RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Advanced Technology Development - BA3				R-1 ITEM NOMENCLATURE Arms Control Technology; 0603711BR				
COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
Total 0603711BR Cost	66.4	62.9	37.6	41.7	41.7	41.9	46.5	Continuing
Project BB – Small Business Innovation Research (SBIR)	2.0	0.8	1.1	1.1	1.1	1.1	1.1	Continuing
Project BI – Arms Control Technology*	64.4	62.1	36.5	40.6	40.6	40.8	45.4	Continuing

*FY 2001 DERF Supplemental provided $17.8M related to this project. Funding is not reflected in this table.

A. **Mission Description and Budget Item Justification** - This program element (PE) provides research, development, test, and evaluation (RDT&E) to meet technology requirements in support of implementation, compliance, monitoring and inspection for existing and emerging arms control treaties and agreements. Efforts under this PE also support international peacekeeping and nonproliferation objectives. Current and emerging technologies are assessed to provide the basis for research and development investment decisions, evaluate existing programs, and provide the technical input required to make compliance judgments and support U.S. Arms Control policy formulation and negotiating teams. Selected technologies are developed and demonstrated to support confidence building measures and nonproliferation initiatives to ensure that capabilities to monitor, comply with, and implement treaties and agreements are available when required.

Specific products include equipment and procedures for data exchanges, on-site and aerial inspections and monitoring, and off-site analysis required to meet treaty specifications and implement confidence building measures. Where applicable, RDT&E to

meet requirements in one area is applied to fulfill requirements in other areas to maximize return on investment.

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B. Program Change Summary

	FY 2001	FY 2002	FY 2003
FY 2001 President's Budget Request (Feb 2000)	52.9	50.0	49.6
FY 2002 Amended President's Budget (June 2001)	67.4	52.5	53.2
FY 2003 President's Budget Request (Feb 2002)	66.4	62.9	37.6

Change Summary Explanation:

Changes in FY 2001 from the FY 2001 President's Budget Request (Feb 2000) and FY 2002 Amended President's Budget Request (June 2001) are attributable to Congressional adds with Congressional emphasis in the areas of nuclear detection analysis and basic and applied research to support operational nuclear test verification systems. Changes in FY 2002 from the FY 2002 Amended President's Budget (June 2001) and the FY 2003 President's Budget Request (Feb 2002) are due to Congressional adds for Industry Based System Development (+$4.2M), Center for Monitoring Research (+$2.8M), and Nuclear Test Monitoring (+$3.5M), as well as a general congressional reduction in the amount of $.1M. Changes in FY 2003 from the FY 2002 Amended President's Budget (June 2001) are a result of a Department reduction to the Arms Control Program in the amount of $10M, as well as DTRA's realignment of $5.5M to support the DTRA Radiation Hardening Microelectronics program. In addition, $.1M reduction is attributed to an inflation reduction.

Project BB – Small Business Innovation Research (SBIR) - 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.

FY 2001 Accomplishments

Small Business Innovation Research ($1,994)

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

Executed Agency-approved SBIRs.

FY 2002 Plans

Small Business Innovation Research ($831K)

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

Execute Agency-approved SBIRs.

FY 2003 Plans

Small Business Innovation Research ($1,128K)

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

Execute Agency-approved SBIRs.

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Project BI - Arms Control Technology – This project provides an integrated and comprehensive approach to meeting the technology requirements associated with achieving national defense nonproliferation and arms control objectives. The major activities consist of the following:

Develop procedures and equipment that will enable the USG to effectively exercise treaty inspection rights, monitor compliance, and accomplish reporting associated with current and projected treaty requirements in the most non-intrusive and cost-effective manner. Objectives include achieving more effective methods of measuring characteristic Treaty-Accountable Item signatures (e.g. for non-deployed missiles and warheads in all life-cycle phases, to include conversion and/or elimination) utilizing technologies based on physical principles such as nuclear radiation detection, acoustics, or chemical identification and providing monitoring/inspection capabilities to reduce the overall cost and increase the flexibility of U.S. inspectors.

Develop technology to provide information collection, processing and dissemination capabilities required for compliance assessments and meet notification and reporting requirements associated with evolving treaties and agreements (e.g., new rules for counting strategic forces).

Develop technology to support revised implementation and compliance requirements resulting from the decisions of the Conventional Armed Forces in Europe (CFE) Joint Consultative Group; the Organization for Security and Cooperation in Europe (OSCE)Forum for Security Cooperation; North Atlantic Treaty Organization (NATO) Verification

Coordinating Committee and the High Level Task Force; the Conference on Disarmament; the Multilateral Working Group on Arms Control and Regional Security; the Wassenaar Arrangement; and the Open Skies Consultative Commission (OSCC).

Perform technology assessments and provide technical input to support development of innovative agreements addressing arms control issues in new topical areas and/or specific geographical regions.

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Project BI - Arms Control Technology (cont'd)–

Develop and validate technologies that ensure on-site sampling and analysis is effective and that DoD equities are protected during the course of all inspections/visits conducted under the convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction (CWC), and the protocol under the Biological Weapons Convention (BWC).

Develop technologies to synergistically support international peacekeeping efforts and other nonproliferation initiatives.

Perform technology assessments and provide technical expertise in areas relevant to the production and detection of biological agents to support DoD and U.S. policy makers and negotiators in determining the impact of proposed BWC protocol alternatives methodologies, declaration requirements and transparency measures on DoD equities, and in representing the U.S. during BWC Ad Hoc Group meetings.

Develop the nuclear test monitoring capability necessary to support current and emerging nuclear world-wide non-proliferation requirements as well as operational monitoring improvements for national security objectives.

Project BI – Arms Control Technology (cont'd) -
FY 2001 Accomplishments ($64,393K)

Assessed potential utility of non-visual ballistic missile verification methods and identified follow-on R&D objectives.

Continued a Space Arms Control Technology Assessment to support DoD analysis and evaluation of potential space arms control measures and the need for verification technology developments.

Identified the technological impact of potential multilateral strategic verification regimes.

Executed a Strategic Arms Reduction Treaty (START) follow-on treaties monitoring regime demonstration at the Pantex Plant for representatives from the Russian Federation.

Conducted a demonstration at a DoD base to evaluate the operational impact of nuclear warhead monitoring at that location.

Initiated a follow-on effort for the cooperative development of strategic arms control technologies with the Russian Federation.

Continued efforts to investigate applications of ultrasonic interferometry technique (originally developed for Chemical Weapons Convention use) to strategic arms control monitoring.
Continued Open Skies Management and Planning System (OSMAPS) life-cycle upgrade assessment.
Assessed various technology options to support the U.S. arms control delegations to NATO, OSCC, the Joint Consultative Group, the Forum for Security Cooperation, the APL, SA/LW, Convention on Conventional Weapons (CCW), Open Skies and regional arms control negotiations.
Assessed Synthetic Aperture Radar (SAR) system performance and provided lifecycle upgrade/replacement recommendations.
Provided RDT&E support for acquisition of upgraded and/or replacement of optical cameras, video camera and Infrared Lens Scanner (IRLS) for the Open Skies Aircraft.
Assessed sensor technology for stand off Anti-Personnel landmine (APL) detection and mapping
Completed Latin America Regional Area Technical Assessment.
Provided technical assessments for Open Skies, APL, CCW and SA/LW treaties/negotiations.

Project BI – Arms Control Technology (cont'd) -
FY 2001 Accomplishments cont'd

Completed situational influence modeling support for regional security assessment and workshops.
Defined User and System software requirements for next generation of CWC-related analytical equipment. Assessed new advances in rapid chemical analytical technologies and evaluated potential applications of new sensors to CWC-related sample analysis. Validated mass spectra, IR spectra, Nuclear Magnetic Resonance (NMR) spectra and Gas Chromatograph (GC) retention indices for inclusion in the Organization for the Prohibition of Chemical Weapons (OPCW) central analytical database.
Provided technical support to Office of the Secretary of Defense (Policy) (OSD(P)) in preparation for Review Conferences. Assessed impact of CWC and proposed BWC inspection activities on DoD equities. Evaluated implications and consequences

for DoD of potential changes to the CWC.
Completed market surveys and assessments on BW detection and related technologies to include immunological and genetic assays, polymerase chain reaction (PCR) analysis, Mass Spectrometer (MS) and genomic sequencing.
Completed version 3.0 of the Gas Chromatograph/Mass Spectrometer (GC/MS) sample preparation method.
Continued development of follow-on non-destructive evaluation (NDE) capabilities for standoff chemical munition classification and identification. Exceeded established acoustic goals.
Completed initial prototype development and initiated field testing of Advanced NDE acoustic CW/BW munitions characterization system.
Completed initial prototype development of mini-Portable Isotopic Neutron Spectroscopy (PINS) NDE system including technical evaluation of several electrical neutron generators.
Initiated technical evaluation of conductive polymer, metal oxide and Metal-Insulator-Metal-Ensemble CW sensors.
Continued development of cost effective computerized, rapidly executing techniques and algorithms to detect, locate, and identify seismic, hydroacoustic, infrasound, and radionuclide signals from operational sensor systems.

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Project BI – Arms Control Technology (cont'd) -
FY 2001 Accomplishments cont'd

Continued the industry-based development of nuclear detection sensors and analysis technology in compliance with Congressional emphasis.
Completed upgrade, documentation, operational test and evaluation, and mock certification of the primary seismic stations at Lajitas, Texas and Pinedale, Wyoming.
Completed documentation, operational test and evaluation, and mock certification of the infrasound station at Kona, HI.
Completed installation, documentation, operational test and evaluation, and mock certification of the infrasound stations at Windless Bight, Antarctica and Pinon

Flat, CA.
Initiated installation and began preliminary operations at the infrasound station at Newport, WA.
Began installation of the infrasound station at Fairbanks, AK.
Continued upgrade of data acquisition and satellite communications systems at auxiliary seismic stations.
Installed and began testing the first engineering prototype Automated Radioxenon Sampler/Analyzer (ARSA) at the Charlottesville, VA radionuclide station.
Upgraded three of the Radionuclide Aerosol Sampler/Analyzers (RASA) already on stations.
Continued development of procedures for sample handling and analysis at the radionuclide laboratory at the Environmental Measurements Laboratory in NY, NY.
Developed and completed delivery of an upgrade to the Release 3 software for the International Data Center (IDC) in support of Nuclear Event Monitoring.
Initiated development of the next generation of treaty support information management capabilities under the Arms Control Information and Notification Program, using state-of-the-art technologies and adhering to DoD international standards.
Completed development of VERITY Treaty Limited Equipment (TLE) Search System and delivered final documentation and source code.

Project BI – Arms Control Technology (cont'd)

FY 2002 Plans ($62,078K)

Develop prototype computer based training for CFE Treaty inspection/escort training.
Provide technical negotiation support for START follow-on treaties or agreements.
Continue Joint DoD/DOE collaboration on the development of technologies that could be used in any potential warhead accountancy regime.

Initiate prototype development of selected non-visual methods of verifying ballistic missiles.
Continue cooperative development of strategic arms control technologies with the Russian Federation and demonstrate a potential warhead monitoring regime.
Test and evaluate mini-neutron spectroscopy using neutron generator.
Provide technical support (to include quick turn around and longer term analyses) to the U.S. arms control delegations to the NATO, OSCC, the Joint Consultative Group, the Forum for Security Cooperation, and other negotiation and DoD analysis and policy formulation activities.
Continue Open Skies sensor performance evaluations and accomplish RDT&E to support acquisition of Synthetic Aperture Radar (SAR), optical and video cameras, and Infrared Line Scanner (IRLS) equipment for Open Skies aircraft.
Initiate the Middle East Aerial/Aerospace Monitoring Technologies Assessment for use in regional arms control treaty verification regimes.
Conduct assessments of technologies to support current and emerging conventional arms control negotiations.
Initiate Data Preparation Facility (DPF) enhancements to meet Open Skies operational requirements.
Assess requirements for a Data Annotation, Recording and Mapping System (DARMS) trainer to support Open Skies operators.

Project BI - Arms Control Technology (cont'd) –
FY 2002 Plans (cont'd) –

Initiate development of OSMAPS life-cycle upgrades and conduct required Independent Verification & Validation (IV&V) tests.
Evaluate mass spectrometry technologies for detection of novel chemical agents, bio-

logical molecules and organisms.
Establish sample preparation and analytical methods for generating standardized mass spectra for biological threat agents.
Conduct technical assessments of technologies for implementation of alternative BWC protocols.
Initiate development of sample preparation methods for alternative sample matrices to include vegetation and biomedical materials.
Initiate chemical characterization and environmental transformation product study on non-traditional agents.
Initiate development of MAGIChip and Electronic Taste chip technologies for BW sample screening.
Develop miniaturized & low powered instruments for follow-on technologies for advanced screening and determinative analysis of chemical and biological samples.
Validate polymerized enzyme foam wipe/swipe screening system for CW agents.
Continue research and development to improve understanding of source phenomenology and propagation for nuclear events near detection threshold and enhance detection, location, screening, and identification of underground, oceanic, and atmospheric events through a peer-reviewed program of basic research.
Assess CFE treaty technical needs based on historical performance of inspections to support CFE Review Conference (REVCON).
Continue development of the next generation of treaty support information management capabilities under the Arms Control Information and Notification Program, using state-of-the-art technologies and adhering to DoD international standards.
Continue prototype development of selected non-visual methods of verifying ballistic missiles.

Project BI - Arms Control Technology (cont'd) – FY 2003 Plans ($36,518K)

Continue cooperative development of strategic arms control technologies with the

Russian Federation, and conduct a second-generation demonstration at a DoD Base to evaluate the operational impact of nuclear warhead monitoring.
Continue to test and evaluate mini-neutron spectroscopy using neutron generator.
Develop and demonstrate an acoustic Tamper Indicating Device (TID).
Continue development of a Neutron Activation foil tag.
Continue development of a portable handheld, room temperature radiation detection and integrated radiation measurement system.
Provide technical support (to include quick turn around and longer term analyses) to the U.S. arms control delegations to the NATO, OSCC, the Joint Consultative Group, the Forum for Security Cooperation, and other negotiation and DoD analysis and Policy formulation activities.
Continue Open Skies sensor performance evaluations and provide acquisition RDT&E support for SAR, optical and video cameras, and IRLS.
Continue assessment of the Middle East Aerial/Overhead verification and confidence building for use in multiple arms control treaty verification regimes.
Conduct assessments of technologies to support current and emerging conventional arms control negotiations.
Initiate development of computer based training and simulation to support CWC escort operations at US facilities.
Continue development of OSMAPS life-cycle upgrades and conduct required IV&V.
Investigate sample screening, preparation, and determinative analysis techniques for CWC and BWC-related analyses.
Complete advanced development of standoff non-destructive evaluation systems to include demonstration of 10 meter standoff range.
Complete development of real-time polymerase chain reaction(PCR) primers and probes for identification of BWC Annex A bacteria and viruses.

Project BI - Arms Control Technology (cont'd) –

FY 2003 Plans (cont'd) -

Validate MAGIChip DNA microarray and Electronic Taste Chip immunological sensor for identification of high priority BW agents and toxins.

Expand Long Path Optical Sensor System (LPOSS) CW sample screening instrumentation and test parameters to compounds other than nerve agents.

Expand non-traditional threat agents fate program to include synthesis of analytes.

Conduct research and engage in advanced sensor RDT&E to meet US next-generation requirements for Weapons of Mass Destruction (WMD) monitoring and nuclear event verification.

Continue research and development to improve understanding of source phenomenology and propagation for nuclear events near detection threshold and enhance detection, location, screening, and identification of underground oceanic, and atmospheric events through a peer-reviewed program of basic research.

Continue development of the next generation of treaty support information management capabilities under the Arms Control Information and Notification Program, using state-of-the-art technologies and adhering to DoD international standards.

Continue IV&V tests of information processing systems.