

Exhibit R-2, RDT&E Budget Item Justification

Date: February 2003

APPROPRIATION/BUDGET ACTIVITY
RDT&E, Defense-Wide/Applied Research - BA2

R-1 ITEM NOMENCLATURE:
Nuclear Sustainment & Counterproliferation
Technologies; 0602715BR

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total 0602715BR Cost	389.1	Realigned	0	0	0	0	0	0
Project BB Small Business Innovative Research	4.1	Realigned	0	0	0	0	0	0
Project BC Force Protection & Technology Applications	5.8	Realigned	0	0	0	0	0	0
Project BD Weapons Effects Technologies	94.4	Realigned	0	0	0	0	0	0
Project BE Testing Technologies & Integration	10.1	Realigned	0	0	0	0	0	0
Project BF CP Operational Warfighter Support	64.1	Realigned	0	0	0	0	0	0
Project BG Nuclear Operations	135.0	Realigned	0	0	0	0	0	0
Project BH System Survivability	75.6	Realigned	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

Exhibit R-2, RDT&E Budget Item Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE: Nuclear Sustainment & Counterproliferation Technologies; 0602715BR	

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 the National Military Strategy, supports the provisions of Joint Vision 2020 and is specifically directed by the 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. DTRA has taken the steps to develop this technology base.

This budget submission provides the essential technologies to deter the use of WMD and prepare for the WMD threat. These technologies can be grouped into two areas, Counterproliferation (CP) technologies and Nuclear Sustainment technologies and projects. CP technologies to include antiterrorism will help DTRA prepare for the WMD threat and support civil and military response to WMD use. Nuclear sustainment technologies and projects support the viability and credibility of the nuclear force as well as development of survivability technology for Theater Missile Defense and National Missile Defense in a nuclear environment.

- **CP Technologies:** The DTRA is the 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 CP strategy for responding to the full spectrum of crises and preparing now for an uncertain future. The CP 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 CP programs.
 - Examination of existing U.S./Allied capabilities to hold hardened, deeply buried targets at risk; evaluation of capabilities against known or projected potential targets; and evaluation of new technologies for possible application against known shortfalls.
 - Targeting and Intelligence Community (IC) support to warfighters that provides functional vulnerability assessments of hostile foreign systems.
 - Development of WMD analysis and simulation tools for the warfighter including target planning and assessment; hazardous materials transport and collateral effects prediction; consequence assessment; and anti-terrorism/force protection.
 - Development and application of state-of-the-art nuclear weapons effects models to support nuclear weapon stewardship and system hardness design.
 - Development, improvements and test engineering for 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.
 - Mission vulnerability assessments of strategic U.S./Allied systems leading to strategies for improved survivability. Provides input to assessment training programs, structural engineering designs and practices, communications and information operations, and security and

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WMD protective measures to support sound mission survivability, vulnerability mitigation, and collective protection principles. Five dedicated teams accomplish up to 30 assessments per year.

- **Nuclear Sustainment:** The nuclear sustainment program, driven by the specific taskings of the National Strategy, National Military Strategy and the Joint Strategic Capabilities Plan, has two projects, i.e., Nuclear Operations and System Survivability.
 - Nuclear Operations develops and supports the National Nuclear Mission Management Plan; Nuclear and WMD Emergency Response Capability; an enhanced WMD consequence management (CM) capability to include a CM Advisory Team (CMAT); nuclear and WMD training expertise for DoD; surety risk and hazard analyses; nuclear planning systems; nuclear deterrent option analyses; technical support for Nuclear Weapons Council (NWC) and nuclear C4I requirements; and WMD threat mitigation analyses.
 - The System Survivability Project develops simulator technology (nuclear, blast, thermal, radio frequency (RF) propagation, and optical/infrared (IR) background effects), electronics technology (radiation-hardened microelectronics, balanced electromagnetic hardening technology, radio frequency threat reduction), assessment and protection technology, and provides technology to support the Congressionally mandated Nuclear Test Personnel Review. These development areas directly support the development of survivable and reliable systems for the warfighter.

Together, the Counterproliferation Technologies and Nuclear Sustainment projects comprise a critical component of the ability of the Department to meet the technology and sustainment challenges posed by the emerging international environment and the National Military Strategy. The coverage of the projects ranges from counter-terrorism through conventional conflict through countering WMD threats to the maintenance of the national strategic nuclear deterrent.

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; and identify gaps in these capabilities and initiate programs to fill them.

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B. Program Change Summary:

(\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005
Previous Program and Budget Review	296.4	Realigned*		
Current President's Budget	389.1	Realigned*		
Total Adjustment	92.70			
Congressional program reductions				
Congressional rescissions				
Congressional increases				
Reprogrammings	92.70			
Transfer (DoD-Defense Wide)				
SBIR/STTR Transfer				

*moved to new program elements

Change Summary Explanation:

In order to better define and capture its 6.2 resources, DTRA has created two new program elements and realigned funding from this program element into the following new program elements:

- WMD Defeat Technology (0602716BR)
- Strategic Defense Technologies (0602717BR)
- Increases to FY 2002 from the previous President's Budget to the current FY 2002 Actual are the result of the Department's decision to reprogram \$92.4 million to DTRA in support of a classified program. The remaining \$.3 million reprogramming is the result of a below-threshold reprogramming to execute the Agency's Small Business Innovative Research program.

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

D. Acquisition Strategy: N/A

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BB - Small Business Innovative Research (SBIR)
	0602715BR	

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BB Small Business Innovative Research	4.1	Realigned	0	0	0	0	0	0

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 2002	FY 2003	FY 2004	FY 2005
Small Business Innovative Research	4.1	Realigned	0	0

FY 2002 Accomplishments

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

FY 2003 Plans

- Funding and activities realigned to Project BB in PE 0602716BR and 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BB in PE 0602716BR and 0602717BR.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: None

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BC – Force Protection and Technology Applications
0602715BR		

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BC – Force Protection and Technology Applications	5.8	Realigned	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

- This project supports Assessment and Mitigation Technologies, which conducts mission vulnerability assessments of strategic U.S./Allied systems to facilitate the development of investment strategies for improved survivability, to include nuclear command and control.
- This program also ensures that assessment training programs, engineering designs, and new construction embody sound force protection, vulnerability mitigation, and collective protection principles. DTRA technologies and expertise are applied to enhance U.S. capabilities across the spectrum of the counterproliferation and force protection missions. These may include development of sensor technologies for initially identifying the consequences of Weapons of Mass Destruction (WMD) through countering or protection against this threat.
- Some of the program's products and services include the Balanced Survivability Assessments (BSA), the Smart Building program's strategic facility construction design and cost estimates, vulnerability out-briefs and written reports, overall vulnerability trend data, National and NATO conferences for Underground Facility Managers, and multi-disciplined technical engineering expertise support.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Balanced Survivability Assessments	1.0	Realigned		

2002 Accomplishments

- Conducted in conjunction with O&M funding, twenty-three balanced survivability assessments on DoD facilities as tasked by Combatant Commanders, the Joint Staff, and OSD Command, Control, Communications (C3I).
- Continued integrated vulnerability assessment of defense and critical national infrastructure facilities.

FY 2003 Plans

- Funding and activities realigned to Project BC in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BC in PE 0602717BR.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BC – Force Protection and Technology Applications

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Smart Building Program	4.8	Realigned		

FY 2002 Accomplishments

- Completed Operational Capability of integrated Smart Building (SB) system.
- Provided on site and reach-back (remote) technical support for special events.
- Began lessons learned upgrade efforts.
- Began decommissioning of SB system.

FY 2003 Plans

- Funding and activities realigned to Project BC in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BC in PE 0602717BR.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers:

- Funding in the amount of \$893K was provided to Science Application Inc., located in Virginia with funding obligated April 2002. Funding supported the Balanced Survivability Assessment program.
- Funding in the amount of \$900K was provided to Science Application Inc., located in California with funding obligated December 2001. Funding supported the Smart Building program.
- Funding in the amount of \$1.5 million was provided to the Army Research Lab, located in Maryland with funding obligated March 2002. Funding supported the Smart Building program.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BD - Weapon Effects Technologies
	0602715BR	

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BD - Weapon Effects Technologies	94.4	Realigned	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

- This project provides for the development and application of products and services to meet Weapons of Mass Destruction (WMD) and other special weapon effects challenges. This is accomplished 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). The project integrates and applies these advanced capabilities to support decision making in the face of rapidly evolving WMD threats in both military and civilian sectors. Products being developed include WMD target planning and assessment tools, WMD hazardous materials transport and collateral effects prediction tools, tools and technologies used to mitigate the effects of WMD on facilities and people, and consequence assessment/management tools to evaluate and respond to WMD events. Additionally, this project develops the enabling technologies used to produce anti-terrorist/force protection tools. This project also develops technologies to support force protection assessments and forensic analysis of terrorist events as well as advanced blast mitigation/retrofit techniques. Such tools developed on this project are used to enable other projects including Project BC-Force Protection and Technology Applications, and Project BF-CP Operational Warfighter Support. Also, they are made available to civilian, anti-terrorism and disaster response support organizations.
- This project also maintains the capability to address nuclear weapon effects problems. This involves development and application of state-of-the-art nuclear weapon effects models to DoD for survivability, operability, and battle employment planning applications. In addition, the project maintains a national archive of nuclear phenomenology, involving perishable nuclear test data and expert interpretation, weapon effects models that encode our knowledge base, and a modern computer-based architecture for retention and access to such archives. These capabilities are used in direct support of the warfighter and are used to enable other projects including Project BG-Nuclear Operations and Project BH-System Survivability.
- In direct support of these products and services to the warfighter, this project also provides and maintains a world-class High Performance Computing (HPC) architecture with high bandwidth communications required for direct support to the warfighter. This service enables the application of state-of-the-art first principles models to WMD problems and supports the development of improved models and migration to advanced computing architectures.
- In addition, this project includes funds for which the DoD has provided direction to DTRA, to initiate a new subproject known as Z-Chip (also referred to as the Study of Conceptual DoD Health Surveillance and Biodefense System). These funds are to be used to initiate development of the next-generation chip-based micro-sensor array pathogen detection technology and demonstrate the capability to fuse patient point-of-care data using health surveillance software. The system utilizes diagnosis in the early stages of disease when patients present respiratory symptoms to identify the threat agent and to recommend appropriate prophylaxis and treatment.
- Also included in this project are civilian salaries required to directly support the development of products and services provided by this project.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BD - Weapon Effects Technologies

B. Accomplishments/Planned Program:

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Targeting Support	19.6	Realigned		

FY 2002 Accomplishments

- Completed development of Munitions Effects Assessment (MEA) 4.2 and Integrated Target Planning Tool Set (ITPTS) 2.0 to support the final Second Counterproliferation (CP2) Advanced Concept Technology Development (ACTD) demonstration DIPOLE ZODIAC and the tunnel defeat demonstration.
- Performed high-fidelity analyses and precision tests to produce blast mitigation and retrofit criteria for use in joint Blast Effects Estimation Model.
- Continued development of a high fidelity, physics-based computer code for DoD High Performance Computing Program capable of generating reliable data for lethality/vulnerability model development for WMD counterforce applications.
- Began development of the capability to defeat a broad spectrum of biological threats (dry/wet spores, viruses, toxins), establish relationships between weapons concepts, their effects and biological threat agent vulnerabilities.
- Refined baseline two-dimensional Discrete Particle Model that was developed in FY 2001 capable of addressing problems associated with extreme (blast/shock) loading of reinforced concrete structures.

FY 2003 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.
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Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Phenomenology and Advanced Computing	31.6	Realigned		

FY 2002 Accomplishments

- Provided online (password protected) scientific and technical information services and products as the DoD-wide repository for test weapon effects photos, films, data, test records, and other information products.

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- Completed archiving of perishable nuclear environmental radiation, thermomechanical, and electromagnetic test data.
- Provided support for Scientific Computing Communications Network and High Performance Computing (HPC) equipment, an enabler of weapon effects research and prediction.
- Initiated numerical simulation code modernization effort.
- Improved simulation of high altitude regime nuclear burst effects important for Ground-Based Midcourse Defense Program (GMD) to provide improved prediction of debris location and energy deposition, critical parameter for GMD operability.
- Continued educational seminars on the use of nuclear prediction tools for application to Missile Defense Agency (MDA) and communications systems.
- Began integration of nuclear weapon disturbed environments into space weather program.
- Completed hostile environment (nuclear interceptor output) definition for reentry body upgrade program.
- Began to develop and apply modern ground shock phenomenology prediction tools and validation databases for Deeply Buried Targets.
- Generated nuclear weapons output from threat weapons (Red Book) using high-performance computers.
- Provided Source Region Electromagnetic Pulse Targeting Application (SREMPTAPS) version # I tool and Nuclear Electromagnetic Pulse Vulnerability Number (EMPVN) Wizard tool to Strategic Command (STRATCOM) for Strategic Target Analysis.
- Provided High Altitude Electromagnetic Pulse Targeting Application (HEMPTAPS) version#5 to STRATCOM for wide area High Altitude Electromagnetic Pulse (HEMP) Targets Analysis together with a Electromagnetic Pulse (EMP) Battle Engagement code architecture for quick analysis of electrically connected targets all at once, estimating their kill probability from a single strike.
- Provided technical briefings to AWE UK on HEMPTAPS and SREMPTAPS Physics algorithm to enable scientists at AWE to include UK weapon information in the matrix of the two US tools under the auspices of the JOWOG-43 for Nuclear Weapons Effects (NEW) Analysis.
- Completed the Initial Operational Capability (IOC) of the STRATCOM C4 Assessment Toolset (STRATCAT) for STRATCOM/J6 and Battle Staff/J3
- Analyzed the target response of three Russian Electromagnetic-Weapons, RANES-E, ROSA-E and NAGIRA claimed to be more lethal than a Nuclear E- Weapon for Air Defense Systems. These are sold in the open weapon markets all over the world.
- Provided support to STRATCOM in the field of nuclear phenomenology and associated tools to include upgrade to the Integrated Nuclear Computational Aids, development of an Electromagnetic Pulse (EMP) Vulnerability Number Engagement Tool, and responding to questions on space and EMP environments.
- Provided High-Altitude Nuclear Effect (HANE) and prediction tools data for the National Missile Defense Program.

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FY 2003 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Hazard Prediction and Assessment Capability (HPAC)/Consequence Assessment Tool Set (CATS)	16.3	Realigned		

FY 2002 Accomplishments

- Delivered HPAC 4.0.1 to JFCOM, STRATCOM, EUCOM and other Combatant Commands and service organizations. Incorporated improved radiological dispersal devices model.
- Delivered HPAC-CATS (Nuclear) prototype for testing to STRATCOM.
- Delivered Consequence Assessment Tool Set-Joint Assessment Catastrophic Events (CATS-JACE) web-based consequence assessment software to JFCOM and other combatant commands, adding 3-D, high-explosive capability.
- Developed initial high-resolution weather forecasting model to incorporate mesoscale methodologies from the Navy, Air Force, Colorado State University, and DTRA.
- Continued development of urban transport and dispersion modeling capability through collaboration with the United Kingdom.
- Provided counter-terrorism support and urban transport and dispersion modeling capability for joint DoD/DOE support during designated special events.
- Provided consequence assessment products associated with Operations Noble Eagle and Enduring Freedom, as well as, supporting a dramatic increase in requests from the warfighter for WMD/analysis information.

FY 2003 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BD - Weapon Effects Technologies	
	0602715BR		

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Advanced Systems and Concepts Office	9.1	Realigned		

FY 2002 Accomplishments

- Commissioned and performed a wide array of study efforts that addressed areas of force protection and operations; homeland defense and countering terrorist attacks; strategic issues; and other unconventional threats and vulnerabilities.
- Completed studies on a chemical weapon next generation agent assessment; assessed casualties for a multilayer biological defense; conducted game theory applications to offense-defense strategies; continued studies of advanced chemical and biological threats and operations in contaminated environments; and further developed the conceptual plan for an integrated national bio-forensics capability.
- Assessment of broad-spectrum WMD intelligence collection gaps and needs.

FY 2003 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Infrastructure	7.8	Realigned		

FY 2002 Accomplishments

- Provided for payment of civilian salaries.

FY 2003 Plans

- Funding and activities realigned to Project BD in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to O&M.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: 0602715BR Project BD - Weapon Effects Technologies

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Zebra-Chip	10.0	Realigned		

FY 2002 Accomplishments

- Validated bio surveillance software/network point-of-care capability.
- Demonstrated PCR-based initial operational capability for point-of-care pathogen detection.
- Developed and demonstrated DNA-based multi-agent biological detection chip.
- Developed and demonstrated anti-body-based multi-agent biological detection chip.

FY 2003 Plans

- Funding ended in FY 2002.

FY 2004 Plans

- Funding ended in FY2002.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: Over \$11 million of FY 2002 funds have been obligated with Science Application Inc., at various locations on multiple actions. All work supports the Weapons Effects Technology program.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BE – Testing Technologies and Integration
	0602715BR	

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BE – Testing Technologies and Integration	10.1	Realigned	0	0	0	0	0	0

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 for various types of test/demonstration functions in response to operational needs. The project develops, provides and maintains test-beds used by the DoD, the Services, the Combatant Commands 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. These test beds also develop and provide technologies for defeat of WMD.
- This project leverages over 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: (1) Hard Target Defeat (HTD); (2) Anti-terrorism (AT); (3) Counterproliferation (CP) Counterforce Advanced Concept Technology Demonstration (ACTD); and (4) Special Operations Forces (SOF). This project maintains testing infrastructure and expertise to support warfighters, other government agencies, and 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 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, and post-test analysis and documentation. This project directly supports Projects BC, BD, and BF, and, in PE 0603160BR, Project BJ and BK.

B. Accomplishments/Planned Program:

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Test-Bed Operation and Support	8.1	Realigned		

FY 2002 Plans

- Continued to provide unique national test-bed capabilities for weapon-target interaction and WMD programs. Expect to support 5 major Second Counterproliferation (CP2) ACTD demonstrations, 15 Hard Target Defeat demonstrations, 6 antiterrorism information tests and 10 general phenomenology tests.
- Provided an inventory of unique targets, infrastructure support, and expertise for conduct of major integrated test programs, including instrumentation maintenance, gauge installation, data recording, source diagnosis, environmental support, safety support, experiment installation, experiment fielding, and test fielding.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BE – Testing Technologies and Integration
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FY 2003 Plans

- Funding and activities realigned to Project BE in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BE in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Field Support	1.4	Realigned		

FY 2002 Accomplishments

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

FY 2003 Plans

- Funding and activities realigned to Project BE in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BE in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Simulator Technology	.6	Realigned		

FY 2002 Accomplishments

- The Large Blast Thermal Simulator Facility test area was used for two explosive tests to validate protective structure designs.
- Maintained Large Blast Thermal Simulator (LB/TS) in a caretaker status, which included one systems test to assure the operational status of the device.
- Began modification of the driver tube section for removal of hydro plugs.

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APPROPRIATION/BUDGET ACTIVITY		PROJECT NAME AND NUMBER:
RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	Project BE – Testing Technologies and Integration

FY 2003 Plans

- Funding and activities realigned to Project BE in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BE in PE 0602716BR.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: None

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BF – CP Operational Warfighter Support

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BF – CP Operational Warfighter Support	64.1	Realigned	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

- This project will provide targeting and Intelligence Community (IC) support, exercise Counterproliferation (CP) technologies and products with the users, develop DoD compliant simulations that exploit CP models for target planning and collateral effects prediction, and demonstrate CP capabilities in operationally realistic environments. The technical approach is to integrate technologies developed in other CP 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 CP technologies into customer operations, and to support use of these capabilities during contingency operations. This project focuses on three thrusts that support outside customer requirements. The three thrusts are: 1) Hard Target Defeat (HTD) program, 2) Operational Support Technology, and 3) Combatant Commanders Planning Support. The CP Operational Warfighter Support project provides the bridge between the CP technology base and operational community needs. The overall project goal is to support the Joint Chiefs of Staff (JCS), the Combatant Commanders and Services/agencies engaged in countering Weapons of Mass Destruction (WMD) threats and to protect the U.S. and its allies against military or terrorist use of WMD.
- **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 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 Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (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 Combatant 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. (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 FY 2004, the WMDAAC will begin the development of a 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 combined with its operations research capability into 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	PROJECT NAME AND NUMBER:
RDT&E, Defense-Wide/Applied Research - BA2	0602715BR Project BF – CP Operational Warfighter Support

- **Hard 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 theater ballistic missiles and 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, thereby defining a current performance baseline. 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 respond to warfighting requirements derived from the Hard and Deeply Buried Target Defeat Capstone Requirements Document, and to the RDT&E priorities of 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 Science & Technology Plan.
 - Targeting and IC Support, part of Hard Target Defeat, provides functional vulnerability assessments of hostile foreign systems in support of warfighter and IC requirements. It assists the Combatant Commanders and IC in target planning against hard and deeply buried facilities. The assessments leverage databases, methodologies, and technical expertise developed during Balanced Survivability Assessments (PE 0602715BR, Project BC). Details of specific individual assessments are classified.
 - 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 demonstration and the Thermobaric Weapon (TW) demonstration. Efforts in this program provide part of the technology base needed for counterproliferation activities conducted in other DoD programs.
- **Combatant Commander Planning Support.** This activity develops modeling and simulation tools and applies them to support the warfighter in development of war plans. Theater and campaign level simulation and modeling tools are also being developed and produced. The War Planning Support (WPS) program is used to assess/analyze war plans or to evaluate the benefits of new technology on improved warfighter efficiency and effectiveness. Two tools currently being developed for theater and campaign level simulation and modeling are the Integrated Theater Engagement Model (ITEM) and the Synthetic Exercise Environment (SEE).

B. Accomplishments/Planned Program:

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Hard Target Defeat Demonstrations	16.5	Realigned		

FY 2002 Accomplishments

- Completed installation of equipment necessary for functional defeat demonstrations on the C3I tunnel facility #2 at Nevada Test Site (NTS).
- Conducted simulated C3I operations at the NTS tunnel facility #2 to support signature/sensor evaluations.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BF – CP Operational Warfighter Support

- Initiated functional defeat demonstrations using advanced weapon concepts on the C3I tunnel facility #2 at NTS.
- Started construction of tunnel portal test facilities at White Sands Missile Range (WSMR) to evaluate operational tactics and standoff weapon systems prohibited at NTS.

FY 2003 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Hard Target Defeat Technologies	34.8	Realigned		

FY 2002 Accomplishments

- Continued development and validation of remote site geologic characterization technology.
- Developed functional characterization models of C3I and WMD tunnel facilities.
- Identified mission critical equipment and vulnerabilities for WMD tunnel facilities.
- Continued penetration testing for rock and damaged concrete focusing on multiple attacks on the same aimpoint.
- Continued advanced weapon/payload testing to identify/quantify defeat mechanisms and evaluate effectiveness for C3I and WMD tunnel facilities.
- Conducted development and lethality testing of a classified weapons concept for C3I tunnel facilities.
- Developed improved weapon/target interaction models to include the response of critical C3I and WMD equipment to advanced payload environments.
- Continued support for other DoD and military service hard target defeat-related activities.
- Developed structural and functional battle damage assessment for C3I and WMD tunnel facilities, for incorporation into the Munitions Effects Assessment (MEA) tunnel module.
- Continued evaluation of signatures for hard target defeat applications.

Exhibit R-2a, RDT&E Project Justification

Date: February 2003

APPROPRIATION/BUDGET ACTIVITY

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

0602715BR

PROJECT NAME AND NUMBER:

Project BF – CP Operational Warfighter Support

- Initiated development of a functional defeat capability to assure critical component and network centric kills for targets invulnerable to physical defeat.
- Assessed ground shock and tunnel blast lethality issues to determine minimum collateral effects application of nuclear weapons against hard targets.
- Initiated development of an advanced payload for improved lethality to address hard and deeply buried target problem.
- Initiated development of high-payoff novel explosive concepts using advanced energetic materials to enable defeat of targets currently invulnerable to weapons solutions.
- Accelerated development of a thermobaric payload optimized for hard and deeply buried targets and WMD agent kill applications.
- Continued targeting and intelligence community support by conducting assessments of hostile facilities based on JCS and Combatant Commanders priorities. Details are classified.

FY 2003 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Operational Support Technology	8.1	Realigned	0	0

FY 2002 Accomplishments

- Delivered 90+ man-days in Post-9/11 Weapons of Mass Effect (WME) support (Operation Noble Eagle) with threat projection/analysis and contingency planning.
- Demonstrated and employed federated WME tools to help accomplish targeting and battle damage assessments (BDA) during congressionally directed Millennium Challenge (MC02) and other exercises.
- Provided web-enabled Weapons Analysis Lethality Tool Set (WALTS) capability for reachback support and advanced collaboration at USEUCOM’s Enabled Freedom ‘02 exercise in the Warrior Preparation Center. WALTS provided physics-based weapons/target interaction and 3-D visualization to assist the commander in mission planning and real-time (virtual) battle damage assessment (BDA).

Exhibit R-2a, RDT&E Project Justification

Date: February 2003

APPROPRIATION/BUDGET ACTIVITY	PROJECT NAME AND NUMBER:
RDT&E, Defense-Wide/Applied Research - BA2	0602715BR Project BF – CP Operational Warfighter Support

- Delivered Phase I High-Level-Architecture-compliant WMD Operational Assessment Model (Integrated Theater Engagement Model plus Hazard Prediction and Assessment Capability) to U.S. Forces Korea.
- Established WME Operations Research Cell for operational concept analysis (sensor placement, novel weapons, etc.), acquisition strategies, and military utility assessments of emerging technologies.
- Continued joint efforts to develop 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 in a simulated environment to include the effects of WMD, conventional weapon effects, and 3-D visualization of weapon/target interaction.
- Accelerated research and development of collaborative tools through involvement with ACTDs (Combatant Commanders 21, Coalition Combatant Commanders 21, HLS C2). Leveraged emerging technologies to ensure compatibility with a wide range of customers (warfighter, federal, state, and local governments) using advanced communication and knowledge management technologies.
- Utilized exercise and wargame participation to educate warfighters and test new concepts and tools (Combatant Commanders 21 ACTD, Fleet Battle Experiments, Ulchi Focus Lens, MC-02 and Joint Land, Air, and Sea Simulation and Strategic Crisis Exercise).
- As a principal stakeholder in the Homeland Security CP2 ACTD, participated in interagency development and demonstration of stand-alone tools and collaboration technologies for dealing with the consequences of terrorist acts, industrial accidents and natural disasters.

FY 2003 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Combatant Commander Support	4.7	Realigned	0	0

FY 2002 Accomplishments

- Produced Synthetic Exercise Environment (SEE) database and cartographic products for AIMING FIST 2002 exercise.
- Completed War Planning Support (WPS) to Supreme Headquarters Allied Powers Europe (SHAPE).

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY		PROJECT NAME AND NUMBER:
RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	Project BF – CP Operational Warfighter Support

- Continued WPS analytical support to the Commanding General 32nd AAMDC with completion of newly integrated Theater Missile Operations Campaign Plan Methodology for USFK/CFC, and transitioning applications to USFK and USCENTCOM Area of Responsibility (AOR) requirements.

FY 2003 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BF in PE 0602716BR.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: None

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BG – Nuclear Operations
	0602715BR	

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BG – Nuclear Operations	135.0	Realigned	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

- These programs directly reflect the National Military Strategy, support the provisions of Joint Vision 2020, and are directed by the JCS in the Joint Strategic Capabilities Plan (JSCP) Nuclear Annex. This project has been reorganized into three activities: 1) Nuclear Programs, 2) Combatant Commands/Forces/Security Support and 3) a new activity--WMD (Nuclear) Protection and Response. Responsive to the oversight of the Nuclear Weapons Council, they provide critical support to the Combatant Commands, Services, JCS and OSD. This project continues the realignment begun by DTRA at its inception so as to deal with the emerging 21st Century strategic landscape, and is divided into the three areas as described above:

- **Nuclear Programs** . Nuclear Weapons Surety: As tasked by the DoD Nuclear Weapon System Safety Program, the surety programs will provide Combatant Commands, Services, and JCS with technical analysis, studies, research, and experimental data to identify and quantify risks of plutonium dispersal and Loss of Assured Safety (LOAS) due to accidents, fires or natural causes during normal, peacetime operations of the nations nuclear weapon systems. Additionally, studies to quantify the probability of success of targeted terrorist attacks on DoD facilities, leveraging these risk assessment advances.
 - Nuclear Mission Management Plan (NMMP): As tasked by Deputy Secretary of Defense and Director, Defense Research and Engineering (DDR&E), and in support of national requirements to maintain a strategic nuclear deterrent, conduct assessments and develop long-range plans, the continued development of the DoD Nuclear Mission Management Plan is designed to provide a comprehensive, integrated DoD roadmap for the sustainment and viability of U.S. nuclear forces, personnel, and infrastructure.
 - Stockpile Sustainment: Continue to act as DDR&E's Executive Agent for Annual Certification and Dual Revalidation and support related stewardship and sustainment activities.
 - Stockpile Operations Support: In support of national requirements to maintain a viable nuclear deterrent, this program provides automated tools to maintain, report, track and highlight trends affecting the nuclear weapon stockpile. It will provide crucial business process and information support to ensure continued sustainability and viability of the nuclear stockpile.

- **Combatant Commands/Forces/Security Support** . As tasked by the JSCP and DoD Directives, these programs will provide Combatant Commands, Services, JCS and DoD with focused analyses in support of nuclear planning and operations and WMD threat mitigation as they pertain to the combat survivability of the forces. Additionally, they provide the DoD nuclear physical security applied research and force-on-force (FoF) testing programs to help insure the security of our nuclear forces. Provides technical support and curriculum development and enhancement for the Defense Nuclear Weapons School (DNWS), to include other WMD support, and other DoD nuclear training activities.

- **WMD (Nuclear) Protection and Response** . As a new activity and in direct support to the National Military Strategy, these programs will promote initiatives to detect the surreptitious introduction and use of weapons of mass destruction against the U.S. and its allies thereby protecting our citizens and critical infrastructures. Potential adversaries, whether nations, terrorist groups or criminal organizations, will be tempted to use asymmetric means

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BG – Nuclear Operations

of war such as WMD to counter U.S. conventional weapon superiority. Promoting such initiatives enhances deterrence and proactively supports the agency's mission of WMD threat reduction.

B. Accomplishments/Planned Program:

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Nuclear Programs	18.0	Realigned		

FY 2002 Accomplishments

- Nuclear Weapon Surety Thrusts:
 - Continued the B-2 Weapon Safety System Assessment (WSSA).
 - Completed Storage Vault Blast Effects Testing and Analysis.
 - Performed a classified safety study of a DoD nuclear facility.
 - Initiated a weapon safety lightning protection workshop.
 - Conducted a review of explosives safety analysis model.
 - Completed the validation of the Storage Facility (Lightning) Tester.
 - Continued the development and population of the "Nuclear Surety Information Center," a weapon safety database of completed assessments, studies, and test programs.
 - Continued Phase II Small Business Innovative Research (SBIR)– Automated Vulnerability Evaluation for Risks of Terrorism (AVERT) and Isis Fire Modeling Program.
- Stockpile Sustainment Program Thrusts:
 - Supported annual certification and stockpile stewardship for the continued safety and reliability of the U.S. nuclear stockpile in the absence of undergroundtesting.
 - Performed assessments and provided support to the Nuclear Posture Review and End-to End Review.
 - Continued the "Nuclear Deterrent Support Program".
 - Supported development of the Nuclear Weapons Stockpile Plan and the Requirements & Planning Document.
 - Developed "Outreach 21" for nuclear expertise support to operational units.

Exhibit R-2a, RDT&E Project Justification

Date: February 2003

APPROPRIATION/BUDGET ACTIVITY

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

0602715BR

PROJECT NAME AND NUMBER:

Project BG – Nuclear Operations

- Prepared an annual performance report, as directed by Presidential Decision Directive #15(PDD), on the DoD stockpile sustainment accomplishments and future plans.
- Provided technical support to the Nuclear Weapons Council (NWC) and Joint Advisory Committee on Nuclear Weapons Surety (JAC).
- Prepared FY 2003 Edition of the NMMP.
- Stockpile Operations Thrusts:
 - Developed and implemented the Defense Integration and Management of Nuclear Data Services (DIAMONDS) capability package 2, which included additional enhancements to Maintenance Bay and Unsatisfactory Reporting System modules, initial Joint Nuclear Weapons Publication System (JNWPS) online access to pubs, as well as, fielded additional integrated modules based upon user priorities and feedback while continuing to enhance fielded modules. Linked 4 CONUS nuclear storage sites with secure communications to support DIAMONDS data transmission and access to stockpile information, tools, and data. Performed OCONUS exploratory visits for unique site requirements. Performed Joint Application Design for Electronic Inspection Record Cards (IRC) and Weapon Information Reports (WIR). The Special Weapons Information Management (SWIM) system also was integrated in this FY.

FY 2003 Plans

- Funding and activities realigned to Project BG in PE 0602717BR and Project BG in PE 0602716BR.

- **FY 2004 Plans**

- Funding and activities realigned to Project BG in PE 0602717BR and Project BG in PE 0602716BR.

Cost (\$ in thousands)	FY 2002	FY 2003	FY 2004	FY 2005
Combatant Command/Forces/Security Support	7.8	Realigned		

FY 2002 Accomplishments

- Maintained USEUCOM/SHAPE European Theater Nuclear Support Program to provide in-theater nuclear and WMD support to EUCOM and NATO.
- Jointly with the CP Directorate, continued the War Plans Support Program for the Combatant Commands. Objective is to provide operational analyses dealing with theater WMD planning issues supporting the development of Combatant Command CONOPS, CONPLANS and OPLANS.

APPROPRIATION/BUDGET ACTIVITY

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

0602715BR

PROJECT NAME AND NUMBER:

Project BG – Nuclear Operations

- Continued support to STRATCOM and regional Combatant Commands with specific nuclear and WMD threat analyses in support of Single Integrated Operational Plan (SIOP) preparation, development of integrated effects models, direct planning support to regional Combatant Commands, and specified applications for the Deterrence Framework analytic structure.
- Continued to execute the Strategic Deterrence Program to support full range of nuclear and WMD Consequence Management Issues, provide nuclear policy support and the assessment of the full range of nuclear/WMD issues for DoD components.
- Completed targeting program to fully integrate the planning processes and target data set of STRATCOM, regional Combatant Commands plans and NATO nuclear planning capability.
- Conducted Force-on-Force exercise program focused on U.S. forces in USEUCOM/USAFE using the Mighty Guardian series.
- Completed support of the Air Force Space Command (AFSPACECOM)/STRATCOM security analyses of ICBM forces.
- Plan to support potential Mighty Guardian Exercise.
- Initiated new program to examine and evaluate the future impacts of technology on political/military/economical trends-focused on WMD/Consequence Management
- (CM)/Nuclear proliferation.
- Completed NATO Nuclear C2, Quadrennial Defense Review Analytical Support program.
- Continued to directly support the curriculum development for the Defense Nuclear Weapons School
- Continued to serve as the DoD Executive Agent for nuclear weapons training and education.
- Began development of a comprehensive WMD Training program.
- Continued to expand and enhance expertise outreach training program across DoD.

FY 2003 Plans

- Funding and activities realigned to Project BG in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BG in PE 0602717BR.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BG – Nuclear Operations

Cost (\$ in thousands)	FY 2002	FY 2003	FY 2004	FY 2005
WMD (Nuclear) Protection and Response	16.8	Realigned		

FY 2002 Accomplishments

- Continued development of tools and capability for rapid attribution of the source of a nuclear event under the "Domestic Nuclear Event Attribution " (DNEA) program.
- Developed a portable, mobile, and rapidly deployable radiation detection and tracking system.
- Developed a multi-platform system to replace the current mobile/aerial/maritime unit.
- Developed satellite communication architecture for rapid data exfiltration.
- Developed new handheld radiation detection equipment.
- Started worldwide equipment replacement and modernization.
- Created the Direct Support Team (DST) to provide WMD support to Combatant Commanders.

FY 2003 Plans

- Funding and activities realigned to Project BG in PE 0602716BR.

FY 2004 Plans

- Funding and activities realigned to Project BG in PE 0602716BR.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BG – Nuclear Operations

Cost (\$ in thousands)	FY 2002	FY 2003	FY 2004	FY 2005
Classified Program	92.4	Realigned		

FY 2002 Accomplishments

- \$92.4M was reprogrammed in year of execution to fund a classified program.

FY 2003 Plans

- N/A

FY 2004 Plans

- Funding and activities realigned to Project BG in PE 0602716BR.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers : Over several actions a total of \$80 million of FY 2002 funding was obligated with the U.S. Department of Energy in support of a classified program.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2		PROJECT NAME AND NUMBER: Project BH – System Survivability
0602715BR		

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project BH – System Survivability	75.6	Realigned	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

- These programs directly reflect the National Military Strategy, support the provisions of Joint Vision 2020 and the Nuclear Posture Review, and are directed by the JCS in the Joint Strategic Capabilities Plan (Nuclear Annex). Current and future warfighters and weapon systems, including the associated Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), missile defense and support systems/equipment, must be able to survive and operate effectively through a spectrum of hostile environments. Planned efforts emphasize the development and demonstration of innovative and cost-effective technologies to sustain the functional survivability of U.S. and Allied Forces and systems when confronted with threats from advanced conventional weapons, special weapons and limited nuclear attack. This project constitutes the DoD’s resident science and technology expertise in nuclear and related survivability matters. It develops and demonstrates affordable strategies and hardening technologies for U.S. systems; transfers the technical products to acquisition program offices; conducts component, subsystem, system and end-to-end performance tests and assessments as requested by the Services and Combatant Commands; and provides support to the Office of the Secretary of Defense on technical and policy matters that relate to the acquisition of survivable systems and strategic system sustainment.
- FY 2002 reflects an addition of \$17M, which resulted from the Secretary of Defense strategic review that stressed the importance of developing technological solutions to critical defense problems including ensuring the availability of radiation hardened microcircuits for survivable military systems, enabling the survivability of critical nuclear command and control networks, space surveillance systems, and missile system upgrades.
- **Radiation Hardened Microelectronics.** Responds to DoD space and missile system requirements for hardened microelectronics and photonics technology to support mission needs. The non-availability of this technology would adversely impact system survivability, performance, weight and cost. The program involves the development and demonstration of radiation-hard, high performance prototype microelectronics to support the fabrication of radiation-hardened microcircuits and photonics for DoD missions through private sector and government organizations. This is achieved through the development and demonstration of enabling technologies to ensure the continued availability of special materials and radiation-hardened prototype microcircuits and photonic devices.
- **Simulator Technology.** This program is being revised to respond to the Defense Science Board Task Force on Nuclear Effects Simulation that recommended that DTRA pursue developing some of the capability lost with the moratorium on underground testing. Since the underground testing (UGT) moratorium, simulators have provided the only remaining experimental test bed for the development and validation of radiation-hardened DoD systems. The intensity and fidelity of these simulators do not match that of the UGT testbed, but, through this program, the agency develops, provides and maintains unique DoD radiation test facilities and enabling technologies that are used by the Defense Agencies, the Services and other federal departments (such as DOE) to evaluate the impact of hostile environments on military systems that support missions in the air, on land, at sea, or in space. The program also develops technologies to improve the intensity, fidelity, reliability, reproducibility, and cost effectiveness of existing and future simulators (including radiation sources, power flow and conditioning components, energy storage, diagnostics, instrumentation, other test

Exhibit R-2a, RDT&E Project Justification

Date: February 2003

APPROPRIATION/BUDGET ACTIVITY	PROJECT NAME AND NUMBER:
RDT&E, Defense-Wide/Applied Research - BA2	0602715BR Project BH – System Survivability

support equipment, debris shields, and numerical models and computer codes for radiation sources and pulsed power components and test beds); develops concepts, plans, and risk reduction strategies for affordable next-generation radiation simulators with substantially improved intensity and fidelity; support improvements to the two existing test centers, one at Titan Pulsed Sciences Division in San Leandro, California, and one at the Arnold Engineering Development Center (AEDC) in Tullahoma, Tennessee; and installs and characterizes upgrades to the new Decade x-ray simulator and to existing radiation simulators at Titan.

- **Assessments and Protection Technology.** Directly responds to warfighter and acquisition program survivability needs by providing radiation hardening solutions, including development of emerging technologies and methodologies for system-level and family-of-system-level assessments, systems hardening, and testing of the effects of nuclear weapons. Includes development and demonstration of cost-effective system design and test qualification techniques to produce hardware that can be tested without the need for underground nuclear tests. Provides testable system design protocols, design and assessment toolkits, and modeling and simulation (M&S) tools for program managers, system designers and users of nuclear effects simulators.
- **Balanced Electromagnetic Hardening.** Provides the necessary science and technology to develop warfighting systems and DoD mission-related infrastructure survivable in multiple electromagnetic (EM) environments, including nuclear electromagnetic pulse (EMP) and high power microwaves. Designs and develops innovative low-cost balanced EM protection, test technologies for weapon systems, C3, and support infrastructure systems to the Combatant Commands, Services and other DoD agencies.
- **Human Risk and Technology.** Applies lessons learned from the Nuclear Test Personnel Review Program (O&M-funded) to allow warfighters and peacekeepers to quantify/mitigate the risk in post-Cold-War settings (i.e., limited nuclear exchanges, terrorist actions, radiological dispersal weapons, and other radiation risk scenarios) by developing field measurement and dosimetry systems to support military radiological guidelines for the protection of human resources. This provides direct support to warfighters by predicting and quantifying the operational impact of nuclear, biological and chemical (NBC) and conventional battlefield soldier effectiveness on NBC battlefields; providing performance and cost analysis to support the Defense Acquisition Board; and joint efforts with system program offices to apply the Agency’s expertise and technologies to specific Service applications.

B. Accomplishments/Planned Program:

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Radiation Hardened Microelectronics	40.6	Realigned		

FY 2002 Accomplishments

- Demonstrated 16M multi-chip module static random access memory.
- Developed the initial technology base to support the demonstration of radiation hardened very deep submicron microelectronics integrated circuits as part of the USD(AT&L) accelerated radiation hardened microelectronics technology roadmap.

Exhibit R-2a, RDT&E Project Justification

Date: February 2003

APPROPRIATION/BUDGET ACTIVITY

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

0602715BR

PROJECT NAME AND NUMBER:

Project BH – System Survivability

- Demonstrated radiation hardened 0.25-micron complementary metal oxide semiconductor/bulk and silicon-on-insulator technology for low-power microelectronics.
- Demonstrated functional, integrated electronic design automation for deep submicron technologies.
- Initiated the process development of a radiation-hardened cryogenic readout circuit.

FY 2003 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Simulator Technology	17.5	Realigned		

FY 2002 Accomplishments

- Supported customer test requirements at DTRA test facilities.
- Exceeded goal set for cold x-ray yield improvements at Decade by 40%.
- Demonstrated over 300 kilojoules (KJ) Ar Plasma Radiation Source (PRS) on the Sandia Z machine.
- Continued development of cold x-ray sources with improved yield for other simulators, leading to factor-of-two improvement in yield.
- Continued diagnostics development for user test support and for source development.
- Continued radiation magnetohydrodynamic modeling and simulation.

FY 2003 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BH – System Survivability

FY 2004 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Design and Assessments Technology	8.5	Realignment		

FY 2002 Accomplishments

- Continued to modify the Electronic Battle Book (EBB) database to include multiple link assessment due to nuclear weapons detonation for USSPACECOM exercises and assessments.
- Continued Missile Defense Agency/Ground Based Midcourse Defense (MDA/GMD) requirements development support for version C1 of the GMD initial capability.
- Continued MDA/Navy Shipboard Midcourse Defense (SMD) requirements development support.
- Completed development of flexible network assessment tool for analyzing various nuclear weapons effects on system performance.
- Initiated USSPACECOM operability assessment of Tactical Warning/Attack Assessment (TW/AA) system considering impacts of future GMD system integration.
- Completed development of the Wideband Channel Simulator.
- Supported GMD Hardware-in-the-Loop (HWIL) testing.
- Started development of a Visible Display Simulator to support Spaced Based Infra-Red Systems (SBIRS) Low testing and other future customers.
- Supported GMD In-Flight Information Control System (IFICS) testing.
- Developed nuclear environment software modules for integration with HWIL facilities.
- Conducted testing of EWRs in support of GMD program upgrades. Developed radar disturbance mitigation techniques for GMD, Ground Based Radar (GBR) and Early Warning Radars (EWRs).
- Provided Infrared (IR) scene testing of MDA (Missile Defense) sensors.
- Supported IR testing of Space-Based Infrared Satellite (SBIRS).
- Continued communication/radar atmospheric effects participation in operational/warfighting exercises through operational assessments.
- Completed development of subsystem controller microcircuitry for fast circumvention and recovery (C&R) after radiation exposure.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BH – System Survivability

- Delivered Testable Hardware Toolkit Version 2.0
- Began development of a thermostructural response (TSR) toolkit.
- Applied System Hardening Upset and Recovery macrocell library to radiation exposure of the Global Positioning System (GPS) for rapid recovery. Demonstrated fast recovery of the GPS clock.
- Sensor Hardening Technology continued to evaluate hardening techniques for current state-of-the-art focal plane arrays.
- Continued development of nuclear effects keepout algorithms for the GMD Battle Management System.
- Continued to assess the survivability of the GMD Communications Network (GCN) and GMD ground facilities.
- Initiated Next Generation Network (NGN) Hard-ware-in-the-loop testbed study of the GCN.
- Started development of Operability Assessment Tool for Systems (OATS).

FY 2003 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Balanced Electromagnetic Hardening	8.0	Realignment		

FY 2002 Accomplishments

- Developed Mission Degradation Analysis (MIDAS) interim software prototype extraction tool for application to existing infrastructure databases.
- Developed Radio Frequency (RF) Circuit Protection theory to predict the effect of transformed, coupled signals on military critical circuits.
- Developed theoretical approaches for hardening circuit components against emerging high power RF weapons threats.
- Developed integrated Electromagnetic (EM) protection measures/technologies for battlefield systems.
- Began activity to update MILITARY-HANDBOOK-423, HEMP Protection for Fixed and Transportable Ground Base C4I Facilities.
- Integrated the substrate protection technology into existing COTS/Non Developmental Items (NDI) and MILSPEC equipment to demonstrate its effectiveness in protecting sensitive receivers from powerful RF attacks.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	PROJECT NAME AND NUMBER: Project BH – System Survivability

FY 2003 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005
Human Survivability	1.0	Realignment		

FY 2002 Accomplishments

- Continued development and evaluation of radiation protection standards and risk measures applicable to personnel/equipment for US Armed Forces, NATO and The Technical Cooperation Program (TTCP) review.
- Provided U.S. Representative to newly formed TTCP Action Group forty-eight on low-level radiation.
- Successful testing of UAV-based radiological measurement package conducted in UAV's and Helicopter using sealed radioactive sources and flights over actual contaminated site under remediation.
- Commenced Electro-Paramagnetic Resonance Mobile Response Dosimetry System for forward deployed battlefield assessment of personnel exposure to ionizing radiation using human teeth in-situ.
- Orchestrated provision of fixed electron paramagnetic resonance (EPR) Forensic Laboratory to be used by the Uniformed University of the Health Sciences (USUSH) and the Armed Forces Radiobiological Research Institute (AFRRI) for use in analyzing tissue samples (teeth, dentin, and bone) for assessment of radiation exposure to deceased individuals.
- Commenced Development and Construction of Rolling Circle Amplification (RCA) based hand-held Radiological Biodosimeter for forward deployed battlefield assessment of personnel exposure to ionizing radiation from human blood.
- Provided support to National Council on Radiation Protection and Measurements and to the NAS/EPA BEIR VII (Biological Effects of Ionizing Radiation) analysis to be completed FY 2003 as well as studies of possible terrorist use of radioactive materials.
- Facilitated the adaptation and integration of human response and behavioral representations into appropriate agency and outside agency programs.

Exhibit R-2a, RDT&E Project Justification		Date: February 2003
APPROPRIATION/BUDGET ACTIVITY		PROJECT NAME AND NUMBER:
RDT&E, Defense-Wide/Applied Research - BA2	0602715BR	Project BH – System Survivability

FY 2003 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

FY 2004 Plans

- Funding and activities realigned to Project BH in PE 0602717BR.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: Over \$18 million of FY 2002 funding has been obligated with Mission Research Corp., at various locations on multiple actions. All work supports the mission of the System Survivability program.