
- This project leverages fifty years of testing expertise to investigate weapons effects and target response across the spectrum of hostile environments that could be created by proliferant nations or terrorist organizations with access to advanced conventional weapons or WMD (nuclear, biological and chemical).
- Specific programs supported by this project include:
  - Hard Target Defeat (HTD);
  - Anti-terrorism/Force Protection(AT/FP);
  - CP2 Counterforce Advanced Concept Technology Demonstration (ACTD);
  - Special Operations Forces (SOF).
- This project maintains testing infrastructure to support:
  - Warfighters;
  - Other government agencies;
  - Friendly foreign countries testing requirements on a cost reimbursable basis.
- This project also develops strategy and planning for a WMD test-bed infrastructure focusing on nuclear, biological, and chemical facilities, and the hard and deeply buried facilities in which these activities are often located.
- The project provides support for full and sub-scale tests that focus on weapon-target interaction with fixed soft and hardened facilities to include aboveground facilities, cut-and-cover facilities and deep underground tunnels.
- Specific activities include:
  - Testbed design and construction;
  - Instrumentation and data collection;
  - Test coordination and execution;
  - Post-test analysis and documentation.
- This project directly supports:
  - PE 0602717BR - Project BC;

**Exhibit R-2a, RDT&E Project Justification**

Date: February 2004

<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	Project BE – Testing Technologies and Integration

0602716BR

- PE 0602716BR - Projects BD & BF;
- PE 0603160BR - Projects BJ & BK.

**B. Accomplishments/Planned Program:**

<b>Cost (\$ in millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Test-Bed Operation and Support	9.0	9.2	10.0

**FY 2003 Accomplishments**

- Provided unique testbed capabilities for weapon-target interaction and WMD programs. DTRA supported 134 tests for Counterproliferation (CP2) ACTD demonstrations, Hard Target Defeat demonstrations, antiterrorism technology, general phenomenology and Service support.
- Provided an inventory of unique targets, infrastructure support, and expertise for conduct of major integrated test programs, including instrumentation maintenance, gage installation, data recording, source diagnosis, environmental support, safety support, experiment installation, experiment fielding, and test fielding.
- Completed Capitol Peak Tunnel complex at White Sands Missile Range.

**FY 2004 Plans**

- Continue to provide unique national testbed capabilities for weapon-target interaction and WMD threat reduction programs. Continue to provide testing support.
- Provide an inventory of unique targets, infrastructure support, and expertise for conduct of major integrated test programs, including:
  - Instrumentation maintenance.
  - Gage installation.
  - Data recording.
  - Source diagnosis.
  - Environmental support.
  - Safety support.
  - Experiment installation.
  - Experiment fielding.
  - Test fielding.

**FY 2005 Plans**

- Continue to provide unique national testbed capabilities for weapon-target interaction and WMD threat reduction programs. Continue to provide testing support.

**Exhibit R-2a, RDT&E Project Justification**

Date: February 2004

<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BE – Testing Technologies and Integration
--	-----------	--

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Field Support	1.6	2.0	1.3

**FY 2003 Accomplishments**

- Provided infrastructure support for maintenance of government vehicles, transportation of equipment, communication, utilities for facilities, rental of facilities, supplies, custodial service and procurement of equipment in support of test execution.
- Microwave mobile communications system installed at Nevada Test Site and White Sands Missile Range.

**FY 2004 Plans**

- Continue to provide infrastructure support for:
  - Maintenance of government vehicles.
  - Transportation of equipment.
  - Communication.
  - Utilities for facilities.
  - Rental of facilities.
  - Supplies.
  - Custodial service.
  - Procurement of equipment in support of test execution.

**FY 2005 Plans**

- Continue to provide infrastructure support for maintenance of government vehicles, transportation of equipment, communication, utilities for facilities, rental of facilities, supplies, custodial service and procurement of equipment in support of test execution.

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Simulator Technology	0.7	.7	.3

**FY 2003 Accomplishments**

- Completed the following upgrade on the original Large Blast and Thermal Simulator (LB/TS): Driver tube section and end caps were modified to remove hydro plugs. This allows a more inexpensive test with the same fidelity.
- Continued to keep the LB/TS in caretaker status, with limited testing of protective structures.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b>		<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	Project BE – Testing Technologies and Integration

**FY 2004 Plans**

- Continue to maintain the Large Blast and Thermal Simulator in caretaker status, with the ability to conduct curtain wall tests and blast tests on short notice.

**FY 2005 Plans**

- Continue to maintain the Large Blast and Thermal Simulator in caretaker status, with the ability to conduct curtain wall tests and blast tests on short notice.

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** Approximately \$1.8M of FY 2003 funding was obligated with Applied Research Associates, Inc, located in New Mexico and \$1.8M of FY 2003 funding was obligated with the Department of Energy/Nevada Operations. Funding obligated was in direct support of Project BE-Testing Technologies.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BF - CP Operational Warfighter Support

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete
Project BF – CP Operational Warfighter Support	51.6	45.9	94.2	101.1	101.0	102.2	103.8	Continuing

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

The CP Operational Warfighter Support project provides the bridge between the WMD Defeat Technology base and operational community needs. The overall project goal is to support the Joint Chiefs of Staff (JCS), the warfighting Combatant Commanders and Services/agencies engaged in countering WMD threats and to protect the U.S. and its allies against military or terrorist use of WMD. This project develops hard and deeply buried target defeat technology, provides targeting and Intelligence Community (IC) support, exercises WMD Defeat Technology and products with the users, develops DoD compliant simulations that exploit counterproliferation (CP) models for target planning and collateral effects prediction, and demonstrates WMD defeat capabilities in operationally realistic environments. The technical approach is to integrate technologies developed in other WMD defeat projects, to conduct a full spectrum of tests to verify capability enhancement, to expose customers to these capabilities in exercises, wargames and demonstrations, to integrate WMD defeat technologies into customer operations, and to support use of these capabilities during contingency operations. This project focuses on two areas that support outside customer requirements. These two areas are: 1) Operational Support Technology, and 2) Target Defeat (TD) program.

- Operational Support Technology.** The Weapons of Mass Destruction Assessment and Analysis Center (WMDAAC) provides the warfighter with the capabilities and understanding for countering the use and effect of Weapons of Mass Destruction (WMD) through the advancement of simulation technology, assessment of operational impact, development of collaborative capabilities and access to mature computer models. Specifically: (1) WMDAAC develops advanced simulations from first-principles physics models produced in other projects in this program element (extensively Project BD). WMDAAC personnel provide an interface between DTRA model developers and the weapons effects simulation community to ensure maximum utility of DTRA models in distributed interactive simulations through compliance with C4ISR & High-Level Architecture (HLA) standards and protocols documented in Federation Object Models; (2) WMDAAC uses these advanced simulations to assist the warfighter in quantifiably assessing operational theater plans and post-attack warfighting effectiveness and to develop alternatives to mitigate the effects of WMD; (3) WMDAAC develops and adapts capabilities to project information through advanced visualization techniques and advanced collaboration at widely dispersed locations including Combat Commanders. Commercial and government-developed technologies are selected and proven in a research environment, and then transitioned to the DTRA Operations Center and/or other warfighter customers; and (4) WMDAAC provides warfighters and first responders with ready access to mature computer models, WMD databases and expert field assistance and training. The end result is to provide more realistic models and simulations of the effects of WMD for use in training, analysis, experimentation, operational environments and acquisition. In FY04, the WMDAAC will open the Weapons of Mass Effect (WME) Battle Laboratory. The WME Battle Lab is a natural “next step” in the evolution of WMDAAC’s simulation and collaboration technology development activities. These activities, combined with its operations research capability, will provide a resource which will enable the warfighter to better understand the effects of WME and refine concepts of operation and battle plans.

**APPROPRIATION/BUDGET ACTIVITY**

RDT&amp;E, Defense-Wide/Applied Research - BA2

0602716BR

**PROJECT NAME AND NUMBER:**

Project BF - CP Operational Warfighter Support

- **Target Defeat Program.** The United States and its allies face a growing threat related to critical military targets hidden within and shielded by hardened, deeply buried tunnel complexes. These complexes may house biological/chemical/nuclear weapons production or storage facilities; command, control, and communications facilities; and/or theater ballistic missiles with their transporter-erector-launchers (TELs). An objective of this project is to examine the existing U.S. and Allied capabilities to hold hardened, deeply buried tunnel targets at risk. Any deficiencies will be identified and the ability of planned systems to address these deficiencies will be assessed. Finally, new technologies needed to mitigate remaining shortfalls will be evaluated as candidates for new hard target defeat acquisitions. Activities support warfighting requirements derived from the Hard and Deeply Buried Target Defeat capstone requirements document and to RDT&E priorities by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD (AT&L)). Funds added as a result of the Secretary of Defense strategic review for FY 2002 are being used to develop technologies identified in the Hard and Deeply Buried Target Defeat (HDBTD) S&T Master Plan. This area supports the Joint Functional Concepts of Battlespace Awareness and Force Application. Supported Transformational Sub-Goals within “deny enemies sanctuary” are small-diameter munitions and defeat of hard and deeply buried targets.

The following milestones have been divided into three major functional areas needed to develop target defeat capabilities and support warfighter operations: attack technologies, tunnel defeat testing; and hard target defeat characterization

- **Attack Technologies.** In this document, attack technologies is further broken down into two parts, generic attack technologies and find, characterize and assess (FCA) Technology.
  - As input to the defeat assessment component of target defeat, physics-based models for all relevant weapons effects and weapon-target interactions are being developed. Specific technology areas being updated include warhead penetration into intact and damaged rock, tunnel collapse near the portal area, in-tunnel effects (including airblast, fragmentation, heat, and electromagnetic pulse), blast door response, and the fragility of critical and vulnerable equipment. The models will incorporate effects from weapons currently in the inventory as well as more advanced defeat concepts. Activities in the technology development area include first principle calculations, numerical simulations, laboratory testing, precision small-scale experiments, fast-running engineering model development, and full-scale field tests at several test ranges. The algorithms and methodology comprising the tunnel defeat models are being submitted for accreditation to the Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME). Additional activities include advanced energetic and non-energetic weapons. Thermobaric weapons are examples of advanced energetic weapons. Non-energetic weapons do not use blast as the defeat mechanism.
  - Targeting and intelligence community (IC) support, and find, characterize and assess (FCA) technology are part of target defeat. This activity provides support to the Combatant Commanders and IC in target planning against hard and deeply buried facilities. The assessments employ intelligence, imagery, and reverse engineering, leveraging the databases, methodologies, and technical expertise developed during Balanced Survivability Assessments (PE 0602717BR, Project BC) to provide target characterizations for physical and functional defeat. Details of specific individual assessments are classified. The find, characterize and assess (FCA) technology effort supports the targeting and IC activity by developing the technical capabilities needed to target hostile foreign systems in support of warfighter and IC requirements.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BF - CP Operational Warfighter Support

- **Tunnel Defeat Testing.** This testing acquires data to better understand weapons effects phenomenology and is used to develop models and attack options for defeating tunnels. The effectiveness of the improved end-to-end defeat capability for tunnels is being demonstrated in a series of three operational exercises being conducted at the Nevada Test Site (NTS). Each exercise will consist of tunnel defeat testing and analyses conducted in the context of an attack on a particular type of tunnel target complex. Phase 1 is associated with tunnel complexes housing theater ballistic missiles (TBMs), their TELs, and other support equipment. U.S. Forces Korea and PACOM are active participants. Phase 2 will represent Command, Control, Communications, and Intelligence (C3I) centers housed in tunnels. Phase 3 will be associated with WMD production and storage facilities. Each demonstration phase includes facility definition, tunnel construction and outfitting, simulated target system operations and related data collection, attack planning, test execution, battle damage assessment and repair and assessment of test results. All the tests are being conducted within the context of a realistic operational scenario involving the use of end-to-end defeat planning tools and procedures with current and advanced weapons, sensors, and platforms. These tests will demonstrate the effectiveness of each of these elements against realistic tunnel targets.
  
- A supplemental tunnel defeat demonstration series at White Sands Missile Range (WSMR), referred to as “WSMR Portals,” is currently being planned to address important hard target defeat demonstration requirements that will not be met by the exercises at NTS. These requirements include realistic air operational tactics, stand-off weapons, geologies with granite rock representative of the Korean peninsula, and the ability to apply stand-off air-to-ground weapons, artillery, Multiple Rocket Launch System (MRLS), and tactical missiles against tunnel facilities. In addition to being of great interest to the warfighters, meeting these requirements will create numerous test opportunities for emerging projects in advanced weapons, for example thermobaric weapon concepts.
  
- **Hard Target Defeat Characterization.** This activity captures the funding and efforts required to support Operation Iraqi Freedom. It consists of underground facility characterization to support targeting. The customers are the intelligence community and U.S. Central Command.

This project focuses weapon/target interaction and target planning tool technology base efforts completed in Project BD on tunnel applications. The program depends on test planning and execution support from Project BE. Products from this project are transitioned to PE 0603160BR, Project BK for Command, Control, Communications, and Intelligence (C3I) facility defeat demonstration, the Thermobaric Advanced Concept Technology Demonstration (ACTD), and the Tunnel Defeat ACTD. Efforts in this program provide part of the technology base needed for counterproliferation activities conducted in other DoD programs.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BF - CP Operational Warfighter Support

**B. Accomplishments/Planned Program:**

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Operational Support Technology	15.7	9.1	9.5

**FY 2003 Accomplishments:**

- Investigated and demonstrated the utility of a WME Urban Dispersion Model for use and re-use in a collaborative 4-Dimensional (x, y, z, and time) simulation environment for integration into the Global Command & Control System for Combatant Commander application and use.
- Web enabled the COTS Chemical Biological Response Aide (CoBRA), a tool for DoD and other federal agencies to deal with and report on WME incidents.
- Established an Operations Research Capability. During FY03, WMDAAC established the capability to perform in-house analysis to better focus development of WMDAAC simulations, analysis of military utility during exercises, experiments, and demonstrations, as well as DTRA model development. This capability, an integral part of the developing WME Battle Lab, was applied to evaluation of tactics and technologies in Combatant Commanders' CONOPS and for analysis of alternatives for acquisition programs.
- Continued the education and training role through participation in selected Joint, Combatant Commands and service school exercises, experiments and wargames.
- Improved high-fidelity physics-based models and databases of targets, weapons, and post-strike effects that support real/near-real time viewing of dynamic weapons effects. These models have improved targeting, Battle Damage Assessment (BDA), no-drop bomb scoring, and course of action development.
- Institutionalized collaborative and reachback capabilities to support DTRA's role in satisfying emerging warfighter and homeland security requirements.
- Continued our support of other federal agencies as directed in the war against terrorists as it pertains to CBRNE issues exploiting information technology with assured security.
- Supported the Homeland Security Command and Control ACTD Demonstration. This ACTD was successfully conducted in December 2002 in Baton Rouge, Louisiana; Hampton Roads, Virginia; Naval Station Miramar, California; and Tacoma, Washington. The WMDAAC planned over 21 separate incidents in four cities and demonstrated several collaborative tools, which provided data and voice collaboration throughout the two weeks of setup, rehearsal, and demonstrations at all venues. The WMDAAC also provided Reachback support from DTRA including hazard prediction modeling and consequence assessment for the 21 CBN attacks.
- Established a Back-up/Alternate Reachback Center at Kirtland AFB, providing uninterrupted access to DTRA services and information databases, should the primary facilities in Alexandria, VA, become unusable for any reason.
- Completed phase I of the Weapons of Mass Destruction Operational Analysis Model resulting in an HLA federation which includes ITEM and HPAC. This allows a theater level simulation to include WMD attacks in a meaningful way.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b>		<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	Project BF - CP Operational Warfighter Support

- Published the first version of the Weapons Effects Federation Object Model, facilitating the interaction of information among models and their integration into simulations. It was applied to Millennium Challenge (MC) 2002, an experiment conducted in collaboration with all the services and US Special Operations Command. MC emphasized the integration of innovations in doctrine, organization, training, materiel, leadership, personnel and facilities to enhance the future joint force commander's operational level command and control. MC02 incorporated live, virtual and constructive elements of all the services and special operations forces representative of their future force concepts. The WMDAAC used DTRA tools both on shore and on ships and evaluated the collaboration and C2 technologies demonstrated for military utility.

**FY 2004 Plans**

- Open the WME Battle Laboratory
- Continue to provide white-cell reachback support to the Unified Defense and Determined Promise annual exercises
- Continue participation in the Joint Forces Command exercise series, with focus on integrating coalition WME expertise with DTRA modeling and simulation.

**FY 2005 Plans**

- Complete design and installation of information technology infrastructure for WME Battle Lab.
- Focus on integrating coalition WME expertise with DTRA modeling and simulation through continued participation in the Joint Forces Command exercise series.
- Complete Airbase Ops Operations Research Study
- Continue to provide white-cell reachback support to the Unified Defense and Determined Promise annual exercises
- Complete CBRNE Object Model version core set of data elements required by high-resolution weapons and collateral effects simulations
- Establish initial operating capability for Weapons Analysis Lethality Toolset (WALTS) version 2. The tool will support force protection and consequence management exercises, real-world events, weapons effectiveness evaluations, and examination of foreign system vulnerabilities.
- Continue development, injection, and integration of advanced WME modeling and simulation capabilities into warfighter C4ISR architecture
- Incorporate enhanced Air Operations capability in WMD Operational Assessment Model (OAM) to support WME analysis of Theater Air War.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BF - CP Operational Warfighter Support

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Attack Technologies	16.1	21.7	57.4

**FY 2003 Accomplishments**

- Improved infrastructure, knowledge base, and test procedures to evaluate and test new explosive formulations.
- Began scale testing on non-energetic advanced warhead fills.
- Added new attack planning methodology into Munitions Effects Assessment (MEA) and released MEA 4.2.
- Developed functional models for missile operational facilities, generalized air blast, and penetration of damaged rock.
- Developed prototype for tunnel attack planning strategies.
- Completed tunnel and portal collapse models.
- Completed enhanced blast effects and portal extension models.
- Created prototype of tunnel attack planning tool.
- Developed and delivered initial operational version of the Underground Targeting and Analysis System (UTAS) software program for characterization and modeling of underground targets.
- Developed geology templating methodology and delivered five initial geology templates for operational use.
- Developed and delivered over 300 target characterizations and 400 three-dimensional target models to the Combatant Commands and Intelligence Community (IC).

**FY 2004 Plans**

- Formulate and test new explosive mixtures in penetrating warheads optimized for use against tunnels and chemical and biological targets.
- Complete tests and develop delivery concepts for weapons with non-energetic warhead fills
- Identify mission critical equipment and vulnerabilities for WMD production tunnel facilities.
- Continue development of defeat technologies to model and predict the extent of multiple weapons penetration, tunnel damage, and advanced weapon performance.
- Continue development of high payoff novel explosive concepts using advanced energetic material to enable defeat of targets currently invulnerable to weapons solutions.
- Complete Deep Digger laboratory technology verification experiments, and conduct preliminary design review for prototype design.
- Continue development of system fragility and response models for Command, Control, Communications and Intelligence (C3I) equipment.
- Develop tunnel aim point optimization models to increase the effectiveness of the planning tools developed for warfighter planners.
- Continue assessments of hostile facilities based on JCS and Combatant Commanders priorities. Details are classified.
- Develop improved weapon/target interaction models of tunnels and liners to nuclear ground shock environments. Incorporate these models in the MEA planning tool.

**APPROPRIATION/BUDGET ACTIVITY**

RDT&amp;E, Defense-Wide/Applied Research - BA2

0602716BR

**PROJECT NAME AND NUMBER:**

Project BF - CP Operational Warfighter Support

- Release MEA 5.0.
- Conduct massive ordnance airblast lethality test against a tunnel target.
- Initiate massive ordnance penetration technology demonstration.
- Develop find, characterize and assess technologies to improve the national capability to functionally defeat tunnel facilities.
- Develop and validate remote site geologic characterization technology.
- Develop and reverse engineer a methodology to characterize tunnel facilities.
- Incorporate nuclear and conventional analysis into the UTAS software.
- Support targeting and IC by conducting assessments of hostile facilities based on JCS and Combatant Commanders priorities.
- Complete four geotechnical templates for hard and deeply buried target characterization.
- Characterize targets and develop additional three-dimensional target models for delivery to Combatant Commands and the IC.
- Document lessons learned from Red-Blue-White exercise.
- Complete WMD material assessment concept demonstration.
- Analyze Operation Iraqi Freedom Bomb Damage Assessment (BDA) data for ground truth comparison to characterizations and assessments delivered during operations. Account for anomalies and refine models as necessary.
- Develop final slope model for geologic template methodology.
- Compile results from 8-Site Geotechnical Validation Study.
- Improve streamlined procedures for characterization of deep geology.
- Initiate concept development for find, characterize and assess technologies and planning tools.

**FY 2005 Plans**

- Continue development of optimized explosive formulations; down-select most promising formulations for more extensive testing.
- Conduct methodology down-select and complete Phase I report of non-energetic fill concepts.
- Collect experimental data on new model of thermobaric (TB) formulations and refine TB metrics.
- Enhance model of coupled combustion and flow in TB detonations.
- Identify TB weapon concepts for use against hard and deeply buried targets.
- Initiate investigation of mechanisms in nanoreactive (N/R) materials.
- Model N/R energy coupling to targets.
- Synthesize and scale-up nitrogen fluoride (NF<sub>2</sub>) compounds.
- Apply coated nanoparticles to weapon payloads.
- Develop model and perform calculations for non-energetic payloads.
- Assess data from field impact tests of projectiles with unstable trajectory.
- Develop weapon system survivability model for horizontal (skip bomb) delivery.
- Develop algorithm for weapon trajectory stability in horizontal (skip bomb) delivery.
- Analyze High Velocity (HV) penetration lab data evaluating oblique impacts of novel case shapes.

**APPROPRIATION/BUDGET ACTIVITY**

RDT&amp;E, Defense-Wide/Applied Research - BA2

0602716BR

**PROJECT NAME AND NUMBER:**

Project BF - CP Operational Warfighter Support

- Demonstrate effectiveness of massive penetration against hard and deeply buried targets.
- Initiate hypervelocity penetration lethality demonstration.
- Develop portal extension engineering response model.
- Update tunnel portal closure model for smaller diameter (vent-size) openings.
- Integrate fragment model with 1.5D (Dimension) airblast model for MEA 6.0.
- Assess experimental data for development & validation of vent-related airblast models.
- Develop methodology to assess equipment fragility based on generic characterization.
- Develop equipment fragility model for MEA 6.0.
- Obtain Joint Technical Coordinating Group (JTCCG)-accreditation of MEA equipment fragility model for C3I type tunnel.
- Improve blast door model and release MEA 6.0.
- Design prototype submunition and sensor to disrupt tunnel operations.
- Accelerate development of high-payoff novel explosive concepts using advanced energetic materials to enable defeat of targets currently invulnerable to weapons solutions.
- Update nuclear planning tool (MEA-N).
- Complete phased War Planning Support (WPS) analytical efforts for USFK, MARFOR/CPF (USPACOM), CNE (USEUCOM) and USCENCOM.
- Complete WPS analytical support to the Commanding General, 32nd AAMDC. Complete transitioning applications to USFK and USCENCOM.
  - Develop Special Operations Forces applications for Underground Targeting and Analysis System (UTAS) software program.
  - Enhance UTAS target visualization capabilities.
  - Continue targeting and IC support by conducting assessments of hostile facilities based on JCS and Combatant Commanders priorities.
  - Continue Red-Blue-White assessment exercises.
  - Initiate development of prototype sensor and planning tool for underground target find, characterize and assess technology application.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BF - CP Operational Warfighter Support

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Tunnel Planning Defeat	16.9	15.1	27.3

**FY 2003 Accomplishments:**

- Completed signature data collections of C3I tunnel facility complex.
- Conducted full-scale blast door response and fragility tests at Nevada Test Site.
- Completed laser guided weapon performance study.
- Completed design and modification of bunker target for MIDWAY EMERALD joint tests of Advanced Tactical Missile System – Penetrator (ATACMS-P) weapon.

**FY 2004 Plans**

- Complete construction of tunnel portals and tunnel at the White Sands Missile Range.
- Using newly developed tactics, techniques, and procedures (TTPs), conduct DIVINE WARHAWK operational tunnel defeat demonstrations against tunnel portals using inventory and new standoff weapons at the White Sands Missile Range.
- Conduct demonstration of massive ordnance bomb against a tunnel facility at Nevada Test Site.
- Conduct functional defeat operational demonstrations on the C3I tunnel complex to be constructed at the Nevada Test Site.
- Conduct MIDWAY EMERALD tests of joint ATACMS-P weapon against a target at White Sands Missile Range in support of ATACMS-P Advanced Concept Technology Demonstration (ACTD).
- Conduct demonstrations and evaluations of sensor technologies to improve battle damage assessment (BDA) of functional attacks on tunnel facilities
- Complete signature data collection of long operational tunnel facility complex at White Sands Missile Range.
- Select and implement enhanced CBR protection technologies into an existing building in Maryland for Project Ancile.

**FY 2005 Plans**

- Conduct DIVINE WARHAWK deep underground operational tunnel facility defeat demonstrations using advanced weapons at the White Sands Missile Range.
- Conduct DIVINE HELCAT reconstitution exercise and determine reconstitution time for C3I tunnel facility at Nevada Test Site (NTS).
- Complete design of simulated WMD production and storage tunnel complex to be constructed at Nevada Test Site.
- Begin planning for DIVINE HATES WMD production and storage tunnel complex functional defeat.
- Begin planning for near-term integrated functional defeat demonstrations against multiple tunnel complexes.
- Demonstrate advanced non-energetic payload concept at NTS.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BF - CP Operational Warfighter Support

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
Hard Target Defeat Characterization (Underground Targeting Analysis System)	2.9		

**FY 2003 Accomplishments**

- Made available over 2200 models of 3-D underground facility targets in terrorist supporting countries.
- Placed technology support in CENTCOM, EUCOM, PACOM/USFK and STRATCOM.
- Hired twelve new engineers at the Director Central Intelligence's (DCI's) Underground Facility Analysis Center and supported Operation Iraqi Freedom.
- Made available online 3-D model visualization program on both the classified internet and Joint Worldwide Intelligence Communications System.

**FY 2004 Plans**

- Completed in FY 2003.

**FY 2005 Plans**

- Completed in FY 2003.

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** N/A

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BG - Nuclear Operations

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete
Project BG Nuclear Operations	82.9	61.5	74.0	69.9	66.4	61.4	61.4	Continuing

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

- This program directly reflects the National Military Strategy, the dictates of the Nuclear Posture Review (NPR), the Quadrennial Defense Review (QDR) and is directed by the JCS in the Joint Strategic Capabilities Plan (JSCP) Nuclear Annex while laying a foundation for potential transformation activities within the Nuclear arena as identified in DoD's Transformation Planning Guidance (TPG).
- This project encompasses WMD (Nuclear) Protection and Response.
  - Responsive to the oversight of the Nuclear Weapons Council, the project provides critical support to the Combatant Commanders, Services, JCS and OSD.
  - This project continues and improves upon the realignment begun by DTRA at its inception to deal with the emerging 21st Century strategic landscape.
  - This activity and in direct support to the National Military Strategy and other national and DoD level documents, these programs will:
    - Promote initiatives to detect and attribute the surreptitious introduction and use of weapons of mass destruction against the U.S. and its allies thereby protecting our citizens and critical infrastructures;
    - Dissuade potential adversaries, whether nations, terrorist groups or criminal organizations, from using asymmetric means of war such as weapons of mass destruction to counter U.S. conventional weapon superiority;
    - Enhance deterrence and proactively support the agency's mission of WMD threat reduction.

**B. Accomplishments/Planned Program:**

Cost (\$ in millions)	FY 2003	FY 2004	FY 2005
WMD (Nuclear) Protection and Response	13.9	13.5	5.1

**FY 2003 Accomplishments**

- Achieved numerous milestones in the DTRA-led interagency "Domestic Nuclear Event Attribution (DNEA) program, including: restoration of nuclear debris radio-chemistry analysis labs; developed baseline set of computer models of potential terrorist nuclear device designs; developed a prototype nuclear debris sample collection robot; and initiated an interagency DNEA Exercise Program.

**APPROPRIATION/BUDGET ACTIVITY**

RDT&amp;E, Defense-Wide/Applied Research - BA2

0602716BR

**PROJECT NAME AND NUMBER:**

Project BG - Nuclear Operations

- Initiated development of a portable, mobile, and rapidly deployable radiation detection and tracking system, a portion of which comprised of remote sensors linked to central receiving/processing station via Radio Frequency (RF) signals. Continue an enhanced effort and began integration of detection arrays with communication and analytical software. Expanded upon mobile prototype, and continued software development and upgrade toward future deployment of three attended or unattended variants, including mobile, maritime, and stationary or portal.
- Provided Combatant Command Technical Support Groups (TSG) ability to employ the system based on intelligence cueing. Continue efforts to enhance and expand to varied geographic and operational environments to evaluate operability
- Began development and fielding of passive and active Special Nuclear Material (SNM) detection systems capable of detection in cases where SNM is shielded; current detector technologies do not perform well when SNM is shielded for gamma and/or neutron emissions. Continue and refine effort by funding scientific review panel and technical support to review studies and proposals to determine promising track for further detailed research.
- Produced through development and adaptive engineering detection equipment capable of rapid and standoff detection of radioactive materials across a broad spectrum of operational environments including uncertain and hostile. Developed some equipment that without significant degradation is waterproof, shockproof, and resistant to extreme conditions and sustained employment. Developed some lighter weight and smaller detector systems for more diverse field employment.
- Began integration through new concept design or adaptive engineering multiple detection sensor systems to facilitate standoff operator detection of radioactive material and passive or active trigger, alarm, destruct, or detection devices targeting the operator.
- Begun establishment of administrative support structure to support technical reporting and document production of R&D development efforts. Reporting program now has the beginnings of a broad enough scope to permit publication at classified and unclassified levels, and permit literature review and exploration of existing technologies to eliminate duplicating or redundant efforts, and exploit dual or multiple-use technologies.
- Conducted operational analysis of commercial, vendor, "off-the-shelf", laboratory-produced concept design, or theoretical radiation detection devices in order to determine relative efficiencies, capabilities, and technologies to further enhance the ability to develop, procure, and employ reliable and current technologies for radioactive material detection. Enhanced tools and capability for rapid attribution of the source of a nuclear event.
- Completed/distributed to Bold Gambler (BG) units of a handheld radiac meter specific and modified to meet the needs of the mission. Began development five prototype hand held chem-bio detectors capable of analyzing and defining suspect material with zero defects

**FY 2004 Plans**

- In the "Domestic Nuclear Event Attribution" (DNEA) Program, develop a deployable lab: install classified interagency communications system/communications terminals at critical agencies; perform the first simulated nuclear event field exercise; formally integrate program plans and improve technical/operational procedures at the national level through support to DTRA's FBI customer co-chair of the National Security Council formed sub-Policy Coordination Committee Attribution Working Group; brief the program to the Vice President.

<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date: February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-Wide/Applied Research - BA2	0602716BR	<b>PROJECT NAME AND NUMBER:</b> Project BG - Nuclear Operations

- Develop a portable, mobile, and rapidly deployable radiation detection and tracking system, a portion of which will be comprised of remote sensors linked to central receiving/processing station via Radio Frequency (RF) signals. Continue effort and begin integration of detection arrays with communication and analytical software. Expand upon mobile prototype, and continue software development toward future deployment of three attended or unattended variants, including mobile, maritime, and stationary or portal.
- Provide Combatant Command Technical Support Groups (TSG) ability to employ the system based on intelligence cueing. Continue refined effort and expand to varied geographic and operational environments to evaluate operability.
- Develop and field passive and active Special Nuclear Material (SNM) detection systems capable of detection in cases where SNM is shielded; current detector technologies do not perform well when SNM is shielded for gamma and/or neutron emissions. Continue to refine and expand effort by funding scientific review panel and technical support to review studies and proposals to determine promising track for detailed research.
- Continue to produce through development and adaptive engineering detection equipment capable of rapid and standoff detection of radioactive materials across a broad spectrum of operational environments including uncertain and hostile. Develop equipment that without significant degradation is waterproof, shockproof, and resistant to extreme conditions and sustained employment. Develop lighter weight and smaller detector systems for more diverse field employment.
- Continue to integrate through new concept design or adaptive engineering multiple detection sensor systems to facilitate standoff operator detection of radioactive material and passive or active trigger, alarm, destruct, or detection devices targeting the operator.
- Enhance the establishment of administrative support structure to support technical reporting and document production of R&D development efforts. Reporting program at its end state must have broad enough scope to permit publication at classified and unclassified levels, and permit literature review and exploration of existing technologies to eliminate duplicating or redundant efforts, and exploit dual or multiple-use technologies.
- Continue to conduct operational analysis of commercial, vendor, "off-the-shelf", laboratory-produced concept design, or theoretical radiation detection devices in order to determine relative efficiencies, capabilities, and technologies to further enhance the ability to develop, procure, and employ reliable and current technologies for radioactive material detection. Enhance tools and capability for rapid attribution of the source of a nuclear event.

**FY 2005 Plans**

- In the "Domestic Nuclear Event Attribution" (DNEA) Program, complete development of the threat device models for Initial Operational Capability; complete development of integrated materials database; perform a networked attribution community exercise.
- Continue to improve and enhance the development of a rapidly deployable radiation detection and tracking system, integration of detection arrays with satellite communication and analytical software, expansion of multi-platform system prototype, and software development toward future deployment of attended or unattended variants, including mobile, maritime, aerial, and stationary or portal.
- Upgrade support to Combatant Commanders Technical Support Groups (TSG) with an eye toward transformational opportunities.

**Exhibit R-2a, RDT&E Project Justification**

Date: February 2004

<b>APPROPRIATION/BUDGET ACTIVITY</b>	<b>PROJECT NAME AND NUMBER:</b>
RDT&E, Defense-Wide/Applied Research - BA2	Project BG - Nuclear Operations

0602716BR

- Enhance the development and fielding of passive and active Special Nuclear Material (SNM) detection systems capable of detection in cases where SNM is shielded; current detector technologies do not perform well when SNM is shielded for gamma and/or neutron emissions. Improve effort by funding scientific review panel and technical support to review studies and proposals to determine promising track for transformational opportunities detailed research.
- Enhance the development of adaptive engineering detection equipment capable of rapid and standoff detection of radioactive materials across a broad spectrum of operational environments including uncertain and hostile. Develop equipment that without significant degradation is waterproof, shockproof, and resistant to extreme conditions and sustained employment. Develop lighter weight and smaller detector systems for more diverse field employment.
- Improve and upgrade integration through new concept design or adaptive engineering multiple detection sensor systems to facilitate standoff operator detection of radioactive material and passive or active trigger, alarm, destruct, or detection devices targeting the operator.
- Enhance further operational analysis of commercial, vendor, "off-the-shelf", laboratory-produced concept design, or theoretical radiation detection devices in order to determine relative efficiencies, capabilities, and technologies to further enhance the ability to develop, procure, and employ reliable and current technologies for radioactive material detection. Begin search for further revolutionary solutions.

<b>Cost (\$ in millions)</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Classified Program</b>	69.0	48.0	68.9

**FY 2003 Accomplishments**

**Classified**

**FY 2004 Plans**

**Classified**

**FY 2005 Plans**

**Classified**

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** Approximately \$57M of FY 2003 funding was obligated with the Department of Energy/Albuquerque Operations Office in direct support of Project BG-Nuclear Operations.