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Exhibit R-2, RDT&E Budget Item Justification

Date: February 2006

APPROPRIATION/BUDGET ACTIVITY

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

R-1 ITEM NOMENCLATURE:

WMD Defeat Technology; 0602716BR

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total 0602716BR Cost	244.729	205.370	213.152	216.594	221.359	229.079	235.379
Project BB Small Business Innovative Research*	0.000	2.316	2.411	2.390	2.424	2.426	2.429
Project BD Weapons Effects Technologies	67.185	74.567	76.462	76.647	77.916	79.863	81.857
Project BE Testing Technologies & Integration	13.270	24.479	19.946	20.200	20.143	20.249	20.423
Project BF CP Operational Warfighter Support	91.792	93.189	97.315	99.685	103.160	106.617	108.914
Project BG Nuclear Operations	72.482	10.819	17.018	17.672	17.716	19.924	21.756

*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 allies from weapons of mass destruction (WMD) by providing capabilities to reduce the present and future threats. The approach to this challenge is contained within the three pillars of the DTRA mission**: non-proliferation, counterproliferation and consequence management. This program element specifically funds technologies necessary to defeat the threat from WMD.

Project BD, Weapons Effects Technologies provides the basic and applied research and development to support the technical underpinning for the next generation of agent defeat, deny and disrupt counterforce weapons to meet WMD threat. This project seeks answers to these challenges by using state-of-the-art science and engineering capabilities, novel payload development and evaluation capability, and precision laboratory and field experimentation.

Project BE, Testing Technologies & Integration provides a unique, simulated WMD national test bed capability for facility characterization, weapon-target interaction, and facility defeat testing by developing and maintaining 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 military or civilian systems/targets.

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Project BF, CP Operational Warfighter Support provides the bridge between the WMD Defeat Technology base and operational and intelligence 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.

Project BG, Nuclear Operations provides initiatives to locate, detect, defeat, and investigate the use of Weapons of Mass Destruction (WMD) against the U.S. and its allies. In accordance with the Nuclear Posture Review, the objective is to dissuade potential adversaries, whether nation states, terrorist groups, or criminal organizations, from using asymmetric means of war.

B. Program Change Summary:

(\$ in Millions)	FY 2005	FY 2006	FY 2007
Previous President's Budget	245.471	206.487	216.206
Current President's Budget	244.729	205.370	213.152
Total Adjustment	-0.742	-1.117	-3.054
Congressional program reductions			
Congressional reductions		-3.117	
Congressional increases		2.000	
Reprogramming			
Classified Program Transfer			
Other Program Adjustments	-0.148		-3.054
SBIR/STTR Transfer	-0.594		

Change Summary Explanation:

- The decrease in the FY 2005 funding profile from the previous submission to the current President's Budget is the result of a Small Business Innovative Research (SBIR) funding transfer and a reduction to support the Department of Energy. During the year of execution, SBIR funding is consolidated into PE 0605502BR "Small Business Innovative Research" for execution.

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- The decrease in FY 2006 from the previous submission to the current President's Budget is the result of the FY 2006 DoD Appropriation Act (P.L. 109-359) that contained several undistributed Congressional reductions applied to the entire DTRA RDT&E program. This program received a -\$3.117 million reduction. This program received Congressional increases in the amount of \$2.0 million.
- The net decrease of \$3.054 million in FY 2007 from the previous submission to the current President's Budget reflects program reprioritization offset by an increase of \$3.056 million for non-pay purchase inflation. The decrease primarily reflects the realignment of funding within DTRA research and development resources to initiate a Basic Research program to support areas that are critical to the Department of Defense maintaining technological superiority. The decrease also reflects a technical adjustment in support of a classified program and reflects funding realignments in support of the Strategic Command (STRATCOM). DTRA's program priorities are linked to the Combatant Commanders.
- Funding is used to support high priority combat support requirements in accordance with current planning, assumptions and associated requirements, address critical infrastructure requirements and implement the business reform initiative. It also balances the program consistent with strategic priorities within DTRA and the Department of Defense.
- The resulting program provides for a flexible combat support structure; focused science and technology investments, to include: critical areas like WMD target defeat and nuclear weapons effects technologies; defeat WMD weapons/devices, 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.

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

D. Acquisition Strategy: Not Applicable.

E. Performance Metrics: Cost, schedule and performance are monitored via a combination of Earned Value Management System, Cost Schedule Status Reporting, and Cost Funds Status Reports.

** Tasking for this mission is contained in the National Security Strategy, Unified Command Plan (UCP), National Strategy to Combat WMD (NSPD-17), Counterproliferation Interdiction (NSPD-20), National Strategy for Combating Terrorism, National Military Strategy, Strategic Planning Guidance (SPG), Contingency Planning Guidance (CPG), National Military Strategy for Combating WMD, National Military Strategic Plan (NMSP) for the War on Terrorism (WOT), Joint Strategic

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Capabilities Plan (JSCP) (including the Nuclear Annex), Security Cooperation Guidance (SCG), Quadrennial Defense Review (QDR), Nuclear Posture Review (NPR), and Defense Transformation Planning Guidance (TPG).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	PROJECT NAME AND NUMBER: 0602716BR Project BB – Small Business Innovative Research	

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BB-Small Business Innovative Research	0.000	2.316	2.411	2.390	2.424	2.426	2.429

A. Mission Description and Budget Item Justification:

To prepare for critical future WMD mitigation technology needs, WMD related advanced technology programs will invest in a balanced program of high leverage technologies that will yield improved WMD capabilities across a broad range of WMD defeat, WMD Defense, and an innovative science and technology programs. DTRA maintains a specific effort with minority and disadvantaged business; to include Historically Black Colleges and Universities/Minority Institutions and businesses. Each program and investment will focus, to the maximum extent feasible, on innovative WMD related technologies in support of future WMD mitigation capabilities. An important goal of each effort is to identify, develop, and demonstrate WMD related innovative technologies which will dramatically improve WMD Defense and Defeat performance.

B. Accomplishments/Planned Program:

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Small Business Innovative Research (SBIR)	0.000	2.316	2.411

FY 2005 Accomplishments:

- Not Applicable.

FY 2006 Plans:

- Fund 43.6 percent of DTRA SBIR investment including:
 - Up to ten Phase I SBIR contracts from proposals from FY 2006 topic areas including WMD Dispersal Device Defeat, Advanced X-ray Simulator; Next Generation Blast Mitigation, Weapons of Mass Destruction (WMD) Hazard Modeling and Simulation, Integrated WMD Toolset Near Real Time Response, Chemical/Biological Agent Deny and Defeat, Enhanced Deep Earth Penetration Capability, and Energetic Materials and Weapon Concepts.
 - Up to two Phase II SBIR contracts to perform full research and development on promising FY 2005 Phase I efforts.

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- Share of incremental funding of FY 2005 Phase I and FY 2004 Phase II SBIR contract awards.

FY 2007 Plans:

- Fund 43.0 percent of DTRA SBIR investment including:
 - Up to ten Phase I SBIR contracts to perform feasibility studies on FY 2007 topics.
 - Up to two Phase II SBIR contracts to perform full research and development on promising FY 2006 Phase I efforts.
 - Share of incremental funding of FY 2006 Phase I and FY 2005 Phase II SBIR contract awards.

C. Other Program Funding Summary: Not Applicable.

D. Acquisition Strategy: Not Applicable.

E. Major Performers: Not Applicable.

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Exhibit R-2a, RDT&E Project Justification		Date: February 2006
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: 0602716BR Project BD – Weapons Effects Technology

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BD - Weapons Effects Technologies	67.185	74.567	76.462	76.647	77.916	79.863	81.857

A. Mission Description and Budget Item Justification:

This project provides an over-arching framework for all Chemical, Biological, Radiological, Nuclear and high Explosive (CBRNE) related modeling and simulation tools. Initiatives supported by this project include, but are not limited to, such activities as follow:

- **Targeting Support:** Provides the warfighter and military engineers with state-of-the-art weapons effects models, structural dynamic models and computational tools for use in weapon selection, post strike assessment and force/mission protection. Develops, validates, and verifies lethality/vulnerability (L/V) models and integrates those models into computational tools for expedient or deliberate pre-strike planning, post-strike assessment, intelligence analysis, and other related missions. Targeting Support also provides technology, tools and expertise in the areas of forensic analysis, vulnerability assessments and weapon/structure interactions in support of anti-terrorism and force protection missions.
- **Environments:** The objective of this activity is to provide the DoD nuclear weapon effects modeling and simulation, common DoD nuclear weapon stockpile and foreign nuclear weapon standard data handbooks for use in developing modeling and/or predictions of effects, and to provide DoD subject matter expertise in nuclear weapon effects for joint DoD and Department of Energy nuclear studies and operational exercises. Specific modeling efforts include high altitude detonations ranging from altitudes of 20 to hundreds of kilometers and surface/buried detonations. This activity provides DoD's only operational and advanced nuclear computational capabilities for use on net-centric information systems by combatant commanders and senior DoD leaders.
- **Hazardous Prediction and Assessment Capability/Consequence Assessment:** The objective of this activity is develop an automated software system to provide the means to accurately predict the effects of hazardous material released into the atmosphere and its impact on civilian and military populations. The system uses integrated source terms, high-resolution weather forecasts and atmospheric transport & dispersion analyses to model hazard areas produced by military or terrorist incidents and industrial accidents. The software developed supports the DoD's Chemical and Biological Defense Program.
- **Advanced System and Concepts:** Supporting, maintaining and sustaining the weapons of mass destruction technology base. Seeks to capitalize on expertise developed through DoD, other U.S. government, and non-government supported research in various

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technologies. Additionally identifies gaps within these capabilities and initiates programs to fill them.

- In accordance with House Report 109-359, funds a study at Center for Nonproliferation Studies, Monterey Institute of International Affairs. This effort conducts strategic studies and analyses related to national and international security, CBRNE threats, homeland defense, and the global war on terrorism. This includes state and non-state proliferation-related activities, and the means and capabilities necessary to effectively and efficiently combat both current and potential CBRNE threats.
- Modeling and Simulation (M&S): The objective of this activity is to provide validated M&S tools to enable rapid access for planning, emergency response and assessment capabilities across a broad spectrum of conventional, unconventional and nuclear scenarios. Significant initiatives focus on extending legacy and future capabilities through web-services and web-browser based delivery methods. The enterprise architecture will allow DoD, government agencies, first responders, planners, managers and operational and technical personnel to have a common computation and planning capability that is web-enabled.
- WMD Counterforce Applications: Developing and validating Chemical and Biological Weapon (CBW) defeat and disrupt weapon effectiveness and collateral release diagnostics for the warfighter to mitigate the impact of the effects of weapons of mass destruction on all aspects of warfighting, to include communications, radar and optical sensor systems. Seeks to predict the response of systems that must operate in WMD disturbed environments.

B. Accomplishments/Planned Program:

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Targeting Support	18.345	16.460	16.355

FY 2005 Accomplishments:

- Modernized DTRA's conventional and nuclear weapon selection software, Integrated Munitions Effects Assessment (IMEA). The new version of this M&S tool predicts ground shock in 3 dimensions, accurately predicts the effect of two penetrating conventional bombs aimed at the same location, includes an improved penetration model, improved efficiency of the cratering model, and provides a revolutionary way of gauging the penetration capability for bombs against hardened bunkers. As a result, the software allows pilots and crews to instantly determine optimal release conditions and better aim points. The software also provides accurate prediction for skip-bomb attacks into tunnels to support U.S. Air Forces in Korea. Initiated 2-year plan to

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interface IMEA with U.S. Air Force and U.S. Navy mission planning systems for automatic transfer of weapon selection information.

- Delivered the Integrated Weapons of Mass Destruction Tool Set for Targeting Support (IWMDT/TS) version 1.0, which implemented IMEA in a web enabled environment. Initiated IWMDT/TS interface with Joint Forces Command's (JFCOM's) nationwide simulation training network to provide Battle Damage Assessment Training for all US forces.
- Leveraging the IMEA effort, delivered to COCOM Vulnerability Assessment Teams the first release of DTRA's force protection software, Vulnerability Assessment and Protection Option (VAPO), for use in conducting assessments of the vulnerability of U.S. assets (buildings etc) to terrorist threats.
- Conducted scaled-down tests to validate and improve IMEA and VAPO models. Testing improved prediction of structural damage from weapons detonation below burster slabs and validated IMEA and VAPO fragmentation models. Conducted 12 explosive tests on steel framed structures to develop and validate a structural response model. Designed and began construction of a wooden test building consistent with DoD's Unified Facilities Criteria (UFC) for development of models on how to prevent/resist progressive collapse. Improved the curvilinear penetration model to better predict small diameter projectile penetration into concrete. Improved tunnel airblast modeling and improved vulnerability information on enemy equipment to better predict damage from airblast.
- Completed software migration projects to prepare major DTRA codes for operation on new parallel processor architectures provided by DoD High Performance Computing Modernization Program (HPCMP). Completed migration of all computational, storage, and networking services to in-house and DoD HPCMP sources. Consolidated in-house operational support.
- Congressional Increase. Worked with the National Center for Blast Mitigation and Protection (George Mason University, Fairfax, VA) and developed a PC-based computational Fluid dynamics (CFD) code and interfaced it with the VAPO tool.

FY 2006 Plans:

- Capability Enhancement: Deliver Integrated Munitions Effects Assessment (IMEA) 7.0 with enhanced penetration and cratering models, as well as updated nuclear prediction capabilities. Implement enhanced Underground Targeting and Analysis System (UTAS) network-wide functional defeat and special operations planning and target visualization functionality in the IMEA/UTAS tool. Continue interfacing IMEA with U.S. Air Force and U.S. Navy mission planning software to rapidly pass weapon selection information.
- Improve integration of IMEA capabilities in the Net-Centric architecture, Integrated Weapons of Mass Destruction Toolset/

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Targeting Support (IWMDT/TS), to include streamlined capability to represent complex targets and increase the target set for JFCOM's simulation network (to include bridges and communications centers). Complete the interface of IWMDT/TS with Counterproliferation Planning System (CaPS) and Joint Targeting Toolbox (JTT).

- Field VAPO 1.0 to assessment teams for Joint Staff Integrated Vulnerability Assessments (JSIVA) of DoD facilities worldwide, and for Balanced Survivability Assessments to help ensure mission readiness of U.S. critical infrastructure worldwide. Deliver VAPO 2.0 for force protection planning worldwide.
- Implement penetration data from tests of weapons against multi-story buildings to improve weapon selection methods against these targets. Update tunnel reconstitution model with test data gathered from live fire test series called: DIVINE HELCAT.
- Decommission in-house Cray computer. Complete the transition plan to streamline the Agency's HPC operations. Maximize user access to DoD (High Performance Computing) HPC Modernization Program assets as the sole source of high-end computational resources.
- Congressional Increase. Continue effort with National Center for Blast Mitigation and Protection (George Mason University, Fairfax, VA) and deliver a personal computer (PC)-based computations structural dynamics (CSD) capability.

FY 2007 Plans:

- Deliver IMEA 8.0 with newly approved collateral effects and modeling information for new weapon systems. Complete the interface with USAF and USN mission planning software. Begin integration of IMEA with real-time sensors.
- Through the Integrated Weapons of Mass Destruction Toolset architecture, fully integrate IMEA capabilities into the Global Information Grid (GiG) and Network-Centric Enterprise Services (NCES) providing broader counterforce support to warfighter.
- Develop mitigation technologies to protect U.S. assets from Chemical, Biological, Radiological, Nuclear and High Explosive weapons, develop associated models for future upgrades of VAPO. Deliver upgraded VAPO 3.0 with improved models for mitigation of terrorist threats against DOD facilities and missions worldwide. Establish an antiterrorism assessment modeling cell to conduct initial assessments and model development to provide assistance to VAPO users when conducting their vulnerability assessments. This cell will also help VAPO users to develop protective solutions for improving survivability of people in facilities subjected to terrorist attacks.
- Perform simulations of WMD operational defeat demonstrations using DTRA's Facility-3 testbed and compare the results. Initiate development of fast-running airblast model for complex geometries in the areas of weapon-target interaction computer codes, component vulnerability/equipment fragility, human lethality, and quasi-static damage and dispersion.

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- Provide high-end computational support to the R&D modeling and simulation community by leveraging the resources of the DoD HPC Modernization Program. Through expert technical support, tailored to DTRA performers, ensure that researchers obtain the maximum benefit from this computational environment.

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Environments	14.472	20.732	23.472

(Re-titled in FY 2005 from Nuclear Phenomenology)

FY 2005 Accomplishments:

- Updated the DoD nuclear weapon stockpile and foreign nuclear weapon standard data handbooks to include improvised and terrorist devices. This provides DoD better prediction capability of potential threats to the U.S., allies, and deployed forces. Developed new data characterizing radioactive weapon debris for use in improved nuclear weapon fallout modeling, initiated a second round of subject matter expert peer review of a new textbook on nuclear weapon effects, and improved the DoD archival nuclear weapon database system by adding a new version of high altitude modeling codes.
- Modernization. Initiated transition of legacy modeling and simulation (M&S) into modern, net-centric nuclear weapon effects M&S capabilities supporting combatant commands and defense agencies in nuclear targeting, consequence assessments, predicting effects on key systems, critical military system survivability designs, and battle simulations. Demonstrated high-fidelity dispersion of nuclear materials in urban areas, refined methods for bio-agent defeat, continued development of an advanced 3-Dimensional code to predict weapon effects on structures and WMD agents, continued advanced development of near surface low-yield nuclear effects in city (terrorist use of nuclear weapons), developed concepts and tools for enhanced mechanisms to kill biological agents, and began reducing the computational run time of DoD's advanced space weather prediction model for satellite and other space system analyses.
- Supported U.S. Strategic Command and other warfighters and agencies by providing nuclear weapon effects training using the improved nuclear codes. Provided subject matter expert support to the U.S. Strategic Command during wargame exercises that included nuclear weapons.

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FY 2006 Plans:

- Continue to improve the DoD nuclear weapon stockpile and foreign nuclear weapon standard data handbooks to include improvised and terrorist devices to provide DoD better prediction capability of potential threats to the U.S. Begin updating and modernizing DoD's nuclear weapon effects manual to provide the baseline for all nuclear weapon effects analysis and prediction capabilities.
- Continue transforming legacy modeling and simulation into modern, net-centric nuclear weapon effects modeling and simulation capabilities. Research will include advanced computation methods for nuclear events in space to improve operational prediction abilities, provide U.S. Strategic Command with improved nuclear cloud modeling and the ability to predict the effects from multiple, simultaneous nuclear weapon detonations, continue research in modeling of low-yield nuclear blasts in urban environments. Develop an advanced 3-Dimensional code to predict nuclear weapon effects.
- Support U.S. Strategic Command and others by providing operational and advanced nuclear weapon effects training using the improved nuclear codes, and provide Combatant Commands nuclear weapon subject matter expert support during wargame exercises.

FY 2007 Plans:

- Continue to improve the DoD nuclear weapon stockpile and foreign nuclear weapon standard data handbooks by using two and three dimensional computations. Threat weapons include improvised and terrorist devices to provide DoD better prediction capability of potential threats to the U.S. Continue updating and modernizing DoD's nuclear weapon effects manual to provide the baseline for all nuclear weapon effects analysis and prediction capabilities.
- Continue transforming legacy modeling and simulation into modern, net-centric nuclear weapon effects modeling and simulation capabilities. Continue the advanced research begun in FY 2006, plus begin research to develop four dimensional (3D plus time) nuclear weapon effects modeling to support net-centric battle simulations. Provide combatant commanders improved decision making tools.
- Continue to provide operational and advanced nuclear weapon effects training using the improved nuclear codes and provide Combatant Commands nuclear weapon subject matter expert support during wargame exercises.

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Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Hazard Prediction and Assessment Capability (HPAC)/Consequence Assessment	15.966	14.878	15.272

FY 2005 Accomplishments:

- Completed HPAC 4.04 Service Pack 3. Provide full Hazard Prediction and Assessment Capability/Consequence Assessment Tool Set (HPAC/CATS) functionality for Integrated WMD Toolset (IWMDT). This is a web-based access to all consequence assessment tools; restricted version of HPAC 4.04 Service Pack 3 to meet Strategic Command's (STRATCOM) consequence of execution requirements; validation of urban dispersion modeling capability using data from Mock Urban Setting Test (MUST).
- Initiated integration of population movement (day and night) and evacuation algorithms with casualty estimation models; continued integration of hazard prediction tools into OSD Joint Effects Module Block 1; integrated military medical planning capability Nuclear-Biological-Chemical (NBC) Casualty and Resource Estimation Support Tool in coordination with the U.S. Army Office of the Surgeon General.
- Linked (HPAC's) atmospheric transport to the Oak Ridge National Laboratory's Hydrologic Transport Assessment System (HYTRAS), a water borne transport model via U.S. Navy funded support of the U.S. Coast Guard (USCG) homeland security - counterterrorism mission in rivers and estuarine areas (littoral region).
- Continued development of water transport model in collaboration with U.S. Navy, National Ocean Service, industry and academia; high-fidelity mesoscale weather forecasting model development to include littorals, complex terrain and urban environments and NWP ensemble techniques; Numerical Weather Prediction (NWP) and Transport and Dispersion (T&D) model coupling; and provided integrated weather data from multiple sources for use in HPAC for operational hazard predictions that more fully account for uncertainty in weather observations and forecasts; Chemical/Biological/Radiological/Nuclear/High Explosive (CBRNE) Decision Support Tool to assist Combatant Commands, Services, and installation commanders with consequence management planning and decision making; Air Force Combat Climatology Center (AFCCC) Environmental Scenario Generator (ESG) for use in HPAC applications.
- Provided technical and operational support to OSD, Joint Staff, and combatant command contingency operations and exercises.

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FY 2006 Plans:

- Continue to develop consequence assessment software for integration into net-centric capabilities to meet DoD Global Information Grid requirements allowing for transition of hazard prediction capabilities into Chem-Bio (CB) Defense Joint Effects Model Block 2; CB Source Term, Industrial Facility and Transportation models; development and integration of hazard prediction tools such as atmospheric transport and dispersion and urban modeling into OSD Joint Effects Module (JEM) Block 1 and improve water transport models in collaboration with the U.S. Navy, National Ocean Service, industry and academia.
- Continue high-fidelity mesoscale weather forecasting model development to include littorals, complex terrain and urban environments; conduct research and development into Numerical Weather Prediction (NWP) and Transport and Dispersion (T&D) model coupling and NWP ensemble techniques to more appropriately characterize uncertainty in T&D calculations; and provide integrated weather data from multiple sources for use in Hazard Prediction and Assessment Capability (HPAC) to provide operational hazard predictions that more fully account for uncertainty in weather observations and forecasts.
- Initiate development of updated climatological, terrain and landuse data sets, into JEM and HPAC. Develop and integrate improved nuclear weapon fallout methods to improve assessments in urban areas and long-term impacts for use by USSTRATCOM, USNORTHCOM, and the homeland defense community.
- Complete integration of casualty resource estimation planning capability into consequence assessment tools in support of U.S. Army Office of the Surgeon General.

FY 2007 Plans:

- Initiate development and integration of economic and environmental assessment methods resulting from nuclear or radiation contamination for use by USSTRATCOM, USNORTHCOM, and the homeland defense community.
- Continue high-fidelity mesoscale weather forecasting model development to include littorals, complex terrain and urban environments; conduct research and development into Numerical Weather Prediction (NWP) and Transport and Dispersion (T&D) model coupling and NWP ensemble techniques to more appropriately characterize uncertainty in T&D calculations; and 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.
- Continue development of CB Source Term, Industrial Facility and Transportation models. Complete conversion and integration into IWMDT and Chem-Bio Defense Joint Effects Model. Continue development and integrate improved water transport models in collaboration with the U.S. Navy, National Ocean Service, industry and academia.

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- Integrate updated climatological, terrain and landuse data sets, into JEM and HPAC.
- Complete development of consequence assessment software for integration into net-centric capabilities to meet DoD Global Information Grid requirements. Transition of hazard prediction capabilities into Chem-Bio Defense Joint Effects Model Block 2.

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Advanced Systems and Concepts Office (ASCO)	10.060	9.846	8.991

FY 2005 Accomplishments:

- Examined the use of nuclear weapons on U.S. soil, including other nation states, near-peer competitors, non-state actors and warhead detonations on undefended targets in the absence of missile defenses. Identified implications for U.S. and Russian interaction with a U.S. missile defense engagement against a North Korean ballistic missile attack at targets on the U.S. west coast. Examined the effectiveness of the current export control regime, and identified possible enhancements. Produced an analytical framework for evaluating trade-offs among the three legs of the New Triad, involving varying acquisition priorities on active defense, offensive strike, and responsive nuclear infrastructure. Evaluated the current state of the proliferation-related multilateral export control regimes
- Determined the laws and regulations that would apply if a WMD incident occurred on a U.S. facility in Europe or in the case of a European country’s request for assistance in the event of a WMD event. Identified new technological opportunities and doctrinal developments to strengthen the effectiveness of U.S. and allied military forces in their deterrence of, and defense against, the use of WMD by potential adversaries in the full spectrum of operations. Evaluated the current state of the proliferation-related multilateral export control regimes. Established a basis for using comparative strategic culture as a threat assessment and anticipation methodology. Furthered the development of a Joint Threat Anticipation Center. Completed two major multi-phased “proof of concept” modeling projects.
- Provided support to Nonproliferation Treaty Review Conference and Biological Weapons Review Conference. Identified those issues the U.S. needed to be prepared to address during the review conference, and developed recommended negotiating approaches and proposals for DoD consideration. Initiated student research program to encourage the next generation of analysts, primarily in research and development.

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- Conducted a quarantine discussion for the San Diego military/civilian community. Results of the exercise were published in the CDC’s journal, Emerging Infectious Diseases.

FY 2006 Plans:

- Identify DoD nuclear weapons infrastructure elements to support the Nuclear Posture Review and other strategic planning requirements.
- Investigate nontraditional methods to defeat difficult special targets with an emphasis on innovation.
- Conduct a study on Novel Energetics (non-nuclear) to provide a science and technology assessment and roadmap for investment in developing DoD capabilities in conventional strike.
- Evaluate potential directions and investment in high energy physics science and technology developments.
- Conduct a study of the effectiveness of non-pharmacologic disease containment measures which examines primary source material to determine which of these measures appeared effective in controlling the spread of the H1N1 flu virus during the 1918 Spanish Influenza Pandemic’s second wave.

FY 2007 Plans:

- Continue systems analysis studies to predict new WMD threats.
- Continue to stimulate, identify, and execute high-impact, innovative 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

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Modeling and Simulation Program	5.096	8.651	8.372

FY 2005 Accomplishments:

- Deployed on DTRA computer systems the only full-spectrum Web-Browser based Chemical Biological Radiological Nuclear and Explosive (CBRNE) assessment tool; providing immediate shared direct and indirect support capabilities across DoD, HLS, and

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state and federal agencies. Extended stand-alone capabilities into the DTRA enterprise architecture by enabling customized scenario development, enhanced tunnel and hard target defeat, initial NBC reporting capability, and improved security standards. A unique aspect of this effort is a design requiring no local software load for full operational capability, which eliminated all local certification and installation requirements.

- Provided an accredited simulation system to Joint Forces Command (JFCOM) by extending the IWMDT capabilities into a simulation network environment which allowed shared database and operational impact visualization. Unique aspect of this effort is the cross platform, accredited process and network based approach of CBRNE targeting.
- Enhanced the collaboration between DTRA's Integrated Theater Engagement Model (ITEM) with U.S. Air Force model THUNDER. ITEM is a fielded theater level analytical model capable of addressing the naval, air and land planning study goals in accordance with OSD J8 requirements. This collaboration improved accuracy of studies and reduced the time required to conduct complex studies across air, land and sea.
- Supported the Supreme Allied Headquarters Powers Europe (SHAPE) exercise and operational planning process through the direct and indirect apolitical terrain generation capability that is solely available through the Synthetic Exercise Environment (SEE) provided by DTRA. SEE is the only fielded coalition and combined integrated terrain and target database for nuclear planning and exercise support.

FY 2006 Plans:

- Expand the architecture scope for design and development to align DTRA initiatives with proposed DoD level efforts for CBRNE capabilities. This effort will extend internal and external CBRNE capabilities to operational and strategic users in a timely and reliable manner.
- Develop and implement a DITSCAP compliant security process across the enterprise architecture for all native components. Implementing this capability allows broader internal and external integration and promotes Joint Program Office-Chem-Bio Defense and DTRA collaboration. This collaboration results in consistent fielding of validated and secure component capabilities more rapidly and repeatable.
- Enhance the accredited simulation system capabilities to include multi-layer security exercise support through the enhanced IWMDT enterprise architecture. Provide a broad integrated analytical/operational capability through the IWMDT architecture, baselined on current theater level analytical user requirements. This effort provides a consistent and accredited response across

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operational, analytical, and exercise scenarios.

FY2007 Plans:

- Fully integrate external command and control and ISR capabilities across the Integrated WMD Toolset (IWMDT) enterprise architecture. This will provide DTRA full situational awareness as it supports STRATCOM's Combating WMD Center.
- Fully integrate all DTRA CBRNE capabilities and transition the delivery method of DTRA capabilities from stand-alone heterogeneous applications into a net-centric architecture that meets existing and emerging requirements.
- Fully integrate simulation capabilities across IWMDT enterprise architecture through external application services-based functionality. Broadly integrate analytical/operational capabilities with a fully integrated multi-user interface and remote access capability.

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
WMD Counterforce Applications	3.246	4.000	4.000

FY 2005 Accomplishments:

- Initiated chemical weapon Agent Defeat technology research to explore new capabilities for defeating chemical agents. Continued development of innovative Agent Defeat payloads.

FY 2006 Plans:

- Continue development of innovative Agent Defeat technologies and their weaponization to include variable terminal effects concepts. Initiate development and validation of live agent tunnel test diagnostic technology for the evaluation of Agent Defeat variant weapons designed for employment against Hard and Deeply Buried targets.

FY2007 Plans:

- Initiate development of a directed energy centric Agent Deny/Disrupt payload. Continue development of diagnostic systems to support testing of live agents in tunnels. Continue research and development of forensic Agent Defeat payload concepts for real time Battle Damage Assessment of Counter-WMD missions. Begin development of soft target agent defeat technologies.

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C. Other Program Funding Summary: Not Applicable.

D. Acquisition Strategy: Not Applicable.

E. Major Performers: L3/Titan, Science Applications International Corporation, Applied Research Associates, Mission Research Associates, DOE/Oak Ridge National Laboratory, Penn State University, National Center for Atmospheric Research.

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Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BE - Testing Technologies and Integration	13.270	24.479	19.946	20.200	20.143	20.249	20.423

A. Mission Description and Budget Item Justification:

Provide a unique national test capability for simulated Weapons of Mass Destruction (WMD) facility characterization, weapon-target interaction, and WMD facility defeat testing to respond to operational needs by developing and maintaining 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. Leverage 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). Maintain testing infrastructure to support the testing requirements of warfighters, other government agencies, and friendly foreign countries on a cost reimbursable basis. Creates testing strategies and a WMD test bed infrastructure focusing on the structural response of buildings and Hard & Deeply Buried Targets (HDBT) that house nuclear, biological, and chemical facilities. 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 programs supported include:
 - Tunnel Target Defeat (TTD) Advanced Concept Technology Demonstration;
 - Hard Target Defeat (HTD);
 - WMD Counterforce
 - Combating Terrorism;
 - Special Operations Forces (SOF).
- Specific activities include:
 - Test bed design and construction;
 - Instrumentation and data collection;
 - Test coordination and execution;
 - Post-test analysis and documentation.
- This project directly supports:

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- PE 0602717BR - Project BC;
- PE 0602716BR - Projects BD & BF;
- PE 0603160BR - Projects BJ & BK.

B. Accomplishments/Planned Program:

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Test and Technology Support	11.270	12.009	12.112

(Re-titled in FY 2005 from Test-Bed Operation and Support)

FY 2005 Accomplishments:

- Provided unique test capabilities for weapon-target interaction and Weapons of Mass Destruction (WMD) programs. DTRA supported 171 tests for the Tunnel Target Defeat (TTD) Advanced Concept Technology Demonstration (ACTD), Service support, the Thermobaric ACTD, Hard Target Defeat demonstrations, Combating terrorism, the Department of State, structural response testing for the UK, and general phenomenology. 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. Continued developing a Program Environmental Impact Statement (PEIS) to support DTRA in proposed expansion of testing and related activities at White Sands Missile Range (WSMR). Continued to standardize logistics, operations and support across test sites, including simulators, and integrate infrastructure development and improvement. Conducted structural response tests at the Large Blast/Thermal Simulator (LB/TS).

FY 2006 Plans:

- Continue to provide unique national test capabilities for weapon-target interaction and WMD threat reduction programs. Provide an inventory of unique targets, infrastructure support, and expertise for conduct of major integrated test programs supporting the TTD ACTD, Combatant Commanders, the Services, international partners, and DTRA’s enterprise areas and campaigns. Support Program Environmental Impact Statement (PEIS) process to support DTRA in proposed expansion of testing and related activities at WSMR.

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Resource infrastructure support to standardize logistics, operations and support across test sites, including Nuclear Weapons Effects simulators, and integrate infrastructure development and improvement. 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 2007 Plans:

- Continue to provide unique national test-bed capabilities for weapon-target interaction and WMD threat reduction programs. Continue to provide testing support. 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. This project supports many of the Agency’s test efforts described in this and other program elements.

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Infrastructure Development and Improvement	2.000	2.000	2.000

(Re-titled in FY 2005 from Field Support)

FY 2005 Accomplishments:

- Provided infrastructure supporting the test program. Cleaned up and remediated legacy test sites including the Advanced Research Electro Magnetic Pulse Simulator. Conducted post-test clean up at White Sands Missile Range (WSMR) and Chestnut Test Site, Kirtland Air Force Base, New Mexico. Purchased an additional Rotary Percussion Sounding System (RPSS) and upgraded the original system. RPSS is used to geologically characterize test sites pre- and post-test. Completed instrumentation bunkers for the Capitol Peak tunnel site at WSMR and the Nevada Test Site (NTS). The new bunkers will protect data recording assets during large blast tests. Completed the Concrete Batch Plant upgrade to facilitate mixing of concrete with exact specifications to replicate various real world facilities.

FY 2006 Plans:

- Continue to provide infrastructure supporting the test program. Activate mobile office test team facility at Chestnut Test Site. Procure additional cameras for the Tunnel Target Defeat ACTD. Continue Magnetic Flyer Plate facility remediation. Remove the 20-foot shock tube from the Giant Reusable Air Blast Simulator (GRABS) site at Kirtland Air Force Base, New Mexico.

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FY 2007 Plans:

- Continue to provide infrastructure support including 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. Continue Test bed remediation. Initiate planning for buildings to support testing events at Permanent High Explosives Test Site (PHETS).

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Environmental Restoration Support	0.000	10.470	5.834

(Re-titled in FY 2005 from Field Support)

FY 2005 Accomplishments:

- Not Applicable.

FY 2006 Plans:

- Provide needed Environmental Restoration support for Defense Threat Reduction Agency (DTRA) Nevada Test Site (NTS) locations in accordance with the Federal Facilities Agreement and Consent Order (FFACO) between the Nevada Division of Environmental Protection (NDEP), the National Nuclear Security Administration (NNSA), and the DTRA; and at other locations as needed.
- Conduct Environmental Site Assessment for DTRA locations on Kirtland Air Force Base, New Mexico.

FY 2007 Plans:

- Continue to provide needed Environmental Restoration support for DTRA NTS locations in accordance with the FFACO between the NDEP, the NNSA, and the DTRA; and at other locations as needed.

C. Other Program Funding Summary: Not Applicable.

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D. Acquisition Strategy: Acquisition of Environmental Restoration Support is normally through an Interagency Cost Reimbursable Order (IACRO) to the National Nuclear Security Administration Nevada Site Office (NNSA/NSO) and/or through Military Interdepartmental Purchase Requests (MIPRs) to the Air Force Center for Environmental Excellence (AFCEE) or the Naval Facilities Engineering Command (NAVFAC).

E. Major Performers: Applied Research Associates, Inc, located in New Mexico, and the Department of Energy/Nevada Operations.

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Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BF - CP Operational Warfighter Support	91.792	93.189	97.315	99.685	103.160	106.617	108.914

A. Mission Description and Budget Item Justification:

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. These three areas are: 1) Operational Support Technology, 2) Hard Target Defeat (HTD) Program and 3) Special Projects (previously accounted for in Hard Target Defeat Program).

- Operational Support Technology.** Provides the warfighter with the capabilities and understanding for countering the use and effect of WMD and weapons of mass effects (WME) through the advancement of simulation technology, assessment of operational impact, development of collaborative capabilities and access to mature computer models. Provides an interface between DTRA model developers and the weapons effects simulation community to ensure relevance of DTRA models in interactive simulations through compliance with standards and protocols. Uses 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. Provides the Agency's portal for providing DoD Transformation and Experimentation support for Chemical, Biological, Radiological/Nuclear, and Explosive (CBRNE) events. 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.
- Hard Target Defeat Program.** The United States and its allies face a growing threat from critical military targets hidden within and shielded by hardened, deeply buried tunnel complexes. These complexes can 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). The purpose of this program is to develop, demonstrate, and transition to the warfighter end-to-end capabilities to defeat Hard & Deeply Buried Targets (HDBT). These end-to-end capabilities embody synergistic effects of optimizing attack planning,

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the weapon and kill mechanism, and the tactics techniques and procedures necessary to defeat a spectrum of HDBT. These tasks support warfighting requirements derived from the Hard and Deeply Buried Target Defeat Initial Capabilities Document (ICD) and research, development, test and evaluation (RDT&E) priorities set by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics. As recommended in HDBTD Science and Technology Master Plan this project develops advanced energetics and weapon concepts and technologies for tunnel defeat. The plan also called for an increased level of tunnel defeat testing to improve weapons effects modeling for penetration and weapon lethality. This area supports the Joint Functional Concept of Battlespace Awareness and Force Application and the Quadrennial Defense Review transformational goal to Deny Enemy Sanctuary. The tests are conducted at National Testbeds for the tunnel defeat community, including the Intelligence Community.

- Special Projects.** The Special Projects effort is an outgrowth of the targeting and characterization work previously performed under the Hard Target Defeat Program. While complete physical destruction may be desired, for some hard and deeply buried targets this effect isn't practicable with current weapons and employment techniques. It may be possible, however, to deny or disrupt the mission or function of a facility. Functional defeat is facilitated through better data collection and intelligence. The defeat process includes finding and identifying a facility, characterizing its function and physical layout, determining its vulnerabilities to available weapons, planning an attack, applying force, assessing damage, and, if necessary, suppressing reconstitution efforts and re-striking the facility. Special Projects supports the Intelligence Community and the Combatant Commands by providing 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. Special Projects consists of two subordinate and related activities, Targeting and Intelligence Community (T&IC) support and the new Find, Characterize, Assess (FCA) technology development activity.

B. Accomplishments/Planned Program:

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Operational Support Technology	10.459	8.649	7.780

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FY 2005 Accomplishments:

- Validated integration of Global Command and Control System/Hazard Prediction and Assessment Capability during Combined Warfighter Interoperability Demonstration 05.
- Established initial test capability for Weapons Analysis Lethality Toolset (WALTS) version 2; integrated WALTS at the ranges at Garden City Combat Readiness Training Center, GA, Eglin AFB, Florida and Eielson AFB, Alaska.
- Focused on integrating coalition WME expertise with DTRA modeling and simulation through continued participation in the Joint Forces Command experimentation series such as Multinational Experiment-4 (MNE-4) and integration into warfighter C4ISR architecture while providing a virtual DTRA presence at JCS, USJFCOM, and Joint National Training Center (JNTC) exercises by remotely introducing WME events and overlaying them onto a common operational picture.
- Enhanced Systems Engineering across the agency by conducting modeling and simulation (M&S) verification and validation testing of WME related software development and life-cycle maintenance activities through the use of Rational software configuration management tools.
- Incorporated DTRA's Integrated WMD Toolset (IWMDT) into selected JNTC exercises and JCDE experiments/events/activities to support IWMDT design, testing, and verification and validation.

FY 2006 Plans:

- Complete DTRA Collaboration Center Initial Operational Capability while refining the requirements for Mid-Operational Capability to establish connectivity to coalition networks, forces, and organizations.
- Exploit international cooperation and decision support technologies with Defense Science and Technology Laboratory (Dstl)/UK and Defense Research and Development Canada (DRDC) by pursuing promising urban modeling capabilities such as OPTIPATH (DRDC) and SAFE (Dstl).
- Continue to provide a virtual DTRA presence at JCS, USJFCOM, and JNTC exercises by remotely introducing WME events and projecting them onto a common operational picture battle space as well as expanding DTRA CBRNE-focused participation in USJFCOM-led JCDE Joint Prototype and Joint Concept Development path efforts, including support to Effects Based Operations, Joint Interagency Coordination Group and Operational Net Assessment.
- Continue with the Systems Engineering efforts to support WME research and development (R&D) by prototyping, testing, evaluating, demonstrating, and distributing applied technology products and operational reachback capabilities in support of the Combatant Commands, Services, DoD agencies, and federal organizations in conducting incident assessment and management.

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- Using the Systems Engineering approach, continue to conduct M&S verification and validation testing of WME-related software development and life-cycle maintenance activities.

FY 2007 Plans:

- As a “workbench” for Agency R&D Systems Engineering, fully integrate the DCC with the JNTC training network, to include CBRNE engineering/technical advice and support, warfighting tools, military/net assessments, field demos and tests, and advanced concept validation; develop a methodology and prototype decision support system for optimal placement and use of sensors; and validate technology like the Hilbert Engine which can search/correlate data from multiple sources to identify patterns that may be precursors to CBRNE/WMD related terrorist activity.
- Continue supporting JFCOM’s JCDE, Distributed Continuous Experimentation Environment (DCEE), Joint Systems Integration Command (JSIC), and program of record prototypes by expanding participation to include a full spectrum of modeling & simulation modules for CBRNE (using IWMDT), to include supporting the Chemical Biological Defense Program (CBDP).
- Begin integration of DCC, M&S and the Battle Lab into the Global Information Grid (GIG).

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Hard Target Defeat Program	67.436	66.148	69.147

FY 2005 Accomplishments:

- Continued development of optimized explosive formulas. Down-selected most promising formulations for more extensive testing. Collected experimental data on new model of thermobaric explosive (TBX) formulations and refine TBX metrics. Accelerated development of high-payoff novel explosive concepts using advanced energetic materials. Continued investigation of aluminum combustion mechanisms and apply these to (TBX) formulation improvement. Developed formulation design techniques for improved energy coupling to targets. Developed improved explosive formulations based on use of coated micron- and/or nano-particles.
- Conducted non-energetic payload methodology down-select and completed Phase I report of non-energetic fill concepts. Conducted multiple proof-of-principle field tests for non-energetic advanced payload fills. These concepts render biological agents inert and cause electrical equipment and electronic devices to become inoperable.

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- Conducted weapon phenomenology testing and analysis. Analyzed High Velocity (HV) penetration lab data evaluating oblique impacts of novel case shapes for advanced weapons. Developed portal extension engineering response model. Developed methodology to assess equipment fragility based on generic characterization. Developed algorithm for weapon trajectory stability in horizontal (skip bomb) delivery. Developed weapon penetration model for damaged materials.
- Analyzed effectiveness of massive ordnance penetration against hard and deeply buried targets and completed preliminary design. Refined Massive Ordnance Penetrator (MOP) concept and began detailed weapon development and testing. Planned statically emplaced Proof-of Principle test of effectiveness of Massive Ordnance payloads. Planned demonstration of massive ordnance air-blast lethality against a full-scale tunnel target.
- Conducted Enhanced Fuze Integrated BDI Demonstration (EFIBDID) system design and component tests. Executed static lethality tests of the I-500 penetrator weapon concept against tunnel targets and began detailed system design. Completed high-speed penetration lethality demonstration for advanced weapon concepts. Completed the feasibility study of the boosted penetrator. Assessed data from field impact tests of projectiles with unstable trajectory. Drafted the 2005 Hard and Deeply Buried Target Defeat Report to Congress.
- Integrated a fragment model with 1.5D (Dimension) airblast model into Integrated Munitions Effects Assessment (IMEA) version 6.0. Developed equipment fragility model for IMEA 6.0. Submitted IMEA version 6.0 for Joint Technical Coordinating Group (JTTCG) accreditation of equipment fragility models of Command, Control, Communications and Intelligence (C3I) facilities in tunnels. Improved blast door model and released IMEA 6.0. Updated nuclear planning tool IMEA-Nuclear. Supported COCOM HDBT defeat planning with the Targeting/Weaponing Assistance Cell.
- Tunnel Defeat Testing: Executed two intermediate scale tests to develop and validate models of tunnel facilities subjected to sever ground shock loading and began the design of a full-scale test to validate models. Conducted deep underground operational tunnel facility defeat demonstrations using advanced weapons at the White Sands Missile Range. Conducted reconstitution exercise and determined reconstitution time for C3I tunnel facility at Nevada Test Site (NTS). Completed preliminary design of simulated WMD production and storage tunnel complex and began planning for a demonstration of the functional defeat of such a complex. Conducted small-scale multistory building tests and model development. Conducted weapon tests of the 84mm Multi-Target Shoulder Launched round for Special Operations Command (USSOCOM) to include multiple fill analysis. Supported the Navy in the test and evaluation of the lethality of a high-speed penetrator warhead against a DTRA test bed (Tactical Missile System - Penetrator (TACMS-P). Conducted joint test and evaluation of lethality of an Advanced Tactical Munition System (ATACMS) with a Stand-off Land Attack Missile (SLAM) warhead against a reinforced concrete frame structure test bed.

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FY 2006 Plans:

- Begin development of general purpose Enhanced Blast Explosives (EBX) to improve next-generation TBX performance and expand its potential for use against an expanded target set. Begin concept demonstration and effectiveness tests for high-payoff energetic concepts involving advanced energetic payloads. Develop and test at least two advanced formulations of high-energy survivable penetrator fills (Mach 1 to 4 impact velocities). Perform static tests of advanced payload concepts to quantify effects and target lethality and analyze results. Downselect novel Kinetic Energy (KE) gun propellant formulation.
- Initiate development and demonstration of promising non-energetic payloads for Hard and Deeply Buried Target Defeat.
- Continue weapon phenomenology testing. Conduct instrumented high-velocity test of jointed penetrator. Complete delivery of enhanced linear penetration model. Conduct thin-layer penetration tests and deliver improved model based on results. Complete validated vent attack model. Conduct high performance calculations to validate blast-door response models.
- Conduct static lethality demonstration of massive ordnance penetrator against hard and deeply buried targets. Conduct Massive Ordnance Penetrator scaled penetration and lethality testing. Conduct statically emplaced Proof-of Principle test on effectiveness of Massive Ordnance payloads. Conduct demonstration of massive ordnance air-blast lethality against a full-scale tunnel target. Start concept study of Precision Massive Ordnance Blast (PMOB) weapon.
- Demonstrate components of key BDI technologies for Enhanced Fuze Integrated BDI Demonstration (EFIBDID). Verify shock harness of weapon-borne Battle Damage Indicator (BDI) component.
- Complete detailed system design of the I-500 and conduct penetrator sled tests. Evaluate results of advanced energetic and non-energetic payload development tests and analyses. Initiate feasibility study of unique communications, navigation, mobility, survivability (passive and active), and explosives technology necessary for the use of ground-mobile munitions systems to attack tunnel complexes.
- Deliver Munitions Effects Assessment Version 7.0. Support Combatant Command (COCOM) Hard and Deeply Buried Target (HDBT) defeat planning with Targeting/Weaponing Assistance Cell (TWAC). Provided initial targeting recommendations to TWAC. Provided initial hard target defeat training sessions to warfighters.
- Complete construction and outfitting of tunnel facility testbed to support massive ordnance tests. Initiate construction of a testbed to support weapon-borne bomb damage information system tests. Design large-scale multistory building tests structure. Conduct multi-weapon egress denial demonstration.

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FY 2007 Plans:

- Continue development of general purpose Enhanced Blast Explosives (EBX) and compare effectiveness in expanded target set conditions vs. conventional high explosives and the latest Thermobaric explosive (TBX). Demonstrate most promising high-payoff novel energetics concepts in sub-scale tests and begin warhead integration concept development. Demonstrate promising high-energy survivable penetrator fills in large-scale tests (tunnel or hardened structure) and begin technology transition.
- Evaluate tunnel damage and in-tunnel effects of advanced weapon fills. Conduct small-scale tests of an optimized-multi-weapon attack against blast doors and develop a response model. Demonstrate optimized high-speed penetrator performance. Validate energy coupling model for massive ordnance.
- Conduct Massive Ordnance Penetrator Demonstration. Conduct full-scale Massive Ordnance Penetrator (MOP) performance demonstration against a realistic hard and deeply buried target. Conduct Precision Massive Ordnance Blast (PMOB) scaled static lethality tests.
- Conduct full scale Enhanced Fuze Integrated BDI Demonstration EFIBDID demonstrations. Demonstrate weapon sensors to facilitate bomb damage assessment (BDA) analysis.
- Initiate planning for a weapon-borne battle damage indicator system to be carried on existing hard target defeat weapon systems. Initiate feasibility study of the unique communications, navigation, mobility, survivability (passive and active), and explosives technology necessary for robotic systems to attack tunnel complexes.
- Begin transition of technology into improved lethality applications which support defeat of hardened facilities.
- Determine effectiveness of additional advanced weapon concepts and incorporate results into version 8.0 of Integrated Munitions Effects Assessment (IMEA). Provide 100 target weaponeering recommendations to Targeting/Weaponeering Assistance Cell (TWAC). Provide six hard target defeat training sessions to warfighters.
- Continue evaluations of other/additional weapon/sensor systems. Complete construction of the integrated demonstration testbed and begin the initial phase--find and characterize. Initiate construction of the internal tunnel defeat testbed. Conduct first large scale testing of weapons against bunkers under multi-story buildings.

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Special Projects	13.897	18.392	20.388

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FY 2005 Accomplishments:

- Continued Targeting and Intelligence Community Support. Delivered over 175 engineering characterizations and 800 3-D models of underground facilities to the warfighting commands and intelligence agencies to help them with targeting. Delivered software tools with enhanced special operations planning and target visualization functionality to help the warfighters and intelligence agencies plan the functional defeat of underground targets. Exercised with U.S. Special Operations Command and U.S. Strategic Command to assess the utility of our software tools and target characterization processes. Trained over 200 warfighters, intelligence analysts and technologists on basic and advanced underground target characterization techniques. Provided improved assessment on the geological characteristics of underground targets to the intelligence community.
- Continued Find, Characterize, Assess Technology Development. Collected signatures and associated data from DTRA hard target defeat testing and demonstrations and passed them to the intelligence community for incorporation into target databases. Demonstrated a prototype software tool to assist warfighters and intelligence analysts in the placement of sensors to gather data from underground targets. Improved and added more information to our database of worldwide underground facility construction technologies and capabilities for easier use by intelligence analysts in developing information on hard targets. Began initial systems engineering and integration planning for a new sensors system for the warfighters and intelligence community to gather signature data needed to characterize the physical layout and function of potential underground targets.

FY 2006 Plans:

- Continue Targeting and Intelligence Community Support. Develop, deliver, and integrate enhanced tools for analysis of target networks and planning special operations missions. Provide planning capabilities for our software tool users to facilitate more comprehensive target analysis. Conduct an exercise with the warfighters to assess the utility of our targeting tools and processes. Train over 200 warfighters and intelligence personnel on basic and advanced underground target characterization techniques.
- Continue Find, Characterize, Assess Technology Development. Begin development of a ground sensor system to improve underground facility (UGF) characterization and prompt bomb damage assessment. Expand and improve access to the target signatures and international construction technology data. Deliver improved geological property templates to intelligence analysts for improved targeting of underground facilities.

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Exhibit R-2a, RDT&E Project Justification		Date: February 2006
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	PROJECT NAME AND NUMBER: 0602716BR Project BF - CP Operational Warfighter Support	

FY 2007 Plans:

- Continue Targeting and Intelligence Community Support. Begin integration of sensor systems data feeds into our software tools through existing command, control and communications systems to facilitate near-real-time target status assessment. Conduct an exercise with the warfighters to assess the utility of our targeting tools and processes. Train over 200 warfighters and intelligence personnel on basic and advanced underground target characterization techniques.
- Continue Find, Characterize, Assess Technology Development. Continue development of a ground sensor system to provide near-real-time data feed for enhanced underground facility (UGF) characterization and prompt bomb damage assessment. Expand and improve access to the target signatures and international construction technology data. Integrate geological characterizations into target assessment software to enhance utility and simplify underground target analysis.

C. Other Program Funding Summary: Not Applicable.

D. Acquisition Strategy: Not Applicable.

E. Major Performers: Not Applicable.

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Exhibit R-2a, RDT&E Project Justification		Date: February 2006
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	PROJECT NAME AND NUMBER: 0602716BR Project BG – Nuclear Operations	

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BG - Nuclear Operations	72.482	10.819	17.018	17.672	17.716	19.924	21.756

A. Mission Description and Budget Item Justification:

The Nuclear Operations project conducts the research, development, test, and evaluation required to carry out the agency’s specified and implied missions articulated in the National Military Strategy, the Nuclear Posture Review (NPR), the Quadrennial Defense Review (QDR), and those directed by the Joint Chiefs of Staff (JCS) in the Joint Strategic Capabilities Plan (JSCP) Nuclear Annex. It concurrently lays a foundation for potential transformation activities within the nuclear arena as identified in DoD's Transformation Planning Guidance (TPG).

This activity enhances deterrence and proactively supports the agency's mission of WMD threat reduction. The research and development is focused on adapting engineering and integrating current or new technologies into user -friendly instruments to meet the WMD threat. Initiatives supported by this project include, but are not limited to, such activities as follow:

- Integrating and applying new technological advances to improving capabilities for locating and detecting, and defeating and attributing, old and emerging WMD threats in both civilian and military areas. When possible or feasible, other government agencies’ expertise or technologies are leveraged, most notably the Department of Energy and the Defense Nuclear Detection Office (DNDO).
- Conducting critical nuclear research, development, test and evaluation in support of the Combatant Commanders, Military Services, JCS and Office of the Secretary of Defense (OSD) through the oversight and response to the direction of the Nuclear Weapons Council.
- Aggressively assesses the continuously evolving CBRNE threat posed by old and new actors in the 21st Century.

B. Accomplishments/Planned Program:

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
WMD (Nuclear) Protection and Response	12.482	10.819	17.018

Exhibit R-2a, RDT&E Project Justification		Date: February 2006
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	PROJECT NAME AND NUMBER: 0602716BR Project BG – Nuclear Operations	

FY 2005 Accomplishments:

- Completed the development of threat device models for the Domestic Nuclear Event Attribution (DNEA) Program's initial attribution capability; completed the initial development of an integrated materials and debris database; assisted the National Security Council (NSC) in developing and implementing a National Nuclear and Radiological Attribution Program Strategic Plan; performed debris analysis, evaluation and reporting exercises; completed the development of ground sampling robots for an initial capability.
- Delivered two laptops with the SENTRY and SNIPER databases. The SENTRY database collects nuclear threats world-wide for trending analysis. It also collects nuclear material/weapon transfers between countries and updated baseline information on facilities and areas that store, handle or produce materials/weapons. The SNIPER is a web-viewable, global nuclear weapons encyclopedia also used in contingency operations. Funding was also used to explore WMD events, data mining, and correlation analysis and expansion of forensics information.
- Developed/delivered two ruggedized, prototype backpack detectors (lanthanum halides radiation detectors) and performed initial operational test and evaluation. Additional test and evaluation is needed to incorporate this new detector material into an operational capability. Additionally, the Multiplatform System (MPS) was modified to add a wireless communication link.
- Congressional increase funding was applied to develop room temperature high pressure/high resolution xenon detector. The development will yield a room temperature detector that will eliminate the need for liquid nitrogen-thus reducing the current logistical burden. Prototype will be tested and delivered in FY 2006.

FY 2006 Plans:

- Participate in Joint Exercise Ardent Sentry 2006 (AS 06) to exercise the airlift of attribution assets and to integrate and coordinate DNEA radiological dispersal device (RDD) attribution operations with other response assets. AS 06 is an RDD event exercise, where the DTRA developed Domestic Nuclear Event Attribution (DNEA) capability will be used to ascertain its strengths and weaknesses when integrated into national, state and local WMD emergency activities.
- Conduct an engineering evaluation of a larger ground-debris collection platform with greater range and greater power capacity than the current DNEA initial integrated operational capability vehicle. Continue to explore other technologies that can enhance the rapid and effective collection of nuclear and radiological debris from the ground, air, water, and space.

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- Conduct research to develop an analytical technology (other than exclusively radiochemistry) that can be used on the debris and signatures from a nuclear weapon event to accomplish the analysis of a nuclear detonation. The analysis will provide information, such as a device’s materials and design that is necessary to help attribute the event.
- Add three-dimensional display/graphic features to the SENTRY/SNIPER databases. Continue to populate databases.
- Continue to explore technologies that can improve and/or enhance rapid deployable radiation detection and tracking system Collaborate with other USG agencies such as the newly created Domestic Nuclear Detection Office (DNDO) to leverage their transformational research. Complete test and evaluation of the backpack prototypes delivered in FY 2005.
- Research and rapidly develop classified, unique (one or two items) technologies that directly aid the Warfighters in locating, identifying and defeating WMD devices.

FY 2007 Plans:

- Conduct the first flight of an Unmanned Aerospace Vehicle (UAV) air sampling system. The purpose of the UAV sampling system is to enhance personnel safety, increase the ability to respond rapidly and operate over areas that may be precluded to manned aircraft due to radiation levels, etc.
- Complete the engineering evaluation of the ground-debris collection platform that is larger has greater range, and greater power capacity than the current DNEA initial integrated operational capability vehicle. Continue to explore other technologies that can enhance the rapid and effective collection of nuclear and radiological debris from the ground, air, water, and space.
- Continue research to develop a more rapid analytical technology (other than exclusively radiochemistry) that can be used on the debris and signatures from a nuclear weapon event to accomplish the analysis of a nuclear detonation. The analysis will provide information, such as a device’s materials and design that is necessary to help attribute the event.
- Enhance/maintain the SENTRY/SNIPER databases to include three-dimensional capabilities. Continue to populate databases
- Deploy a Chemical Biological Radiological Nuclear Explosive (CBRNE)-detection system, integrated with satellite communication (reachback) and featuring enhanced analytical software.
- Research and rapidly develop classified, unique (one or two items) technologies that directly aid the Warfighters in locating, identifying, and defeating WMD devices. Annual Requirements are usually time-sensitive and tailored in scope.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: 0602716BR Project BG – Nuclear Operations

Cost (\$ in Millions)	FY 2005	FY 2006	FY 2007
Classified Program*	60.000	0.000	0.000

(* FY 2005 includes \$60 million in No Year Funding)

FY 2005 Accomplishments:

- Classified.

FY 2006 Plans:

- Classified.

FY 2007 Plans:

- Classified.

C. Other Program Funding Summary: Not Applicable.

D. Acquisition Strategy: Not Applicable.

E. Major Performers: Department of Energy/Albuquerque Operations Office.