Exhibit R-2, RDT&E Budget Item Justification	Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	**R-1 ITEM NOMENCLATURE:** WMD Defense Technologies 0602717BR Re-titled in FY 2005 from Strategic Defense Technologies

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total 0602717BR Cost	111.6	112.5	106.7	112.9	116.9	121.1	123.3	125.6
Project BB Small Business Innovative Research*	0	0	2.4	2.5	2.5	2.5	2.5	2.5
Project BC Force Protection & Technology Applications	1.3	2.1	1.8	1.7	1.7	1.7	1.7	1.7
Project BG Nuclear Operations	25.4	24.5	25.4	25.4	27.1	28.4	28.4	28.4
Project BH System Survivability	84.9	85.9	77.1	83.3	85.6	88.5	90.7	93.0

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

A. Mission Description and Budget Item Justification:

The Defense Threat Reduction Agency (DTRA) is working to make the world safer by reducing the present threat and preparing for future threats. Weapons of mass destruction (WMD) (chemical, biological, radiological, nuclear and high explosives) are the most serious threats our nation and its allies face today. This mission directly reflects several national and DoD-level documents to include 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 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). 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 deter the use of WMD, reduce the present threat and prepare for the future threat. A focused, strong threat reduction technology base is critical to achieving these objectives and is closely tied with the operational support programs that make up its combat support mission. DTRA has taken the steps to develop this technology base and provide a foundation for transformational activities within the WMD arena as delineated in the TPG.

This budget submission provides the essential technologies and operational support to deter the use of weapons of mass destruction and prepare for the projected WMD threat. It includes funding for assessments and development of strategies, concepts and strategic nuclear and WMD deterrence options. In addition, it provides funding for development and testing of special equipment, necessary facilities, and other associated costs necessary for the development of the technology base needed to support the national deterrent policy and military strategy. Supported initiatives include, but are not limited to, the following development efforts:

- Programs focused on assessing, enhancing and maintaining the survivability and operability of nuclear deterrent forces.
- Operational support programs focused on activities such as balanced survivability assessments, operational assessments, nuclear physical security technology development, and assessments of various OPTEMPO concerns obtained from chemical, biological, radiological, and nuclear environments.
- Support to the Office of the Secretary of Defense (OSD), JCS and Combatant Commands in war planning, force structure options, logistics, WMD mitigation operations and stockpile programs.

- Developing and validating advanced technology to provide enhanced Weapons of Mass Destruction (WMD) Training supporting Joint Mission Essential Tasks (JMETS) for forces and coordination of DoD WMD training requirements.
- Nuclear weapon effects survivability technology programs focused on:
- Simulator technology that enables simulation of the nuclear environments from a nuclear burst
- Assessments technology that develops design protocols, hardware, and software that enhances the ability of mission essential systems to survive a nuclear attack and to operate after a nuclear attack.
- Radiation hardened microelectronics technology that responds to DoD space and missile system requirements for radiation-hardened microelectronics and photonics to support mission needs.
- Human survivability technology that rapidly develops/converts radiation sensor, dosimetry and biological technologies for integration into real-time forward deployed tools for characterization of radiologically hazardous environments that impact warfighter mission and command and control decisions.

Nuclear sustainment technologies and projects support the viability and credibility of the nuclear force as well as development of nuclear environment survivability for Theater Missile Defense and National Missile Defense.

The nuclear sustainment program, driven by the specific taskings of the National Security Strategy, National Military Strategy, the Nuclear Posture Review, 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 training expertise for the DoD; surety risk and hazard analyses; nuclear planning systems; nuclear deterrent option analyses; technical support for Nuclear Weapons Council (NWC) and nuclear Command, Control, Communications, Computers, and Intelligence (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 protection technology (radiation-hardened microelectronics, electromagnetic hardening technology, radio frequency threat reduction), assessment technology, radiation detection technologies, 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.

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 through countering WMD threats to the maintenance of the national strategic nuclear deterrent.

Operational support of the Combating WMD mission integrates support to the Joint Staff and OSD with support to the Combatant Commands. Support to the Joint Staff and OSD drives policy and doctrine development. Support to the Combatant Commanders turns policy into operational plans that are executable.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	**R-1 ITEM NOMENCLATURE:** WMD Defense Technologies 0602717BR Re-titled in FY 2005 from Strategic Defense Technologies

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	**115.5**	**116.1**	**111.8**	**102.7**
Current President's Budget	**111.6**	**112.5**	**106.7**	**112.9**
Total Adjustments	**-3.9**	**-3.6**	**-5.1**	**10.2**
Congressional program reduction				
Congressional reductions		**-2.1**		
Congressional increases		**1.0**		
Reprogrammings	**-2.6**			
Other Program Adjustments			**-5.1**	**10.2**
SBIR/STTR Transfer	**-1.3**	**-2.5**		

Change Summary Explanation:

- The decrease in the FY 2004 funding profile from the previous President's Budget to the current President's Budget is the result of a SBIR funding transfer and two below-threshold reprogrammings. During the year of execution, SBIR funding (-$1.3 million) is consolidated into PE 0605502BR "Small Business Innovative Research" for execution. DTRA also completed a below-threshold reprogramming in support of the Advanced Systems and Concepts Office, Threat Anticipation Program (TAP) (-$1.2 million) to DTRA PE 0602716BR "WMD Defeat Technology"; and reprogrammed funds to support Nevada Test Site Remediation (-$1.4 million) to PE 0602716BR.
- The net decrease in FY 2005 from the previous President's Budget to the current President's Budget is attributable to the FY 2005 DoD Appropriations Bill (P.L. 108-287) that contained several undistributed congressional reductions that were proportionally applied to the entire DTRA RDT&E program. Reductions for this program amounted to -$2.1 million. This program had a Congressional Add of +$1 million. Additionally, SBIR funding (-$2.5 million) was consolidated into PE 0605502BR "Small Business Innovative Research" for execution.
- The decrease of -$5.1 million in FY 2006 from the previous President's Budget to the current President's Budget reflects program reprioritization. DTRA's priority development is strongly linked to the Combatant Commanders. Funding is used to support high priority combat support requirements in accordance with current planning, assumptions and associated requirements, correct infrastructure deficiencies and implement the business reform initiative. It also balances the program consistent with strategic priorities both within DTRA and the Department of Defense.
- The increase of $10.2 million in FY 2007 from the previous President's Budget to the current President's Budget reflects program reprioritization. DTRA's priority development is strongly linked to the Combatant Commanders. Funding is used to support high priority combat support requirements in accordance with current planning, assumptions and associated requirements, correct infrastructure deficiencies and implement the business reform initiative. It also balances the program consistent with strategic priorities both within DTRA and the Department of Defense.

- The resulting program provides for a flexible combat support structure; focused science and technology investments, to include such critical areas as WMD target defeat and nuclear weapons effects technologies; enhanced consequence management capabilities; force protection, infrastructure protection and dual-use homeland security initiatives; as well as the streamlining and transformation of the supporting business practices and workforce.

Exhibit R-2a, RDT&E Project Justification	Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2 0602717BR	**PROJECT NAME AND NUMBER:** Project BB– Small Business Innovative Research

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BB - Small Business Innovative Research*	0	0	2.4	2.5	2.5	2.5	2.5	2.5

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

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 2004	FY 2005	FY 2006	FY 2007
Small Business Innovative Research	0	0	2.4	2.5

FY 2004 Accomplishment

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

FY 2005 Plans

- In year of execution, funding executed under PE 0605502BR "Small Business Innovative Research"
- Support the Small Business Administration (SBA) National Direction by actively seeking small business contractors to perform innovative research.
- Execute Agency-approved SBIRs.

FY 2006 Plans

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

FY 2007 Plans

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

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: N/A

Exhibit R-2a, RDT&E Project Justification	Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2 0602717BR	**PROJECT NAME AND NUMBER:** Project BC– Force Protection & Technology Applications

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BC - Force Protection & Technology Applications	1.3	2.1	1.8	1.7	1.7	1.7	1.7	1.7

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 project 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.
- Some of the project's products and services include:
  - Balanced Survivability Assessments (BSA)
  - Vulnerability out-briefs and written reports
  - Overall force protection vulnerability trend data
  - National and NATO conferences for Underground Facility Managers
  - Multi-disciplined technical engineering expertise support

B. Accomplishments/Planned Program:

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007
Balanced Survivability Assessments	1.3	2.1	1.8	1.7

FY 2004 Accomplishments

- Conducted improved and refined balanced survivability and integrated vulnerability assessments on DoD facilities as tasked by Combatant Commands, the Joint Staff, and OSD/C3I based on lessons learned from previous assessments and new technology.
- Conducted balanced vulnerability assessment of defense and critical national infrastructure facilities based on lessons learned from previous assessments and new technology.

FY 2005 Plans

- Conduct balanced survivability and integrated vulnerability assessments of DoD facilities and systems as tasked by Combatant Commands, the Joint Staff, and OSD.
- Conduct balanced vulnerability assessment of defense and critical national infrastructure facilities and systems.
- Conduct architectural analyses to determine systemic vulnerabilities.

FY 2006 Plans

- Conduct balanced survivability and integrated vulnerability assessments of DoD facilities and systems as tasked by Combatant Commands, the Joint Staff, and OSD.
- Conduct balanced vulnerability assessment of defense and critical national infrastructure facilities and systems.
- Conduct architectural analyses to determine systemic vulnerabilities.

FY 2007 Plans

- Conduct balanced survivability and integrated vulnerability assessments of DoD facilities and systems as tasked by Combatant Commands, the Joint Staff, and OSD.
- Conduct balanced vulnerability assessment of defense and critical national infrastructure facilities and systems.
- Conduct architectural analyses to determine systemic vulnerabilities

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: Approximately $1.2M of FY 2004 funding was obligated with Science Application International Corporation with locations in California and Virginia. Funds obligated were in direct support of work performed by Project BC – Force Protection and Technology Applications.

Exhibit R-2a, RDT&E Project Justification	Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2 0602717BR	**PROJECT NAME AND NUMBER:** Project BG – Nuclear Operations

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BG - Nuclear Operations	25.4	24.5	25.4	25.4	27.1	28.4	28.4	28.4

A. Mission Description and Budget Item Justification:

- These programs directly reflect the National Military Strategy, support the dictates of the Nuclear Posture Review (NPR), and are directed by the JCS in the Joint Strategic Capabilities Plan (JSCP) Nuclear Annex. This project for this Program Element encompasses two activities:
  - Nuclear Programs
  - Combating WMD Support.
- 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 to deal with the emerging 21st Century strategic landscape, and is divided into the two areas as described below:

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, these programs will provide 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. 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 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 to ensure continued sustainability and viability of the nuclear stockpile.
- Provide the DoD nuclear physical security applied research and force-on-force (FoF) testing programs to help insure the security of our nuclear forces.

- **Combating WMD Support**.
  - As tasked by the Strategic Planning Guidance, the Contingency Planning Guidance and the Joint Strategic Capabilities Plan (JSCP), to provide Combatant Commands, Services, Joint Staff and OSD with focused analyses in support of Combating WMD planning and operations.

B. Accomplishments/Planned Program:

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007
Nuclear Programs	20.1	17.5	18.4	18.4

FY 2004 Accomplishments

- Nuclear Weapon Surety Thrusts:
  - Conducted modeling and testing to respond to weapon storage facility and weapon system safety requirements and criteria.
  - Improved the development and population of a "Nuclear Surety Information Center," a weapon surety database and interface to utilize and archive completed assessments, studies, tools and test programs.
  - Continued forensics nuclear activation project with Oak Ridge National Lab.
  - Completed Graphical Unit Interface (GUI) Development for ISIS-3D Fire model.
  - Completed demonstration and Validation of Storage Facility Tester.
  - Completed Fire Hazard Analyses for Weapon Storage facilities at two Air Force Bases.
  - Developed a plan to refocus the development of an electrical system Penetration Tester for Nuclear Facility Safety to meet the requirements of USAF and OSD Nuclear Matters.
  - Supported annual certification and stockpile stewardship for the continued safety and reliability of the U.S. nuclear stockpile in the absence of underground testing; reviewed for new opportunities to enhance nuclear safety and reliability.
  - Improved upon evaluation of enduring stockpile weapons in support of the Air Force and Navy.
  - Prepared an Annual Surety Report for SECDEF and President.
  - Conducted two Mighty Guardian (MG) exercises for the Air Force in Germany, Mighty Guardian MG VI and New Jersey, Mighty Guardian MG VII and improved Force-on-Force test program based on lessons learned.
  - Conducted nuclear physical security engineering studies to develop mitigation strategies for enhancing and upgrading physical delay to potential adversaries.
- Conducted exploratory research on physical security equipment and technology designed to enhance the protection of the nuclear stockpile.
- Stockpile Sustainment Program thrusts:
  - Supported annual certifications, at Presidential direction, of the continued safety and reliability of the U.S. nuclear stockpile in the absence of underground testing.
  - Assessed impacts of Nuclear Posture Review, End-to-End Review, and new National Security Presidential Directive (NSPD) on nuclear weapons surety.
  - Continued and enhanced the "Nuclear Deterrent Support Program" by leveraging nuclear deterrent expertise to address nuclear threats.
  - Continued and improved upon technical support to the Nuclear Weapons Council (NWC) and Joint Advisory Committee (JAC).

  - Continued improvement, development and presentation of tailored nuclear weapons expertise and sustainment modules through Outreach efforts to the War Colleges and operational units; conducted first-ever Outreach presentations to nuclear students at U.S. Naval Academy and U.S. Military Academy.
  - Continued to support development of the Nuclear Weapons Stockpile Plan and Requirements & Planning Document.
- Stockpile Operations thrusts:
  - Completed the Nuclear Ordinance Commodity Management (NOCM) module and Special Weapons Information Management (SWIM) integration into Defense Integration and Management of Nuclear Data Services (DIAMONDS).
  - Began planning for the Nuclear Management Information System (NUMIS) integration into DIAMONDS.
  - Installed DIAMONDS in 6 OCONUS custodial and a headquarter location.
  - Continued to enhance Maintenance Bay, Unsatisfactory Reporting, and other modules based on user feedback and priorities while continuing development of the DIAMONDS system.
  - Provided Phase I of electronic Joint Nuclear Weapons Publication System (JNWPS) module DIAMONDS to all users except those in the maintenance areas.

FY 2005 Plans

- Nuclear Weapon Surety Thrusts:
  - Continue to conduct modeling and testing to respond to weapon storage facility and weapon system safety requirements and criteria.
  - Improve nuclear storage facility fire suppression capabilities based on Fire Hazard Analysis results and new technology.
  - Complete the development and population of the "Nuclear Surety Information Center", a weapon surety database and interface to utilize and archive completed assessments, studies, tools and test programs.
  - Continue to improve the evaluation of enduring stockpile weapons in support of the Air Force and Navy.
  - Continue forensics nuclear activation project with Oak Ridge National Lab.
  - Begin analyses of abnormal environment scenarios for nuclear weapons systems.
- Continue to conduct the Force-on-Force (F-O-F) test program using the Mighty Guardian (MG) series and based on lessons learned and new technology.
- Conduct nuclear physical security engineering studies to enhance delay/denial.
- Conduct exploratory research on physical security equipment and technology designed to enhance the protection of the nuclear stockpile.

- Stockpile Sustainment Program thrusts:
  - Continue to support annual certification and stockpile stewardship for the continued safety and reliability of the U.S. nuclear stockpile in the absence of underground testing.
  - Evolve and improve the "Nuclear Deterrent Support Program" into a more robust “Nuclear Deterrent and WMD Support Program.”
  - Continue enhanced technical support to the Nuclear Weapons Council (NWC) and Joint Advisory Committee (JAC).
  - Continue developing third edition of the Nuclear Mission Management Plan.

  - Improve the development and presentation of tailored nuclear weapons expertise and sustainment modules through Outreach efforts to the War Colleges, Service Academies and operational units.
  - Continue to support development of the Nuclear Weapons Stockpile Plan and the Requirements & Planning Document.
- Stockpile Operations thrusts:
  - Field remaining Air Force OCONUS sites in Germany and Turkey.
  - Begin fielding of DIAMONDS at Navy munitions sites.
  - Complete Phase I of Nuclear Management Information System (NUMIS) integration into DIAMONDS.
  - Complete integration of Joint Nuclear Weapons Publication System JNWPS publications into DIAMONDS.
  - Begin planning and implementation of the Decision Support Module for DIAMONDS.

FY 2006 Plans

- Nuclear Weapon Surety Thrusts:
  - Continue to conduct modeling and testing to respond to weapon storage facility and weapon system safety requirements and criteria.
  - Continue to improve nuclear storage facility fire suppression capabilities based on Fire Hazard Analysis results and new technology.
  - Continue to improve the evaluation of enduring stockpile weapons in support of the Air Force and Navy.
  - Complete forensics nuclear activation project with Oak Ridge National Lab.
  - Continue analyses of abnormal environment scenarios for nuclear weapons systems.
- Continue to conduct the F-O-F test program using the MG series and based on lessons learned and new technology.
- Conduct exploratory research on physical security equipment and technology designed to enhance the protection of the nuclear stockpile.
- Stockpile Sustainment Program thrusts:
  - Continue to support annual certification and stockpile stewardship for the continued safety and reliability of the U.S. nuclear stockpile in the absence of underground testing.
  - Continue to improve the “Nuclear Deterrent and WMD Support Program.”
  - Continue enhanced technical support to the Nuclear Weapons Council (NWC) and Joint Advisory Committee (JAC).
  - Complete third edition of the Nuclear Mission Management Plan.
  - Improve the development and presentation of tailored nuclear weapons expertise and sustainment modules through Outreach efforts to the War Colleges, Service Academies and operational units.
  - Support development of the Nuclear Weapons Stockpile Plan and the Requirements & Planning Document.
- Stockpile Operations thrusts:
  - Complete Phase II of Nuclear Management Information System (NUMIS) integration into DIAMONDS.
  - Begin planning advanced/interactive Joint Nuclear Weapons Publication System NWPS in DIAMONDS.
  - Begin redesign of reporting system in DIAMONDS.
  - Continue fielding of DIAMONDS at Navy sites.
  - Continue implementation of the Decision Support Module for DIAMONDS.

FY 2007 Plans

- Nuclear Weapon Surety Thrusts:
  - Continue to conduct modeling and testing to respond to weapon storage facility and weapon system safety requirements and criteria.
  - Continue to improve nuclear storage facility fire suppression capabilities based on Fire Hazard Analysis results and new technology.
  - Continue to improve the evaluation of enduring stockpile weapons in support of the Air Force and Navy.
  - Complete the Sentry forensics database project.
  - Continue analyses of abnormal environment scenarios for nuclear weapons systems.
- Conduct Force-on-Force exercise program using the Mighty Guardian series and based on lessons learned and new technology.
- Conduct exploratory research on physical security equipment and technology designed to enhance the protection of the nuclear stockpile.
- Stockpile Sustainment Program thrusts:
  - Continue to support annual certification and stockpile stewardship for the continued safety and reliability of the U.S. nuclear stockpile in the absence of underground testing.
  - Continue to improve the "Nuclear Deterrent and WMD Support Program."
  - Continue enhanced technical support to the Nuclear Weapons Council (NWC) and Joint Advisory Committee (JAC).
  - Improve the development and presentation of tailored nuclear weapons expertise and sustainment modules through Outreach efforts to the War Colleges, Service Academies and operational units.
  - Support development of the Nuclear Weapons Stockpile Plan and the Requirements & Planning Document.
- Stockpile Operations thrusts:
  - Complete Phase III of Nuclear Management Information System (NUMIS) integration into DIAMONDS.
  - Continue planning and begin preliminary design of advanced/interactive Joint Nuclear Weapons Publication System JNWPS in DIAMONDS.
  - Continue redesign of reporting system in DIAMONDS.
  - Complete fielding of DIAMONDS at remaining Navy sites.
  - Complete Decision Support Module for DIAMONDS.

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007
Combating WMD Support	5.3	7.0	7.0	7.0

Retitled in FY 2005 from Combatant Commands/Forces/Security Support

FY 2004 Accomplishments

- Provided European Theater Nuclear Support Program for in-theater nuclear and WMD support to European Command (U.S.) EUCOM and North Atlantic Treaty Organization (NATO), and Supreme Headquarters Allied Powers Europe (SHAPE).
- Provided Combating WMD war plan support for the Combatant Commands

  - Responded to Combatant Commands requests to address Combating WMD challenges within theater war plans
- Increased support to Strategic Command (STRATCOM):
  - Single Integrated Operational Plan (SIOP) preparation
  - Global Strike plan preparation
  - Development of integrated effects models
  - Direct nuclear planning support to regional Combatant Commands
- Provided nuclear policy support and the assessment of the full range of nuclear/WMD issues for DoD components.
- Continued to examine and evaluate the future impacts of technology on political/military/economical trends-focused on WMD/Consequence Management (CM)/Nuclear proliferation.

FY 2005 Plans

- Enhance European Theater Nuclear Support Program to provide in-theater nuclear and WMD support to EUCOM, NATO, and SHAPE
- Provide Combating WMD policy support to Joint Staff and OSD over the full range of nuclear/WMD issues
  - Complete National Military Strategy for Combating WMD
- Provide Combating WMD war plan support for the Combatant Commands
  - Respond to Combatant Commands requests to address Combating WMD challenges within theater war plans
  - Support Contingency Planning Guidance taskings
  - Support Comprehensive Combating WMD mission
- Increase support to STRATCOM:
  - Integrate the SIOP and Global Strike plan
  - Develop integrated effects models
  - Direct nuclear planning support to regional Combatant Commands
- Provide nuclear policy support and the assessment of the full range of nuclear/WMD issues for DoD components.
- Continue to examine and evaluate the future impacts of technology on political/military/economical trends-focused on WMD/Consequence Management (CM)/Nuclear proliferation with a focus on the world after the War on Terrorism

FY 2006 Plans

- Continue to enhance the European Theater Nuclear Support Program to provide in-theater nuclear and WMD support to EUCOM, NATO, and SHAPE
- Provide Combating WMD policy support to Joint Staff and OSD over the full range of nuclear/WMD issues
  - Complete National Military Strategy for Combating WMD
- Provide Combating WMD war plan support for the Combatant Commands
  - Respond to Combatant Commands requests to address Combating WMD challenges within theater war plans

- Support Contingency Planning Guidance taskings
- Support Comprehensive Combating WMD mission

- Increase support to STRATCOM:
  - Integrate Combating WMD mission
  - Develop integrated effects models
  - Direct nuclear planning support to regional Combatant Commands
- Provide nuclear policy support and the assessment of the full range of nuclear/WMD issues for DoD components.
- Continue to examine and evaluate the future impacts of technology on political/military/economical trends-focused on WMD/Consequence Management (CM)/Nuclear proliferation with a focus on the world after the War on Terrorism

FY 2007 Plans

- Continue to enhance the European Theater Nuclear Support Program to provide in-theater nuclear and WMD support to EUCOM, NATO, and SHAPE
- Provide Combating WMD war plan support for the Combatant Commands
  - Respond to Combatant Commands requests to address Combating WMD challenges within theater war plans
  - Support Contingency Planning Guidance taskings
  - Support Comprehensive Combating WMD mission
- Increase support to STRATCOM:
  - Integrate Combating WMD mission
  - Develop integrated effects models
  - Direct nuclear planning support to regional Combatant Commands
- Provide nuclear policy support and the assessment of the full range of nuclear/WMD issues for DoD components.
- Continue to examine and evaluate the future impacts of technology on political/military/economical trends-focused on WMD/Consequence Management (CM)/Nuclear proliferation with a focus on the world after the War on Terrorism.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: Approximately $6.1M of FY 2004 funding has been obligated with Science Applications International Corporation with locations in California and Virginia, and approximately $6.1M of FY 2004 funding has been obligated with Northrop Grumman in Virginia. Funding obligated with these companies directly supports Project BG – Nuclear Operations.

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project BH – System Survivability	84.9	85.9	77.1	83.3	85.6	88.5	90.7	93.0

A. Mission Description and Budget Item Justification:

- These activities directly reflect the National Military Strategy, support the provisions of Joint Vision 2020 and the Nuclear Posture Review, and are directed by the Joint Chiefs of Staff (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 and forces; 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. This project encompasses activities divided into four business areas as described below: Radiation Hardened Microelectronics, Simulation Technology, Assessment Technology and Radiation Detection Technologies, formerly known as Human Survivability.

- **Radiation Hardened Microelectronics.** The Radiation Hardened Microelectronics area responds to DoD space and missile system requirements for radiation-hardened microelectronics and photonics technology to support mission needs. The non-availability of this technology would adversely impact system survivability, performance, weight and cost. This program develops and demonstrates radiation-hard, high performance prototype microelectronics to support the availability of radiation-hardened microelectronics and photonics for DoD missions in both private sector and government organizations. This is achieved by two complementary components: a core program that develops and demonstrates enabling technologies; and an Accelerated Technology Development Program whose objective is to establish the capability to fabricate radiation hardened 0.15-micron Complementary Metal Oxide Semiconductor (CMOS) technology at two domestic radiation hardened semiconductor suppliers, British Aerospace Engineering (BAE) SYSTEMS and Honeywell Defense Space and Electronics Systems (DSES).

- **Simulation Technology.** The Simulation Technology area develops technology to enable the simulation of components of the environments from a nuclear burst, for testing of military systems. Since the underground testing (UGT) moratorium, simulators have provided the only remaining experimental test beds for the development and validation of radiation-hardened DoD systems. Although the intensity and fidelity of these simulators do not match that of the UGT testbed, this program provides and maintains unique DoD nuclear weapon effects test facilities and through focused research develops the enabling technologies that closely approach the stressing environment of a nuclear burst. The simulators are used by the Defense Agencies, the Services and other federal departments (such as DOE) and allies to evaluate the impact of hostile environments on military systems that support missions in the air,

on land, at sea, or in space. As military systems and concepts improve, especially in the area of electronics, parallel improvements in simulation technology are required. Thus 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 support equipment, debris shields, and numerical models and computer codes for radiation sources and pulsed power components and test beds); develops testbeds and response databases for synergistic prompt radiation and thermal effects for the defeat of biological agents; and develops concepts, plans, and risk reduction strategies for affordable next-generation radiation simulators with substantially improved intensity and fidelity.

- **Assessments Technology.** The Assessments Technology area develops design protocols, hardware, and software that enhance the ability of mission essential systems to survive a nuclear attack and to operate after a nuclear attack. It provides products and assistance to system program offices, the services, combatant commanders and the National Command Authority. It defines the engineering standards for hardening, develops testable design protocols, and develops effective nuclear threat mitigation technologies. To test system effectiveness, the program develops affordable and user-friendly technologies that predict and stimulate nuclear effects on military systems, particularly the impact of intense electromagnetic radiation that can destroy or severely degrade sensors and communications equipment. Because of the emergence of non-nuclear weapons that present a similar electromagnetic threat (high-power microwave or ultrawideband weapons), this area includes a parallel development effort to predict and mitigate their effects. This area develops tools that assess the vulnerabilities of mission essential infrastructure, nuclear missile interceptors, strategic radar systems, strategic command and control networks, computers, sensors, satellites, and other critical warfighting systems. It also provides cost-effective solutions for the nuclear hardening and testing of these systems and technical assistance for their implementation. Additionally, the Assessments Technology area develops the science and technology base for predictive nuclear effects assessments and maintains a core expertise in nuclear weapons testing methodologies.

- **Detection Technologies.** This area rapidly develops or converts radiation sensor, dosimetry and biological technologies for integration into real-time, forward-deployed tools for characterization of radiologically hazardous environments impacting warfighter mission and command and control decisions. Its products protect the health and welfare of U.S. service personnel and allied forces by monitoring and improving human survivability in the conduct of operations on the radiological/WMD battlefield or in areas of suspected WMD development or release. Lessons learned are applied from the Nuclear Test Personnel Review Program (O&M-funded) to allow warfighters and peacekeepers to quantify and 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 WMD and soldier effectiveness on NBC battlefields; providing performance and cost analyses to support the Defense Acquisition Board; and facilitating 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 2004	FY 2005	FY 2006	FY 2007
Radiation Hardened Microelectronics	57.4	59.4	36.5	36.8

FY 2004 Accomplishments

- Completed test structure demonstration of radiation-hard 0.15-micron technology for the accelerated programs at British Aerospace Engineering (BAE) SYSTEMS and Honeywell
- Completed circuit qualification of radiation-hard 0.25-micron technology for the accelerated programs at British Aerospace Engineering (BAE) SYSTEMS and Honeywell.
- Completed testing of Honeywell 16 million bit multi-chip module.
- Completed testing of prototype 64-kilobit field programmable gate array technology.
- Demonstrate radiation hardened embedded giant magneto resistive non-volatile random access memory technology.
- Completed demonstration of a prototype radiation-hard mixed-signal 0.35-micron deep submicron technology.
- Demonstrated analog and mixed-signal electronic design automation.
- Continued initial development of a 0.15-micron radiation-hard, CMOS fabrication process for the accelerated program.

FY 2005 Plans

- Demonstrate radiation-hard 0.15-micron bulk product demonstration vehicle.
- Demonstrate 0.15-micron CMOS bulk and silicon-on-insulator (SOI) digital technology for DoD space and missile systems.
- Demonstrate ultra-deep submicron rad-hard EDA development system.
- Demonstrate Single-Event-Effects (SEE) mitigation methods for < 130nm CMOS technology.
- Demonstrate radiation-hard hardened-by-design 130nm CMOS technology.
- Demonstrate radiation-hard ultra-deep sub micron compiler for 130nm/150nm bulk and SOI CMOS technologies.
- Demonstrate analog, mixed signal radiation-hard system-on-a-chip (SOC).
- Demonstrate radiation-hard Read Out Integrated Circuit (ROIC) semiconductor technology.
- Demonstrate 4M gate Application Specific Integrated Circuit (ASIC).

- **FY 2006 Plans**
- Demonstrate 0.15-micron silicon-on-insulator and bulk ASIC and memory devices.
- Develop design automation tools to support rad-hard systems-on-a-chip technology.
- Demonstrate 0.15-micron rad hard mixed signal chip with digital, analog and memory.
- Demonstrate single-event-effects mitigation methods for 0.15-micron technology.

- Demonstrate rad hard ROIC device.
- Demonstrate rad hard 250K gate fuse-field programmable gate array using 0.15-micron technology.
- Develop rad-hard 0.15-micron cell library and structured ASIC design flow.

FY 2007 Plans

- Demonstrate prototype rad hard 16 million bit static random access memory (SRAM) and 8 million-gate array.
- Qualify photonics radiation characterization system
- Demonstrate rad hard 16 million bit non-volatile memory technology
- Demonstrate integrated rad hard SiGe heterojunction bipolar technology with < 0.15-micron digital technology
- Demonstrate rad hard non-volatile and field re-programmable gate array technology
- Develop rad hard SOC for communication and sensor system applications
- Develop rad hard design rules for digital CMOS 0.13-micron technology advanced memories and gate arrays

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007
Simulation Technology	11.5	12.2	22.6	26.3

FY 2004 Accomplishments

- Demonstrated increased cold x-ray yield on DTRA simulators.
- Continued NWE test customer support at the West Coast Facility (WCF).
- Demonstrated 60% increase in warm x-ray dose rate at the West Coast Facility (WCF).
- Supported Sandia Defense Programs strategic component response model validation testing.
- Initiated new and innovative design to enable major improvements in warm x-ray sources.
- Supported Army NWE tests of the Stryker vehicle at the Large Blast and Thermal Simulator (LBTS)

FY 2005 Plans

- Advance the cold x-ray source and debris mitigation system (DMS) technology readiness levels to enable NWE model validation and test support.
- Continue warm x-ray source technology development.
- Modernize the obsolete data acquisition system instrumentation at the WCF.
- Continue NWE test customer support and agent defeat database development at the WCF.
- Integrate simulator validation and verification efforts for new code development

- Begin development of a debris electron simulation capability that will be used to analyze space systems against natural and nuclear weapon induced system charging phenomena both as a unique environment and in combination with other nuclear environments where synergistic effects are suspected.
- Continue terrorist threat assessments of civilian structures on LBTS.
- Conduct air blast testing of Army vehicles on LBTS.

FY 2006 Plans

- Optimize the cold x-ray source and debris mitigation system DMS performance and analytical capability for producing cold x-rays on existing DoD machines.
- Develop advanced opening switch technology to reduce x-ray pulse widths and control pulse.
- Demonstrate and characterize a debris electron source test capability
- Develop an experimental combined environment capability at the WCF to investigate which discrete environments must be provided in combination to validate and verify hardness of military systems.
- Demonstrate two-times faster rise-time hot x-ray and gamma ray capabilities.
- Begin initial low level development of a flyer plate capability (strategic level cold x-ray simulation) on the Light Initiated High Explosive (LIHE) Simulator in collaboration with SNL.

FY 2007 Plans

- Demonstrate cold x-ray source and DMS performance on DOE machines. End-state is a scalable capability that can be used on the much larger DOE machines to validate DOE and DoD models and to facilitate subsystem and system level tests.
- Demonstrate and characterize advanced opening switch technology to reduce x-ray pulse widths and control pulse.
- Implement debris electron source test capability in support of missile defense and satellite programs
- Implement lab-scale combined environment test at the WCF for verifying hardness of military systems.
- Apply fast rise-time hot x-ray and gamma ray capabilities to electronics validation.
- Continue development of a Light Initiated High Explosive LIHE flyer plate capability in collaboration with SNL.

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007
Assessments Technology	15.0	13.2	16.9	19.1

FY 2004 Accomplishments

- Investigated critical infrastructure interdependency and cascading effects of WMD/advanced electromagnetic threats using Next Generation Testbed (Mission Degradation Analysis System (MIDAS).

- Designed and verified an EMP hardened fiber optic network using operational commercial telecommunications facilities for the White House Communication Agency.
- Continued communication/radar atmospheric effects participation through operational assessments.
- Continued development of a Visible Display Simulator to support Spaced Based Infrared Systems (SBIRS) Low testing and other future customers.
- Developed nuclear environment software modules for integration with hardware-in-the-loop facilities.
- Continued to provide support to Missile Defense Agency (MDA) Ground-based Midcourse Defense (GMD) for facility EMP hardening.
- Developed/Completed radiation hardening toolkits (e.g., Thermostructural Response Toolkit) for the system designer and warfighter.
- Continued NWE assessments for Missile Defense Systems and architectures.
- Continued to provide subject matter expert support of Congressional Commission on Electromagnetic Pulse.
- Wideband Channel Simulator (WCS) Certification completed.
- Designed and verified an EMP-hardened fiber optic network using operational commercial telecommunications facilities for the White House Communications Agency.
- Completed Thermo-Structural Response Toolkit (TSRTk) upgrade to incorporate gun test, thin film, and generated response models
- Convened panel to determine requirements for combined environments testing of MDA ground- and space-based assets.

FY 2005 Plans

- Begin X-Band Radar Nuclear Effects Clutter Simulator (RNECS) development.
- Continue to provide support to Missile Defense Agency (MDA) Ground-based Midcourse Defense (GMD) for facility EMP hardening.
- Continue to provide innovative hardening solutions to the National Military Command Center (NMCC) for facility EMP hardening.
- Ensure integrated design environment (IDE) incorporates testable hardware toolkit (THT) and thermo-structural response (TSR) toolkit with high performance computing interface.
- Update/refine Operability Assessment Tool for Systems (OATS) to assess network capability and reliability. Continue operability assessment of the Ground-based Midcourse Defense (GMD) Communication Network (GCN) and DISA's emergency action message system using OATS.
- Improve and develop electromagnetic pulse assessment of tools for combatant commands.
- Develop improved upgrades for the nuclear dynamic display simulator (NODDS).
- Identify future needs for Testable Hardware Toolkit (THTk) to support EKV hardness assessments.
- Begin development of the Nuclear Capabilities Server to provide nuclear weapon effects modeling and simulation capabilities to DoD and other customers.
- Begin transitioning nuclear weapon effects modeling and simulation stand alone codes into the Nuclear Capabilities Server.
- Begin developing the nuclear weapon effects verification, validation, and accreditation methodology and process for implementation of codes in the Nuclear Capabilities Server.

FY 2006 Plans

- Develop an automated, remote capability to perform EMP hardness maintenance/surveillance for MDA Ground-based Midcourse Defense (GMD) Communications Networks.
- Continue to provide HEMP hardening assessments of critical DoD assets supporting the Joint Staff, DISA, and MDA.
- Develop affordable test techniques to verify EMP protection against the magneto-hydrodynamic long pulse for fixed facilities.
- Continue to improve X-band, visible, and multispectral optical simulators.
- Begin improved electromagnetic environments detector
- Improve EMP lethality prediction models based upon program development in FY 2005 focusing on verifying and validating data and methods.
- Update/refine assess network capability and reliability modeling for nuclear weapon effect analysis of message traffic.
- Improve and develop electromagnetic pulse assessment tools for combatant commands.
- Implement the Nuclear Capabilities Server.
- Continue transitioning modeling and simulation stand alone codes into the Nuclear Capabilities Server.
- Finalize nuclear weapon effects verification, validation, and accreditation methodology and process for implementation of codes in the Nuclear Capabilities Server.
- Support/conduct Ballistic Missile Defense System nuclear weapon effect survivability assessments to assist in verifying BMDS systems can survive and operate in nuclear weapon effect environments.

FY 2007 Plans

- Continue to develop an automated, remote capability to perform EMP hardness maintenance/surveillance for MDA Ground-based Midcourse Defense (GMD) Communications Networks.
- Continue to provide HEMP hardening assessments of critical DoD assets supporting the Joint Staff, DISA, and MDA.
- Continue to develop affordable test techniques to verify EMP protection against the magneto-hydrodynamic long pulse for fixed facilities.
- Continue to improve X-band, visible, and multi-spectral optical simulators.
- Deliver an improved electromagnetic environments detector
- Improve EMP lethality prediction models based upon program development in FY 2005 focusing on verifying and validating data and methods.
- Update/refine nuclear weapon effects modeling and simulation capabilities within and for the Nuclear Capabilities Server.
- Improve and develop electromagnetic pulse assessment tools for combatant commands.

- Support/conduct Ballistic Missile Defense System nuclear weapon effect survivability assessments to assist in verifying BMDS systems can survive and operate in nuclear weapon effect environments.

Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007
Detection Technologies	1.0	1.1	1.1	1.1

* Retitled to Detection Technologies in FY 2005 (Previously titled: Human Survivability).

FY 2004 Accomplishments
- Completed unmanned aerial vehicle (UAV) detector integration activity.
- Continued Electron Paramagnetic Resonance (EPR) development.
- Initiated work on a biodosimeter to assume total dose.
- Initiated work on individual dosimeter integrated into DoD Common Access Card.
- Initiated aerial radiation hazard mapping system development

FY 2005 Plans
- Continue Electron Paramagnetic Resonance (EPR) development
- Continue biodosimeter to assume total dose development.
- Continue individual dosimeter integrated into DoD Common Access Card development.
- Initiate low cost individual dosimeter development.
- Continue aerial radiation hazard mapping system development

FY 2006 Plans
- Complete Electron Paramagnetic Resonance (EPR) development
- Complete biodosimeter to assume total dose development.
- Complete individual dosimeter integrated into DoD Common Access Card development.
- Continue low cost individual dosimeter development.
- Complete aerial radiation hazard mapping system development
- Initiate an Advanced Concept and Technology Demonstration (ACTD) to provide an Airborne Radiological Detection, Identification and Mapping System (ARDIMS).

FY 2007 Plans

- Initiate Mass Casualty ACTD to provide an incident response dosimetry evaluation.
- Initiate Common Access Card dosimeter spiral development.
- Continue low cost individual dosimeter development.
- Continue an ACTD to provide an Airborne Radiological Detection, Identification and Mapping System (ARDIMS).

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Major Performers: Approximately $19M of FY 2004 funding has been obligated with British Aerospace Engineering (BAE) Systems located in Virginia, and approximately $20M of FY 2004 funding has been obligated with Honeywell Inc. located in New Hampshire. Funding obligated is in direct support of Project BH – System Survivability.