(White Book)

Defense Threat Reduction and Treaty Compliance Agency
FY 1999
Amended Budget Estimates

Program Document

Research, Development, Test and Evaluation, Defense-Wide

(Supports Congressional Amended Budget Estimates)
February 1998

Budget Justification for Program Elements (PE) of the Defense Threat Reduction and Treaty Compliance Agency Research and Development Program

FY 1999 Amended Budget Estimates

February 1998

This document has been prepared to provide summary information on the Defense Threat Reduction and Treaty Compliance Agency, Research, Development, Test and Evaluation (RDT&E) Program. The R2 exhibits provide narrative information on all FY 1999 non Special Access RDT&E Program Elements and projects.

The Quadrennial Defense Review (QDR) examined the national security threats, risks, and opportunities facing the United States out to 2015. Based on the QDR analysis, the Department of Defense designed a strategy to implement the defense requirements of the President's National Security Strategy for the New Century. The SecDef white paper, "Defense Reform Initiative (DRI)--The Business Strategy for Defense in the 21st Century" dated November 1997, announced a series of reforms necessary to carry out that defense strategy. Central to the reform effort is the reorganization of the Office of the Secretary of Defense (OSD) and the streamlining of the Defense Agencies. The DRI directed the establishment of the Defense Threat Reduction and Treaty Compliance Agency (DTR&TCA) to be formed by consolidating the Defense Special Weapons Agency (DSWS), On-Site Inspection Agency (OSIA), and the Defense Technology Security Administration (DTSA). In addition, several functions from the Office of the Secretary of Defense (OSD) and Washington Headquarters Services (WHS) currently involved in the management of associated programs will transfer to DTR&TCA as well. The DTR&TCA will also carry out programs to counter proliferation and reduce threats posed by weapons of mass destruction and provide nuclear weapon stockpile and related support. Effective 1 October 1998, the DSWA, OSIA, and DTSA components are disestablished and their mission, functions, and funding are transferred to the DTR&TCA. For FY 1999 and out, the DSWA budget submission reflects such disestablishment and transfer of resources to the DTR&TCA.

DEFENSE THREAT REDUCTION AND
TREATY COMPLIANCE AGENCY

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

R-1 LINE ITEM ORDER INDEX

DEFENSE THREAT REDUCTION AND
TREATY COMPLIANCE AGENCY

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

ALPHABETICAL INDEX

DEFENSE THREAT REDUCTION AND
TREATY COMPLIANCE AGENCY

SPECIAL ACCESS PROGRAMS

Program Element/Project, Title

0602715BR/AL, Classified Program

0605128BR/BA, Classified Program

R-2 exhibits are not required for the above projects/programs due to classification.

DEFENSE THREAT REDUCTION AND
TREATY COMPLIANCE AGENCY

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

BUDGET ACTIVITY
($ in Thousands)

(THIS SUMMARY IS UNCLASSIFIED)

	FY 1997	FY 1998	FY 1999
BA 2 Applied Research	0	0	203,598
BA 3 Advanced Technology Development	0	0	133,663
BA 6 RDT&E Management Support	0	0	23,629
Total RDT&E Direct	0	0	360,890
Reimbursements	0	0	20,000
Total Program	0	0	380,890

EXHIBIT R-1

DEFENSE THREAT REDUCTION AND
TREATY COMPLIANCE AGENCY

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

FYDP PROGRAM
($ in Thousands)

(THIS SUMMARY IS UNCLASSIFIED)

		FY 1997	FY 1998	FY 1999
0602715BR	WMD Related Technologies	0	0	203,598
0603160BR	Counterproliferation Support-Adv Dev	0	0	70,611
0603711BR	Verification Technology Demonstration	0	0	63,052
0605128BR	Classified Program	0	0	13,755
0605160BR	Counterproliferation Support	0	0	9,874
	Total RDT&E Direct	0	0	360,890
	Reimbursements	0	0	20,000
	Total Program	0	0	380,890

EXHIBIT R-1

DEFENSE THREAT REDUCTION AND
TREATY COMPLIANCE AGENCY

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

RESEARCH PROGRAMS
($ in Thousands)

(THIS SUMMARY IS UNCLASSIFIED)

	FY 1997	FY 1998	FY 1999
WMD Related Technologies; PE #0602715BR 6.2 Applied Research	0	0	203,598
Counterproliferation Support-Adv Dev; PE #0603160BR 6.3A Advanced Technology Development	0	0	70,611
Verification Technology Demonstration; PE #0603711BR 6.3A Advanced Technology Development	0	0	63,052
Classified Program; PE #0605128BR 6.5 RDT&E Management Support	0	0	13,755
Counterproliferation Support; PE #0605160BR 6.5 RDT&E Management Support	0	0	9,874
Total RDT&E Direct	0	0	360,890
Reimbursements	0	0	20,000
Total Program	0	0	380,890

EXHIBIT R-1

Defense Threat Reduction and Treaty Compliance Agency
Research and Development Project Listing
FY 1999 Amended Budget Estimates
February 1998

Program Element: #0602715BR
Title: WMD Related Technologies

Budget Activity: Applied Research

($ in Thousands)		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003
President's Budget (2/97)		0	0	221,702	222,277	226,500	231,384	236,913
POM Submission		0	0	221,702	221,671	225,784	231,116	236,725
Current Budget Submission		0	0	203,598	206,611	209,655	212,728	215,880
Project	Title							
AB	Test & Simulation Technology	0	0	53,315	52,785	49,730	50,100	50,412
AC	Weapon Systems Lethality	0	0	37,254	37,394	37,500	37,869	38,140
AE	Weapon Safety & Operational Support	0	0	30,772	32,044	35,185	35,505	36,196
AF	Weapon System Operability	0	0	47,785	49,555	52,429	53,347	55,143
AG	Scientific Computations & Information Systems	0	0	20,236	20,536	20,437	20,891	20,396
AI	Hard Target Tunnel Defeat and NTS Sustainment	0	0	11,847	12,532	12,737	12,931	13,428
AL	Classified Program	0	0	2,389	1,765	1,637	2,085	2,165
Total		0	0	203,598	206,611	209,655	212,728	215,880

Defense Threat Reduction and Treaty Compliance Agency
Research and Development Project Listing
FY 1999 Amended Budget Estimates
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Program Element: #0603711BR
Title: Verification Technology Demonstration

Budget Activity: Advanced Technology Development

($ in Thousands)

		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003
President's Budget (2/97)		0	0	50,232	43,838	42,996	43,648	44,493
POM Submission		0	0	50,232	43,838	42,996	43,648	44,493
Current Budget Submission		0	0	63,052	60,435	59,303	55,871	55,472
Project	Title							
CA	Strategic Arms Control Technology	0	0	9,078	9,942	11,076	11,215	11,389
CB	Conventional Arms Control Technology	0	0	8,141	7,832	7,995	8,173	8,273
CC	Chemical Weapons Convention Technology	0	0	10,542	10,620	12,588	12,832	13,181
CD	Nuclear Arms Control Technology	0	0	35,291	32,041	27,644	23,651	22,629
Total		0	0	63,052	60,435	59,303	55,871	55,472

Defense Threat Reduction and Treaty Compliance Agency
Research and Development Project Listing
FY 1999 Amended Budget Estimates
February 1998

Program Element: #0603160BR
Title: Counterproliferation Support-Adv Dev

Budget Activity: Advanced Technology Development

($ in Thousands)

		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003
President's Budget (2/97)		0	0	0	0	0	0	0
POM Submission		0	0	0	0	0	0	0
Current Budget Submission		0	0	70,611	68,110	64,180	65,004	66,280
Project	Title							
P535	SOF Counterproliferation Support	0	0	15,663	18,175	16,658	16,634	16,936
P539	Counterforce	0	0	54,948	49,935	47,522	48,370	49,344
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
Total		0	0	70,611	68,110	64,180	65,004	66,280

Defense Threat Reduction and Treaty Compliance Agency
Research and Development Project Listing
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Program Element: #0605128BR
Title: Classified Program

Budget Activity: RDT&E Management Support

($ in Thousands)

	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003
President's Budget (2/97)	0	0	0	0	0	0	0
POM Submission	0	0	0	0	0	0	0
Current Budget Submission	0	0	13,755	7,834	7,803	7,775	7,747

Project	Title							
BA	Classified Program	0	0	13,755	7,834	7,803	7,775	7,747
Total		0	0	13,755	7,834	7,803	7,775	7,747

Defense Threat Reduction and Treaty Compliance Agency
Research and Development Project Listing
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Program Element: #0605160BR
Title: Counterproliferation Support

Budget Activity: RDT&E Management Support

($ in Thousands)

		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003
President's Budget (2/97)		0	0	0	0	0	0	0
POM Submission		0	0	0	0	0	0	0
Current Budget Submission		0	0	9,874	9,675	10,338	8,529	8,702
Project	Title							
P542	CP Architecture Studies and Mgt/Oversight	0	0	7,862	7,714	8,006	6,178	6,335
P545	Nuclear Matters			2,012	1,961	2,332	2,351	2367
Total		0	0	9,874	9,675	10,338	8,529	8,702

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE February 1998			
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2					R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR			
COST (In Millions)	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
Total 0602715BR Cost	0.0	0.0	203.6	206.6	209.7	212.7	215.9	Continuing
Project AB Test & Simulation Technology	0.0	0.0	53.3	52.8	49.7	50.1	50.4	Continuing
Project AC Weapon Systems Lethality	0.0	0.0	37.3	37.4	37.5	37.9	38.2	Continuing
Project AE Weapon Safety & Operational Support	0.0	0.0	30.8	32.0	35.2	35.5	36.2	Continuing
Project AF Weapon System Operability	0.0	0.0	47.8	49.6	52.4	53.3	55.1	Continuing
Project AG Scientific Computations & Information Systems	0.0	0.0	20.2	20.5	20.5	20.9	20.4	Continuing
Project AI Hard Target Tunnel Defeat and NTS Sustainment	0.0	0.0	11.8	12.5	12.8	12.9	13.4	Continuing
Project AL Classified Program	0.0	0.0	2.4	1.8	1.6	2.1	2.2	Continuing

A. Mission Description and Budget Item Justification

This program develops the technology base needed to support national security issues relevant to nuclear and other advanced weapons and force application technologies. Program initiatives include the development, upgrade, and maintenance of advanced nuclear weapons effects simulators to address weapon systems operability issues; conventional weapon targeting and strike planning tools for regional contingencies; battle damage prediction/assessment of conventional strikes against fixed hardened facilities; and predictive models for dispersion and transport of hazardous particles generated by attacks of Weapons of Mass Destruction (WMD) facilities. These projects also serve to support sustainment of a core nuclear competence in the national industrial base. Efforts encompass:

-Support for national security policy implementation.
-Support to CINCs in nuclear force structure, logistics, operations and stockpile programs.
-Quantitative assessments of nuclear weapons systems with development and maintenance of nuclear weapons system safety databases.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Mission Description and Budget Item Justification (cont'd)

-Development, upgrade, and operation of simulators (radiation, blast, thermal, radio frequency propagation and optical/infrared background effects) to characterize operability of military systems during and after exposure to nuclear disturbed environments.
-Physical and functional characterization of hardened underground structure designs and associated vulnerabilities.
-Determination of nuclear and conventional weapons effectiveness against fixed targets. Emphasis is on targeting technical support, hard target kill criteria, and damage assessment methodologies.
-Utilization of weapons effects information to support development of adaptive targeting methodologies.
-Support of high-performance computing capability to maintain and upgrade the Agency's predictive codes in radiation hydrodynamics, structural dynamics, and electromagnetic propagation supporting nuclear and conventional weapon system lethality, operability, and safety assessments.

The 6.2 programs under this Program Element (0602715BR) are divided into seven projects. It should be noted that information concerning Project AL is classified per DoD Directive 0-5205.7, Para B.2.f.

The November 1997 Defense Reform Initiative (DRI) directed the establishment of a Defense Threat Reduction and Treaty Compliance Agency (DTR&TCA) effective 1 October 1998. As a result of the DRI, resources for FY 1999 and out which were previously addressed in Defense Special Weapons Agency Program Element (PE) 0602715H have been transferred to this PE.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AB - Test & Simulation Technology - Development of effective, survivable, and affordable weapon systems requires a robust testing and simulation capability to support acquisition managers and decision makers. This project develops, provides and maintains unique DoD test and simulation facilities and enabling technologies that are used by the Defense Agencies, the Services and other federal agencies to evaluate the impact of hostile environments from conventional, nuclear and other special weapons on military or civilian systems and targets. These facilities provide blast, thermal, electromagnetic pulse, ionizing radiation and radio frequency propagation environments and testbeds to support DoD and national test requirements. This project leverages fifty years of testing expertise to investigate weapons effects and target response to a spectrum of hostile environments that could be created by proliferant nations or terrorist organizations with access to advanced conventional weapons or weapons of mass destruction (nuclear, biological and chemical).

The project includes the upgrade of existing simulators to extend their utility and life, the decommissioning of obsolete simulators, and the development of new simulators, when required, to compensate as much as possible for the lack of underground testing (UGT). Additionally, it provides the innovative, enabling technologies that make simulator enhancements and new facilities technically feasible and cost-effective. Specific programs in this project include: based on user test requirements, maintain two existing test centers - one at PRIMEX Physics International in San Leandro, California and one at Arnold Engineering Development Center (AEDC) in Tullahoma, Tennessee, including the development, construction and checkout of the new DECADE x-ray facility; development of technologies to provide enhanced radiation sources on the DECADE simulator; development of communications and radar propagation effects simulators, and infrared and optical scene generators; partnership with Sandia National Laboratories (DOE) to develop technologies in energy storage, power flow, plasma switches, debris shields, and radiation sources that are applicable to stockpile stewardship and DoD strategic systems sustainment; characterization, optimization and operation of the Large Blast/Thermal Simulator (LB/TS) at White Sands Missile Range (WSMR), including the demonstration of a non-ideal airblast simulation capability; operation and maintenance of the ARES electromagnetic pulse (EMP) facility at Kirtland AFB; and target defeat assessments for precision-guided and special weapons against Weapons of Mass Destruction (WMD) related targets.

The project provides test beds for full- and sub-scale tests that focus on weapon-target interaction with fixed hardened facilities to include hardened aboveground bunkers, cut-and-cover facilities and deep underground tunnels. This effort supports the Services'

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Project AB - Test & Simulation Technology (cont'd)

requirements for hard target defeat testing and emphasizes teaming with the Services to assess weapon-target interaction of existing and developmental weapon systems. Specific activities include test bed design and construction, instrumentation and data collection, test coordination and execution, and post-test analysis and documentation.

This project relies on hardening and simulation technologies [Testable Hardware and Aboveground Testing(AGT)/UGT Correlation] funded under Project AF and supports the evaluation of weapons lethality accomplished in Projects AC and AI. Funded programs support JCS Joint Warfighting Capabilities: Control Space, Counterproliferation, Discriminate Attack, Global Reach and Situational Awareness, and also provide support to STRATCOM, EUCOM, USFK (PACOM) and ACOM.

FY 1999 Plans

Test & Simulation ($20,831K)

- Continue to respond to emerging user testing needs through R&D upgrades.
- Begin process of transferring user test support technologies to AEDC.
- Continue to provide high explosive simulation infrastructure and test support, and maintain Permanent High Explosives Test Site facility at WSMR and Chestnut Site at Kirtland AFB.
- Complete Radar Nuclear Effects Corruption and Simulators (RNECS) development for National Missile Defense (NMD) and begin initial operational tests.
- Develop advanced optical scene generation/projection and mitigation techniques for Theater Missile Defense (TMD) Ground-Based Radar (GBR) in a nuclear-disturbed environment and provide advanced SATCOM/UEWR Simulation Test Support to assess NMD architecture operability.
- Continue communication/radar atmospheric effects simulator participation in operability assessment/warfighting exercises.
- Evaluate NMD GBR for operability and continue advanced SATCOM Simulation Test Support to MILSTAR and Global Positioning System upgrades.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AB - Test & Simulation Technology (cont'd)

Complete evaluation of NMD target acquisition and tracking algorithms against improved NODDS IR scene and evaluate for fusion with RNECS.

Complete modifications to LB/TS for blast and thermal diagnostics. Test one Navy ship decking and six Israeli tactical systems.

Weapon/Target Interaction ($9,112K)

Develop and validate tunnel targeting capability at system component level.

Continue to construct and rehab test target facilities, provide utilities, maintain the construction capability infrastructure, and execute tests needed for the Counterproliferation, Hard Target Defeat and Hard and Deeply Buried Target programs. Complete tunnel testbed facility outfitting.

Continue to develop signature requirements and munitions effectiveness assessment for hard target defeat. Collect operational signatures from tunnel testbed facility.

Begin rehab of industrial targets for the assessment of WMD Component damage, target response, and collateral effects for conventional weapons and enhanced payloads.

Radiation Simulators ($23,372K)

Continue DECADE preplanned product improvement program for power flow technologies to support high-fluence, soft x-ray and high-dose and dose-rate bremsstrahlung capabilities and evaluate the need for a second DECADE module.

Initiate improved radiation source spectral diagnostics development.

Continue to operate the Double EAGLE, Pithon, MBS, DM1/DM2, and ACE-4 simulators in support of customer testing and DECADE R&D.

Complete close-out of the High Power Microwave Simulator and Fast Rise EMP Simulator.

Continue advanced, high-fluence, soft x-ray and high-dose and dose-rate bremsstrahlung for DECADE Quad application.

Demonstrate >100cm^2 debris shields for the DECADE Quad.

Continue development of a portable, compact, high-fidelity prototype simulator.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AC - Weapons Systems Lethality - Building upon core nuclear competencies in nuclear effects and target response, this project addresses the lethality of the full spectrum of weapons, including nuclear and advanced conventional weapons, against the target base of today and tomorrow -- ranging from ultra-hard underground facilities to above ground, unhardened surface facilities and other special facilities that may be associated with the production, storage or deployment of weapons of mass destruction. Helping to maintain the continued effectiveness of the nuclear deterrent, this project also seeks to provide decision makers and warfighters expanded conventional weapon options against well-protected, high-priority targets. The program relies extensively on advanced numerical methods, as well as laboratory scale experiments, intermediate and full-scale field tests and operational test data to quantify functional and physical damage criteria and collateral effects. Project results will be provided to operational planners through analytic prediction tools, multimedia hypertext databases, and technical manuals. Central to this support is an automated expert system to assist in pre-strike target planning and post-strike battle damage assessment. Technology developed in this project will also enable civil agencies to assess engineering designs to mitigate direct and collateral damage from terrorist attacks such as occurred at the Oklahoma City Federal Building and Khobar towers attack in Saudia Arabia. Additionally, the technology developed directly supports force protection issues, operations other than war and DoD support to civil authority.

On a broader scale, improvements in weapon effects and target response codes will be used to upgrade and expand physics-based modeling and simulation. These improved codes include: coupled finite difference-finite element codes, structure-medium interaction codes, groundshock propagation codes suitable for jointed and/or layered media and high resolution dynamic codes capable of predicting the transport of hazardous aerosol clouds over complex terrain. The understanding of weapon-target interaction resulting from this project will support the generation of weapon system requirements for the changing worldwide target base and provide a quantitative basis for planning contingency operations against high value targets. It will also improve the understanding of target/weapon interactions and their consequences for battle damage prediction and assessment. This project also includes the development of high power electromagnetic source technology for warfighter applications.

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Project AC - Weapons Systems Lethality (cont'd)

Project AB, Test & Simulation Technology, provides the testbeds to support weapons lethality tests in this project. The computer tools and databases developed under this project support the execution of Project AI. This project supports the following JCS Joint Warfighting Capabilities: Counterproliferation, Discriminate Attack, Global Reach, and the Hard Target Defeat Program.

FY 1999 Plans

Nuclear Weapons Effects Phenomenology ($7,742K)

- Distribute completed volume 2 of Nuclear Weapon Manual & Output Handbook. Complete advanced technical threat volume.
- Deliver SHAPE/NATO integrated nuclear Munitions Effects Assessment (MEA)/Hazard Prediction Assessment Capability.
- Deliver STRATCOM microphysics based fall out model.
- Complete analysis of the geology of three additional sites.

Technical Information ($1,247K)

- Complete and demonstrate integrated nuclear weapons effects computational aids.
- Update chapters 2 and 3 of Effects Manual-1 (EM-1).

Application of Nuclear Weapons Expertise ($16,341K)

- Construct brassboard compact power sources.
- Conduct high-level testing of compact power distribution source prototype.
- Define the vulnerability of nuclear reactors and nuclear reprocessing facilities to advanced conventional weapons effects.
- Complete development of substrate conduction, an innovative protection technology effective against all EM threat frequencies.
- Participate in advanced technology demonstration with the Navy.
- Apply High Power Microwave (HPM)/EM hardening technology to a warfighter system.
- Complete key technologies for an advanced long pulse HPM solid-state source.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AC - Weapons Systems Lethality (cont'd)

Weapon/Target Interaction ($10,300K)

Develop vulnerability/collateral effects tools for uranium mining/milling facilities module and transport model including effects of rainout/washout.

Provide technical support, hardware/software to integrate weapons effects, target response codes in distributive interactive environment.

Develop 3-dimensional, real-time visualization of targets with variable damage levels from physics-based weapon effects.

Implement joint service component vulnerability model into the MEA.

Conduct functional defeat tests on systems.

Produce a final CD-ROM version of Revision 1 of the Design and Analysis of Hardened Structures (DAHS) manual.

Continue penetration testing into rock, weathered rock, and hardened structures using advanced concept weapons.

US/Allied Survivability and Operability in Nuclear/Special Weapon Environments ($270K)

Update analysis tool for STRATCOM to assess aircraft dust survivability for planned SIOP routes.

Test and Simulation ($1,354K)

Validate height-of-burst airblast environments for models used in the STRATCOM PDCALC tool using advanced Adaptive Mesh Refinement (AMR) computational code.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AE - Weapon Safety and Operational Support -This project is critical to the maintenance of a safe, secure and reliable nuclear deterrent, given that the enduring stockpile will retain weapons far beyond their designed life. Stockpile support efforts in this project include nuclear weapons stockpile technology for weapon system sustainment, probabilistic risk-based system safety assessments, and nuclear physical security policy/requirements validation. Reliability efforts include participation and assistance to Dual Revalidation, Annual Certification, and the Stockpile Stewardship Program. This project performs research and development in support of nuclear contingency planning, force structure deployment and employment options, innovative nuclear command and control concepts, nuclear mission planning, vulnerability assessments, safety assessments, advanced survivability concepts, and theater missile defense against Weapons of Mass Destruction (WMD) delivery systems and warheads. Vulnerability assessments of DoD and Allied fixed and mobile Command, Control and Communications (C3) assets subjected to WMD effects are also part of this project. This project includes the Modeling and Simulation Center, which provides integration of weapons effects, downwind hazard prediction models and force effectiveness models to users in acquisition, training, exercises, operations other than war, and warfighting. Oversight, technical support and curriculum review for the Defense Nuclear Weapons School (DNWS) and other DoD nuclear training activities are also provided.

This project is in direct support of Presidential Decision Directives and taskings and requirements from OSD, the Joint Staff and CINCs. Relevant directives include National Security Strategy of Engagement and Enlargement, National Security Science and Technology Strategy, National Military Strategy, Joint Strategic Capabilities Plan, Presidential Decision Directives, Defense Planning Guidance, and prioritization memorandums from CINCs. These efforts have been closely coordinated with Joint Staff, OSD offices, CINCs and Services, Department of Energy, Federal Emergency Management Agency and the Federal Bureau of Investigation. The thrust of this project supports the JCS Joint Vision 2010 Warfighting Capabilities of Dominant Manuever, Precision Engagement, and Full-Dimensional Protection.

FY 1999 Plans

Nuclear Operations ($16,957K)

Complete the safety assessment for the dual capable fighter aircraft in Europe in support of nuclear weapon system safety and stockpile safety.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AE - Weapon Safety and Operational Support (cont'd)

Initiate safety assessment for a designated weapon system.

Continue experimental testing to develop a technology base for fuel fire, energetic materials and electrical/lightning.

Initiate experimental testing to develop a technology base for combined mechanical/thermal environments.

Conduct Forces Support technical analyses as required by OSD, Services, Joint Staff, and NWC on nuclear infrastructure, stockpile planning, force structure, storage issues, weapons safety and security, theater missile defense, counterproliferation, planning, and international military and political security issues.

Conduct technical analyses to support CINCs, Services and Joint Staff on operational force planning, counterproliferation, nuclear forces, command and control, and regional security issues in light of the changing international security environment.

Continue the development of the interface between Air Vehicle Planning System (APS) and service planning systems such as Tactical Aircraft Mission Planning System (TAMPS), NATO Nuclear Planning System (NNPS), and US/NATO intelligence systems.

Continue an adaptive planning system software program to develop a deployable strategic planning capability for STRATCOM and initiate a modernized software interface between data collection sources and the Nuclear Planning and Execution System (NPES). Accept and test the first incremental delivery of the NPES.

Initiate study for requirements development to integrate the Air Vehicle Planning System, as the aircraft and cruise missile nuclear planning system, with the NPES.

Complete and transition the nuclear planning system target data feed which provides intelligence planning data in support of NATO.

Complete analytical support assessing STRATCOM's capability to effectively meet national objectives involving the SIOP while reducing its complexity.

Continue utilization of the analytical framework that facilitates alternative WMD deterrence approaches to the needs of multi-regional scenarios.

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Project AE - Weapon Safety and Operational Support (cont'd)

Conduct an annual force-on-force exercise to evaluate and validate policy standards as designated by the Security Policy Verification Committee (SPVC).

Continue to provide quick turn analysis on WMD consequence issues for OSD, Services, and Joint Staff and provide weapons effects analysis to weapons Project Officer's Groups and weapons modification programs as required.

Continue development of an integrated reporting system for automated reporting of NBC activity and hazard predictions. Provide support to the CINC planning staffs on NBC capability and impacts on warfighting capability.

Continue supporting system assessment and analytical concepts analysis for DoD, JCS, CINCs, and Services.

Develop mission and consequence analysis for HQ Air Combat Command's (ACC's) Agent Defeat Weapon phase studies and Analysis of Alternatives (AOAs).

Education/Training to Maintain Core Competencies ($1,050K)

Provide nuclear operational training support to CINCs, Services, and OSD.

Continue development of general interest DoD nuclear training program.

Continue development, improvement, and integration of course materials for the DNWS.

Support DoD and CINC exercises and wargames with WMD/target response analysis.

Nuclear Weapons Stockpile Management ($750K)

In support of stockpile stewardship and reliability, continue participation in, and support to, the Dual Revalidation program with research, technical analysis, and assessment reports.

Provide technical support and recommendations to OSD, Joint Staff, Services, STRATCOM and other Combatant Commanders related to weapons safety, reliability, and performance.

Continue support to the Annual Certification program and support to the service weapons life-extension programs.

Modeling and Simulation ($4,006K)

Upgrade and refine operations of the Modeling and Simulation Center.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Applied Research - BA2	R-1 ITEM NOMENCLATURE WMD Related Technologies; 0602715BR

Project AE - Weapon Safety and Operational Support (cont'd)

Provide an integrated program for analysis and testing of alternate strategies, force employment options and technologies.
Continue to provide technical and operational consequence analysis support for exercises and wargames.
Include WMD use and effects in a joint theater-level simulation.
Implement the Analysis and Assessments program to provide real-time support to Services through enhanced infrastructure, deployment teams, integrated models, and technical support.
Update and refine support database per CINCs, Services, and Joint Staff guidance and continue development of consequence analysis of WMD counterproliferation programs.
Establish permanent (Virtual) presence at the Joint Warfare Simulation Center (JWARS) and Joint Simulation System (JSIMS).
Continue to develop Extended Air Defense Simulation (EADSIM) based scenarios for additional studies to support STRATCOM requests.

Nuclear Weapons Effects Phenomenology ($1,000K)

Transition 36 hour weather forecast modeling capability to the CINCs and Services for use in WMD consequence predictions.

US/Allied Survivability & Operability in Nuclear/Designated Advanced Weapons Environments ($5,645K)

Conduct Balanced Survivability and Integrated Vulnerability Assessments on DoD facilities as tasked by CINCs and DoD Agencies.
Assist CINCs and Intelligence community in target planning against hard and deeply buried facilities.
Conduct integrated vulnerability assessments of defense national infrastructure facilities.
Apply sensor technology for target characterization and battle damage assessments.

Weapon/Target Interaction ($1, 364K)

Develop visualization tools for weapon effects models that are compatible with the High Level Architecture (HLA).

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Project AF - Weapon System Operability - Current and future warfighters and weapon systems, including the associated Command, Control, Communications, Computers and Intelligence (C4I) and support systems, must be able to tolerate and operate effectively through a spectrum of hostile battlefield 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 to advanced conventional weapons and limited nuclear attack. The military systems of interest include those that support warfighting missions in the air, on land, at sea, or in space.

This project constitutes the DoD's residual 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 CINCs; 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. Specific programs in the project include: development and demonstration of the enabling technologies for ensuring the continued availability of special materials and radiation tolerant microelectronics and photonic devices; development and demonstration of affordable hardening and mitigation methods that treat the adverse effects from electromagnetic, natural space and nuclear weapons engendered radiation (i.e., ionizing radiation and displacement damage), nuclear electromagnetic pulse (EMP), high power microwave (HPM) and nuclear atmospheric environments; direct support to warfighters by predicting and quantifying the operational impact of nuclear, biological and chemical (NBC) and conventional battlefield environments on systems and personnel; development and demonstration of cost effective system design and test certification techniques for testable hardware that does not require underground nuclear tests; methods for measuring and increasing soldier effectiveness on NBC battlefields; 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.

This project provides the testable system design rules and protocols for users of nuclear effects simulators that are funded in Project AB. It also supports the following JCS Joint Warfighting Capabilities: Information Superiority, Counterproliferation, Electronic Warfare, and Precision Force.

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Project AF - Weapon System Operability (cont'd)

FY 1999 Plans

Nuclear Weapons Effects Phenomenology ($10,889)

- Complete new fireball model initialization and faster running grid chemistry models.
- Test, document and deliver Initial Space environmental prediction Model.
- Complete preliminary EMP Vulnerability Number (VN) product.
- Demonstrate and enhance human response models.

US/Allied Survivability & Operability in Nuclear/Special Weapon Environments ($19,527K)

- Finalize configuration control electronics database for qualification testing.
- Begin development of design protocols for advanced optical systems.
- Begin development of draft design and test protocols for reentry vehicles.
- Complete Aboveground Test (AGT)/Underground Test (UGT) threat correlation for penetration aids, missile and reentry vehicle materials/structures.
- Finalize sensor design and test protocols.
- Complete development and assessment of low-level radiation standards and equipment for NATO.
- Evaluate the end-to-end operability of advanced architectures/networks in nuclear-disturbed environments.
- Continue to assess Space Based Infrared Satellite (SBIRS) architecture operability, and evaluate the vulnerability of C4I systems exposed to nuclear-disturbed environment.
- Continue application of innovative, low-cost EMP/HPM hardening technology and propose candidate Electromagnetic standards and guidelines in accordance with the new technology.
- Continue assessment and testing of critical, fixed-ground-based and mobile C4I facilities.
- Gather and assess warfighter Survivability needs and concerns. Incorporate and demonstrate Survivability Simulation Planning System.

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Project AF - Weapon System Operability (cont'd)

Radiation-Tolerant Microelectronics, Materials, and Electro-optics ($17,369K)

Demonstrate, test and evaluate a radiation-tolerant, low-power 500K gate array for USAF.

Demonstrate, test and evaluate radiation-tolerant, 16M Static Random Access Memory integrated circuit technology for USAF and BMDO.

Demonstrate, test and evaluate application-specific integrated circuits, including a digital signal processor for USAF and BMDO.

Demonstrate radiation-tolerant photonics technology for DoD space-based applications.

Investigate and characterize single event effects in photonic devices and deep-submicron microelectronics for USAF and BMDO.

Demonstrate radiation-tolerant Electronic Design Automation (EDA) System for USAF and BMDO.

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Project AG—Scientific Computations & Information Systems. This project provides High Performance Computing (HPC), computational databases, information products, and advanced numerical models that enable the Agency's customers, researchers, and RDT&E contractors to answer questions about nuclear and advanced special weapons effects. Models, codes, and information products are developed to aid the design of experiments, predict types and levels of measurements required, establish system design requirements, assess performance, and provide system-specific predictions of weapons effects to DoD planners. Nuclear issues often require use of advanced computational resources, e.g., for investigation of the physics of weapon-target interactions, and for extrapolating test results into areas for which tests are no longer possible. This has required the development of a world-class high performance computing architecture with high bandwidth communications. This capability, currently with a hub at Los Alamos National Laboratory, is scheduled to transition to the new DoE and DoD HPC architecture over the FYDP. The Data Archival and Retrieval Enhancement (DARE) information system (a digital archive and retrieval system tailored to the specific needs of the researcher, the system designer, and developer) is supported by this project. This project funds the "Graybeard" efforts for collection of unique and potentially perishable nuclear data with appropriate prioritization based on technical value. The principal thrusts respond to warfighter requirements for survivable systems and effective weapons in the Joint Warfighting Technology Areas of Discriminate Attack, Global Reach, and Counterproliferation.

FY1999 Plans

Nuclear Weapons Effects Phenomenology ($7,469K)

- Continue review/commentary/archival of electronics/environmental test data.
- Initiate Graybeard knowledge capture efforts for thermomechanical and biological effects.
- Provide scientific and technical information services and products as the DoD-wide repository for test photos, films, data, test records and other information products.
- Continue computer operations support by providing centralized CRAY resources to researchers, Agency customers and RDT&E contractors.
- Continue operation of web site providing radiation response of electronic parts.

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Project AG—Scientific Computations & Information Systems (cont'd)

Complete high-altitude nuclear effects data commentary/archival.
Initiate transient radiation effects on electronics data review/commentary/archival.
Continue review/commentary/archival of airblast, cratering, ejecta, dust and fallout test data.
Initiate review/commentary/archival of nuclear effects test data for thin-film optics.
Initiate review/commentary/archival of biological nuclear weapon effects test data.
Continue DATACOM computational support by providing wide area connections.
Disseminate Science and Technology Digest.
Review, approve, and archive perishable nuclear test data.
Coordinate draft update The Effects of Nuclear Weapons prior to distribution.

Infrastructure ($7,408K)

Continue computational support by providing annual support for the communication network and upgrade/acquire the supercomputing equipment for the data center.
Provide classified access channels for the data center.
Acquire file storage for classified systems.
Continue assessment of circuit utilization and the investigation of new communication and networking technologies.
Continue to provide broad based science and technology Information Analysis Center research support.

Data Archival and Retrieval Enhancement (DARE) ($4,491K)

Expand archival of information and knowledge of nuclear weapons, other WMD and Agency mission areas for retrieval in DARE as outlined in DARE Master Plan.
Continue development and testing implementation of computational adjuncts and system enhancements which provide greater search, retrieval, storage and analysis capability to the DARE customer.
Provide and continue development of on–line video/text capability and other innovative knowledge enhancement and preservation tools.

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Project AG—Scientific Computations & Information Systems (cont'd)

Application of Nuclear Weapons Expertise ($668K)

Complete validation of Advanced Numerical Methods. Compare results to precision test data.

Perform large-scale analysis of incendiary warheads to support demonstration testing.

Weapon/Target Interaction ($200K)

Develop a 3D atmospheric code with column physics based on the Adaptive Mesh Refinement code.

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Project AI - Hard Target/Tunnel Defeat & Nevada Test Site (NTS) Sustainment

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 which house battle management facilities, command, control, and communications facilities, theater ballistic missiles and their transporter-erector-launchers (TELs), and biological/chemical/nuclear weapons production or storage facilities. An objective of this program 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 priorities by the Office of the Under Secretary of Defense for Acquisition and Technology (OUSD(A&T)), Hard and Deeply Buried Target Defeat Capability Initiative and warfighting CINCs. Efforts in this program provide part of the technology base needed for counterproliferation activities conducted in other DoD programs.

The Presidential Decision Directive (PDD) on Stockpile Stewardship implemented an indefinite moratorium on underground nuclear testing while requiring retention of the capability to resume testing at Presidential direction. DoD has complied with this policy by realigning the previously existing underground test program to emphasize non-nuclear weapons test technology and facility development, and to conduct a program for an orderly decommissioning and mothballing of the national underground nuclear test assets. The following major tasks will satisfy this requirement: (1) continue test complex shutdown, and tunnel stabilization and preservation; (2) continue environmental characterization; (3) document testbed design and construction methodology; (4) maintain underground test readiness through joint test organization activities at NTS including counterproliferation and hard target defeat testing; and (5) support SOCOM efforts to develop tactics and techniques for JCS Joint Warfighter Capabilities of Discriminate Attack and Counterproliferation. Project AI is linked to Project AB, through which its testing is conducted, and to Project AC which leverages its weapons work.

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Project AI - Hard Target/Tunnel Defeat & Nevada Test Site (NTS) Sustainment (cont'd)

FY 1999 Plans

Weapon/Target Interaction ($4,687K)

Continue support for USD(A&T)'s Hard and Deeply Buried Target Defeat Capability program.
Evaluate weapon/target interactions for new weapons concepts, enhanced payloads, and target fragility.
Collect and evaluate target and event signatures for surveillance.
Begin planning activities for C3I tunnel target.
Complete field tests on blast/fragmentation/fire damage to target subsystems, including blast doors, vehicles and equipment.

Bomb Damage Assessment ($500K)

Continue target reconstitution studies and model development for incorporation in Munitions Effects Assessment tunnel module.

Test and Simulation ($6,660K)

Continue NTS infrastructure maintenance through activities at NTS in support of environmental remediation.
Continue providing on-site personnel to evaluate environmental remediation requirements of Agency facilities.
Maintain one tunnel complex in support of the stockpile stewardship program.
Complete construction of a missile tunnel facility test tunnel.
Continue site characterization and risk evaluation for the N-Tunnel Drums site.
Begin site characterization drilling and sampling at 16-Tunnel Portal Tanks and Spills site, the Area 12 Conditional Release Storage Yards, Area 12 Spills site, and N-Tunnel Muckpile.

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B. Program Change Summary

	FY97	FY98	FY99
Previous President's Budget	0.0	0.0	0.0
Current Budget Submit/President's Budget	0.0	0.0	203.6

Change Summary Explanation:

In accordance with the November 1997 Defense Reform Initiative, resources for FY 1999 and out which were previously addressed in PE 0602715H have been transferred to this PE. The budget request represents a highly leveraged science and technology program, consistent with departmental strategic objectives. Fiscal realities have necessitated reductions in a number of program areas, however, to include the termination of future work on the Electro Thermal Chemical (ETC) gun program.

C. Other Program Funding Summary

	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
0602715H Defense Special Weapons Agency	189.2	203.7	0.0	0.0	0.0	0.0	0.0

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APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/Advanced Technology Development - BA3**					R-1 ITEM NOMENCLATURE **Verification Technology Demonstration; 0603711BR**			
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
Total 0603711BR Cost	0.0	0.0	63.1	60.4	59.3	55.9	55.5	Continuing
Project CA Strategic Arms Control Technology	0.0	0.0	9.1	9.9	11.1	11.2	11.4	Continuing
Project CB Conventional Arms Control Technology	0.0	0.0	8.1	7.8	8.0	8.2	8.3	Continuing
Project CC Chemical Weapons Convention	0.0	0.0	10.6	10.6	12.6	12.8	13.2	Continuing
Project CD Nuclear Arms Control Technology	0.0	0.0	35.3	32.1	27.6	23.7	22.6	Continuing

A. Mission Description and Budget Item Justification - This program element covers implementation, compliance, monitoring and inspection, research development test and evaluation (RDT&E) for existing and emerging arms control treaties and agreements. The funded projects conform to requirements presented and approved by the Office of the Under Secretary of Defense (Acquisition & Technology) through the DoD Arms Control Requirements Assessment Board (RAB) process. RDT&E fulfills the technical requirements to implement, comply with, and monitor the following treaties/agreements: the Treaty on the Reduction and Limitation of Strategic Offensive Arms (START); the Treaty on Further Reduction and Limitation of Strategic Offensive Arms (START II) (START III); the Anti-Ballistic Missile (ABM) Treaty; the Intermediate-Range Nuclear Forces (INF) Treaty; the Conventional Armed Forces in Europe (CFE) Treaty; the Open Skies (OS) Treaty; the Convention on Certain Conventional Weapons (CCW); the Chemical Weapons Convention (CWC); Comprehensive Test Ban Treaty (CTBT); the CFE Adaptation negotiations; the Anti-Personnel landmine negotiation; Presidential arms control initiatives; and other existing and emerging arms control related agreements, treaties, and initiatives, such as the United Nation's (UN) Transparency in Armaments; the Organization on Security and Cooperation in

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Mission Description and Budget Item Justification (cont'd) - Europe's Vienna Document 94 (VD-94) and the Global Exchange of Military Information (GEMI); Missile Technology Control Regime (MTCR) and the UN's Transparency in Armaments Agreement. It also provides confidence and transparency building capabilities to support DoD efforts concerning the Biological Weapons Convention (BWC), and conforms to the Administration's research and development priorities as related to both conventional arms control and weapons of mass destruction arms control, and disarmament. Arms control technologies are critical for enabling the U.S. to monitor, verify and implement international arms control treaties and other agreements whose purpose is to prevent the proliferation and or reduction of nuclear, chemical, biological, and other advanced conventional weapons. Technical assessments are made to provide the basis for sound project development, to evaluate existing programs, and to provide the data required to make compliance judgments. Technology developments and system improvements projects are conducted to ensure that capabilities to monitor, comply with, and implement treaties and agreements are available when required.

The program includes development of equipment and procedures for data exchanges, on-site and aerial inspections and monitoring, and other confidence-building measures. In addition, assistance is provided to the Office of the Secretary of Defense by providing technical support in preparing for U.S. compliance with treaty obligations. For example, work includes an assessment to determine the susceptibility of a CTBT verification regime to evasive measures. Results will be used by the CTBT negotiators to develop a technically robust International Monitoring System (IMS). Hardware and procedures developed are often transitioned to the On-Site Inspection Agency (OSIA), or appropriate international inspectorate, as in the case of the CWC, for use in conducting treaty mandated inspection and monitoring and for implementing transparency and confidence-building regimes. Where applicable, RDT&E to meet requirements in one treaty area is applied to fulfill requirements in other areas to eliminate duplication of efforts. For example, development of remote monitoring capabilities for future START Treaty applications will also be evaluated for use to verify limits and activities in a future conventional arms control regime. The technologies and procedures developed in the arms control technology program provided an invaluable source of information on equipment and procedures that was extensively used by an Agency team to support an interagency assessment of Long Term Monitoring of Iraq. The results of the effort and equipment developed in this program are being used to implement the provisions of United Nations Resolution 715.

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Mission Description and Budget Item Justification (cont'd) - The Agency's synergistic approach to fulfilling arms control requirements has been maximized in data management development. Arms control treaties require extensive exchanges of data concerning treaty accountable items, initial declarations, movements, etc., by signatory nations. The Agency has developed a treaty information management system, the Compliance Monitoring and Tracking System (CMTS), to accommodate these data exchanges and monitor U.S. compliance with treaty data reporting provisions. The CMTS provides treaty required data exchanges for INF, START, CFE and Confidence- and Security-Building Measures. A DoD system, Chemical Accountability Management Information Network (CAMIN), is under development to create the capability to transmit CWC required data. The Open Skies Notification System (OSNS) is being developed to support an anticipated FY1998 treaty entry-into-force (EIF). Operational control of the CMTS was transitioned to OSIA in a phased approach starting with Data Management/Notification System (DMNS) and START Central Data System (SCDS) in FY1997. The Chemical Weapons Convention Information Management System (CWCIMS) was offered to the Preparatory Commission at the Hague by the United States Government (USG). The Commission accepted the U.S. offer and the system was delivered in late FY1996.

In FY 1999, the architecture for presentation/execution of this program will change. Elimination and realignment of the Implementation and Compliance (I&C) category resulted in all negotiation, compliance, and implementation efforts moving to the Technical Assessments category. All hardware and software developments in I&C have moved to the Technology Development or Improvements category to reflect the actual nature of the effort.

The November 1997 Defense Reform Initiative (DRI) directed the establishment of a Defense Threat Reduction and Treaty Compliance Agency effective 1 October 1998. As a result of the DRI, resources for FY 1999 and out which were previously addressed in Defense Special Weapons Agency Program Element (PE) 0603711H have been transferred to this PE.

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Project CA - Strategic Arms Control Technology - This project consists of research, development, test and evaluation (RDT&E) activities required to provide the capabilities needed to conduct monitoring, inspections, and data exchanges under the Strategic Arms Reduction Treaty (START), START II, START III, Missile Technology Control Regime (MTCR), Safeguards, Transparency and Irreversibility (STI) Agreement, Anti-Ballistic Missile (ABM) Treaty, and the Intermediate-Range Nuclear Forces (INF) Treaty. It also assists the United States Government (USG) and industry in compliance with the treaties and development of technology to meet requirements of future strategic arms control agreements. The projects conform to requirements presented and approved by the Office of the Under Secretary of Defense (Acquisition & Technology), (OUSD(A&T)), through the DoD Arms Control Requirements Assessment Board (RAB) process and OSD/Arms Control Implementation and Compliance memorandum of 31 July 1997, subject: Guidance, Mission Needs and Requirements Summary.

The START Central Data System (SCDS), as part of the Compliance Monitoring and Tracking System (CMTS), enables the U.S. to generate treaty-required notifications, perform treaty compliance assessments, and transmit notifications to treaty states for START. The START II Treaty, signed in January 1993, requires inspections of converted SS-18 silos and authorizes additional re-entry vehicle on-site inspections of Intercontinental Ballistic Missiles (ICBMs) installed in the converted silos. It also introduces new rules for counting strategic forces that complicate START reporting. Tools developed by this program will enable the USG to effectively exercise treaty inspection rights and monitor compliance and reporting. Technology development efforts are planned to support anticipated future treaty requirements in the most non-intrusive and cost-effective manner. Future strategic arms control regimes may consider non-deployed missiles and warheads in all phases, to include conversion and/or elimination, and would require the development of new procedures and equipment to accomplish the monitoring task. The primary focus of the efforts is on more effective methods of measuring characteristic Treaty Limited Item (TLI) signatures with technologies such as object and pattern recognition and micro-machined integrated neutron detector and providing monitoring/inspection capabilities to ultimately reduce cost and increase the flexibility of U.S. inspectors.

Overall RDT&E requirements and implementation timelines are dependent on the desired robustness and implementation schedule for the various components of the verification regime. RDT&E is being initiated now to ensure that monitoring and

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Project CA - Strategic Arms Control Technology (cont'd) -
inspection systems are available at treaty entry into force (EIF) and that negotiators have the technical information to make informed decisions on key issues. This project supports the JCS Warfighting Capability of counterproliferation.

FY 1999 Plans

Technical Assessments ($3.3M)

- Provide treaty compliance assessments and planning support to OUSD(A&T)/ACI&C.
- Provide technical and engineering support to START Treaty commissions (JCIC/BIC).
- Continue research on technologies to support post-START II requirements to monitor mobile delivery systems, non-deployed nuclear weapons and delivery systems, and warhead inventories.

Technology Development ($5.8M)

- Incorporate provisions for post-START II nuclear warhead and non-deployed TLI data incorporation (and hardware improvements) into CMTS.
- Initiate remote monitoring prototype development systems.
- Continue modification/enhancement/development of ABM/TMD computer analysis models.
- Initiate development of implementation compliance information system.
- Demonstrate proof of concept for selected warhead accountancy technologies to support START II follow-on.
- Provide follow-on support to WATS OCONUS installation.
- Continue Emerging Technology investigations for future treaty requirements through industry, academia and national laboratories.
- Develop inspection training aids and tools to provide enhanced inspection and monitoring capability in support of START I/II/III treaties.
- Provide solutions to implement future treaty verification/inspection protocols.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Advanced Technology Development - BA3	R-1 ITEM NOMENCLATURE Verification Technology Demonstration; 0603711BR

CB - Conventional Arms Control Technology - This project covers research, development, test & evaluation (RDT&E) required to: meet on-site and aerial monitoring, transparency, confidence-building, and peacekeeping monitoring technology requirements for existing, emerging, and potential treaties, agreements, and initiatives related to Conventional Arms Control (CAC) and compliance monitoring of peacekeeping regimes; ensure compliance; implement agreements; and provide technical support to negotiations. The funded projects conform to requirements presented and approved by the Office of the Under Secretary of Defense (Acquisition & Technology) through the DoD Arms Control Requirements Assessment Board (RAB) process and described in the Office of the Secretary of Defense (OSD)/Arms Control Implementation and Compliance (ACI&C) Memorandum, dated 31 July 1997, Subject: Guidance, Mission Needs and Summary Requirements. Relevant agreements which require continuing RDT&E support include: (1) the Conventional Armed Forces in Europe (CFE) Treaty, (2) Open Skies (OS) Treaty (projected Entry-Into-Force FY1997); (3) the Organization for Security and Cooperation in Europe (OSCE) Confidence- and Security-Building Measures (CSBMs) contained in Vienna Document 94 (VD-94) to include the Global Exchange of Military Information (GEMI) signed in December 1994 and the OSCE agreements contained in the Lisbon Document of 5 December 1996; (4) the United Nation's Transparency in Armaments (TIA) Agreement established in 1993; and the April 1996 Wassenaar Arrangement on Export Controls for Conventional Arms and Dual Use Goods and Technologies. The RDT&E needs for emerging treaty and agreement areas include: (1) the OSCE Review Conferences, with its OSCE Forum for Security Cooperation (2) the CFE Review Conferences and CFE Adaptation negotiations; (3) regional/sub-regional arms control and peacekeeping to include RDT&E arms control implementation support for the Dayton Agreement and conventional arms proliferation issues; (4) enhancing CSBMs, and (5) the Convention on Certain Conventional Weapons (CCW) and the Anti-Personnel Landmine (APL) negotiations in the Conference on Disarmament and the Ottawa Process. This project also supports U.S. implementation of and compliance with the decisions of consultative commissions, arms control negotiating and coordinating organizations including: the CFE's Joint Consultative Group; the OSCE's Forum for Security Cooperation; NATO's 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. Decisions in negotiating fora and by coordinating organizations listed above have resulted and will continue to result in new or revised implementation and compliance requirements to which the U.S. must abide. Further, they require technical advice and assessments to support U.S. positions and evaluate proposals to ensure DoD equities are protected. New treaty areas not previously addressed include the APL and expanded regional security and peacekeeping monitoring applications. This project supports the JCS Warfighting Capability of counterproliferation.

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CB - Conventional Arms Control Technology (cont'd) -

FY 1999 Plans

Technical Assessments ($4.1M)

- 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, the APL negotiation, and regional arms control negotiations.
- Provide treaty compliance assessments and planning support to OUSD(A&T)/ACI&C.
- Continue analysis of new classes of sensors for modification of the Open Skies regime and other aerial observation regimes.
- Conduct assessments of technologies to support on-going or emerging conventional arms control negotiations.
- Conduct technical assessment of regional arms control needs for the Pacific Rim.
- Conduct technical assessment for stand off APL detection and mapping capability.
- Conduct technical assessments of regional arms control needs.
- Document and maintain prototypes to support current and future conventional arms control agreements.

Technology Development ($4.0M)

- Continue to develop compliance block updates for OSMAPS capabilities and perform independent validation and verification.
- Initiate the development of an extended digital processor to process foreign digital sensor data to ensure treaty required resolution of foreign sensors used in overflights of the U.S.
- Initiate CMTS compliance updates and integration of APL agreement data requirements.
- Begin long range development of follow-on technologies to support implementation and compliance with the future APL agreements.
- Continue CMTS independent verification and validation to ensure efficient development of CMTS software.
- Initiate development of Implementation Compliance Information System and analytical tools.
- Continue Emerging Technologies investigations for future treaty requirements through industry, academia and national laboratories.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Advanced Technology Development - BA3	R-1 ITEM NOMENCLATURE Verification Technology Demonstration; 0603711BR

Project CC - Chemical/Biological Arms Control Technology - This project funds research, development, test and evaluation (RDT&E) necessary to meet DoD requirements for the implementation of chemical and biological arms control agreements and technical analyses to support and protect DoD equities in the negotiation and review of arms control agreements. The DoD requirements are documented in OUSD(A&T)/ATSD(NCB) "Program Guidance, Mission Needs and Requirements Summary", dated 6 February 1997. The primary focus in this project has been and continues to be preparing for multinational verification of, and U.S. compliance with, the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction (CWC). This project develops and validates technologies to ensure that on-site sampling and analysis is effective and that DoD equities are protected during the course of all CWC inspections. The focus is on sample screening, sample preparation and analytical equipment and procedures which are accurate without revealing sensitive DoD information. Technologies developed to support the CWC synergistically support both the U.S.-Russian chemical weapons Bilateral Destruction Agreement and international peacekeeping efforts such as the UN Special Commission on Iraq. In the area of biological weapons arms control, this project provides for technical assessments to assist DoD and U.S. policy makers and negotiators in their efforts to strengthen the Biological Weapons Convention (BWC). These assessments are essential to DoD and U.S. negotiators in the multilateral arena, both in preparation for and subsequent to the BWC Review Conferences (RevCons) held every five years. The RevCons (latest RevCon held December 1996) have the goal of developing measures to strengthen compliance with the BWC; this project supports U.S. policy makers by analyzing and prioritizing proposed confidence-building measures. RDT&E following the RevCons will be essential in continuing this process and ensuring confidence-building is balanced against the need to protect legitimate DoD/U.S. equities. The project also provides technical assessments of transparency measures that are being reviewed for inclusion in a series of planned exchange visits among the US/UK/Russia, in accordance with the 1992 Trilateral Statement; the goal is to resolve ambiguities in compliance with the BWC as well as to promote openness on legitimate military BW defense programs.

This project descriptive plan supports the JCS Joint Warfighting Capability of counterproliferation.

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Project CC - Chemical/Biological Arms Control Technology (cont'd) -

FY 1999 Plans

Technical Assessments ($4.0M)

- Continue support to Interagency for BWC Ad Hoc Committee.
- Provide support to BW Trilateral Visits.
- Continue technical support to CWC Policy Interagency Working Group to establish the U.S. position on and responses to issues raised concerning verification/implementation provisions of the CWC.
- Provide technical assessment of BW protocols and DoD vulnerabilities.
- Continue validation of on-site sampling and analytical methods developed in Agency programs.
- Transition operational control of CAMIN to U.S. Army Chemical Biological Defense Command (USACBDCOM).
- Deliver CAMIN source code and documentation.
- Expand and maintain BW History and Database.

Technology Development ($6.5M)

- Evaluate emerging sampling, sample preparation, and analytical technologies as they become available.
- Complete development of technologies and equipment to fill CWC-identified on-site inspection technology gaps.
- Continue to adapt more advanced spectroscopy technologies to improve on-site sampling and analysis.
- Develop innovative sensing technologies for potential CWC verification applications.
- Support CWC inspection equipment/procedures test & evaluation.
- Complete engineering development of the hand-held chemical detector.
- Continue engineering development of the On-Site Laboratory.
- Improve chemical agent characterization and sensitivities of non-destructive evaluation technologies.
- Continue emerging technologies investigations for future treaty requirements through industry, academia and national laboratories.
- Initiate development of Implementation and Compliance Information System and analytical tools.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Advanced Technology Development - BA3	R-1 ITEM NOMENCLATURE Verification Technology Demonstration; 0603711BR

Project CD - Nuclear Arms Control Technology - This project consists of research, development, test and evaluation (RDT&E) activities required to provide a comprehensive and integrated DoD research and development program to support preparation, implementation, compliance, and verification of the Comprehensive Test Ban Treaty (CTBT). This project is consistent with the direction given December 1995 by the Deputy Secretary of Defense (Implementation of the CTBT), May 1996 by the Under Secretary of Defense for Acquisition and Technology (Revised Arms Control Treaties and Agreements Planning Assumptions) and the August 1996 Program Decision Memorandum 1 that describes funding for CTBT safeguards support and funding required for CTBT entry-into-force.

The CTBT arms control activities are the following:

U.S. CTBT International Monitoring System (IMS) Sensors-- This program will enable the U.S. to independently monitor and detect nuclear test activities worldwide and fulfill its obligations under the CTBT. The Treaty will require the U.S. to contribute 40 stations and data exchange to the IMS . This funding supports R&D and prototyping for the four technologies required by the treaty.

CTBT International Data Center (IDC)-- The U.S. has committed to develop, prototype, and transition to the CTBT international organization an IDC that will have the capability to acquire, archive, process, and analyze data from approximately 320 IMS sensor stations positioned around the globe, and to disseminate raw data and products to all States Parties. The IDC will serve as the central data processing and distribution hub for the treaty verification regime, will be located in Vienna, Austria, at the headquarters of the CTBT organization. The IDC will be critical for supporting the U.S. objectives for CTBT implementation and compliance and global monitoring.

U.S. CTBT Interface-- The U.S. must develop, integrate, test, and evaluate an interface to the international CTBT organization to support routing of data between U.S. facilities and the IDC; to support the U.S. National Authority in the execution of Treaty related exchanges and decisions; and to function as a backup data archive and research analysis center. This funding supports initial prototyping of the National Authority interface.

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Project CD - Nuclear Arms Control Technology (cont'd) -
Seismic - Acoustic and Radionuclide Research-- The U.S. agreement to a zero-yield CTBT is contingent upon the capability to independently monitor nuclear activities worldwide. Understanding, processing, and analyzing monitoring data and providing actionable information based on these data and products will require significant basic research and exploratory development in the areas of seismic, hydroacoustic, infrasound, and radionuclide monitoring. This R&D work has no parallel in other arms control treaties. This effort requires an understanding of geophysical and physical phenomena that have not yet been studied or understood but must be developed if the treaty is to be successfully monitored. The objectives of the R&D program are to enhance monitoring capabilities to meet current CTBT standards at decreasing cost over time and to enhance monitoring capabilities to detect potential violators.

Implementation/Compliance Support-- The DoD must facilitate the transfer of technical data and information from the nuclear monitoring R&D program to the interagency and U.S. delegation for arms control impact analysis, including verification and verification technology requirements; implementation planning and oversight; treaty compliance reviews; coordination and R&D program support; education; and management information system (MIS) support for arms control-related data bases. This funding supports technical analysis, technology demonstration plans, test plans, etc. in anticipation of requirements based on the current monitoring and verification technologies needed by the CTBT Preparatory Commission or any other R&D programs related to the CTBT.

FY 1999 Plans
U.S. CTBT IMS Sensors ($5.9M)
- Implement prototype seismic stations.
- Test and evaluate infrasound sensors.
- Prototype radionuclide sensors.

CTBT IDC ($13.8M)
- Integrate proven seismic, hydroacoustic, infrasound, and radionuclide data exploitation techniques into the automated and interactive systems.
- Transition the prototype IDC systems to the international CTBT organization.

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APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/Advanced Technology Development - BA3**	R-1 ITEM NOMENCLATURE **Verification Technology Demonstration; 0603711BR**

Project CD - Nuclear Arms Control Technology (cont'd) -

Validate prototype for initial operational testing and evaluation.

Develop upgrades to increase the prototype IDC capability to support on-going R&D.

U.S. CTBT Interface ($4.7M)

Develop U.S. Data Routing protocol and interface with IDC.

Develop tools and methodologies to support National Authority.

Seismic - Acoustic Research ($8.8M)

Continue to derive new methods for enhancing detection, location, screening, and identification of seismic, oceanic, and atmospheric events.

Continue to develop computerized, rapidly executing techniques and algorithms to detect, locate, and identify seismic, acoustic and gases signals from operational sensor systems.

Continue research and development to improved understanding of source phenomenology and propagation for events near detection threshold.

Implementation/Compliance Support ($2.1M)

Conduct analyses and assessments of selected CTBT implementation and compliance issues.

Develop the types of information to be presented to policy and decision makers.

Develop cost effective techniques for arms control related databases.

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B. Program Change Summary

	FY1997	FY1998	FY1999
Previous President's Budget	0.0	0.0	0.0
Current President's Budget	0.0	0.0	63.1

Change Summary Explanation:

In accordance with the November 1997 Defense Reform Initiative, resources for FY 1999 and out which were previously addressed in PE 0603711H have been transferred to this PE. Increased funding beginning in FY 1999 supports the development and installation of the monitoring facilities in the U.S. required by the Comprehensive Test Ban Treaty.

C. Other Program Funding Summary.

	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
0603711H Verification Technology Demonstration	25.3	80.8	0.0	0.0	0.0	0.0	0.0

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APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/Advanced Technology Development - BA3**					R-1 ITEM NOMENCLATURE **Counterproliferation Support-Advanced Development; 0603160BR**			
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
Total 0603160BR Cost	0.0	0.0	70.6	68.1	64.2	65.0	66.3	Continuing
Project P535 SOF Counterproliferation Support	0.0	0.0	15.7	18.2	16.7	16.6	16.9	Continuing
Project P539 Counterforce	0.0	0.0	54.9	49.9	47.5	48.4	49.4	Continuing

A. Mission Description and Budget Item Justification - In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and U.S. Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

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Mission Description and Budget Item Justification (cont'd)

The November 1997 Defense Reform Initiative (DRI) directed the establishment of a Defense Threat Reduction and Treaty Compliance Agency effective 1 October 1998. As a result of the DRI, resources for FY 1999 and out which were previously addressed in Program Element (PE) 0603160D8Z have been transferred to this PE.

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Project P535 - SOF Counterproliferation Support: This project enhances U.S. capabilities to prevent or mitigate biological and chemical threats/attacks. The project is divided into two categories: First Responder projects and Special Operations Forces (SOF) projects.

The purpose of the First Responder projects is to quickly leverage DoD biological and chemical response, detection and mitigation technologies to crisis and consequence management response teams such as the U.S. Army Technical Escort Unit (USA TEU), the Navy Defense Technical Response Group (DTRG), the Federal Emergency Management Agency (FEMA), the U.S. Secret Service (USSS) and the Department of Public Health and Safety (PHS). These agencies have concepts of operation or employment doctrines considerably different from Major Theater of War (MTW) based nuclear, biological and chemical (NBC) defense doctrine. These projects are executed in conjunction with the Joint Chiefs of Staff CONPLAN 0300, the Office of the Assistant Secretary of Defense (Special Operations and Low Intensity Conflicts) and the Technical Support Working Group of the National Security Council's Interagency Working Group on Counterterrorism to ensure full interagency coordination of requirements. Specific projects are detailed below.

First Responder Projects:
Chemical/Biological Sentry System (CBSS)--A field portable sensor that can be deployed in civilian settings or venues such as stadiums and parks. Potential users of this technology are the PHS and FEMA.

Biological Detection Kit--Development of a first responder biological detection kit in conjunction with the U.S. Army Medical Research Institute for Infectious Diseases and Navy Medical Research and Development Center. Typical users will be the USA TEU, FEMA, PHS, U.S. Federal Drug Administration, and USSS.

Chemical Agent Recognition Training Aid—Develop a training aid that reproduces the visual and odor signatures and causes common chemical detectors to alert/warn in order to increase the effectiveness of training.

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Project P535 - SOF Counterproliferation Support (cont'd):
The SOF Projects will develop and demonstrate SOF unique devices that enable SOF and special mission units to detect, disable and neutralize Weapons of Mass Destruction (WMD) and their associated facilities under the direction of a geographic CINC in support of CONPLAN 0400. These techniques are leveraged from larger overall DoD programs. Specific details are classified.

FY 1999 Plans
First Responder Projects ($1,381K)
- Chemical/Biological Sentry System (CBSS)—Extend capabilities of system by optimizing chemical sensor technology.
- Detection/Electronic Diagnostics—Continue development of modified x-ray system, initiate development of additional techniques, such as close focus improved low light Night Vision Goggles (NVG) for suspect device inspection and interrogation.
- Neutralization—Assess capability of explosively driven magneto-hydrodynamic generators as a means of defeating very fast firing circuits on explosive devices.

SOF Projects ($14,282K)
- Specific details are classified.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Advanced Technology Development - BA3	R-1 ITEM NOMENCLATURE Counterproliferation Support-Advanced Development; 0603160BR

Project P539 - Counterforce: The purpose of this project is to develop technologies, demonstrate prototype systems in an operationally realistic environment and provide the warfighter with enhanced capabilities in response to current threat projections for potential adversaries who have the capability to develop and/or employ nuclear, biological and chemical (NBC) weapons in future regional conflicts involving the U.S. or its allies. The U.S. requires the capability to identify and characterize NBC research, production, storage and operational support facilities and be prepared to attack and neutralize them while mitigating collateral effects resulting from expulsion and release of NBC agents. The potential target set includes fixed, aboveground and underground hardened and unhardened facilities. The project started in FY 95 and was structured to exploit ongoing technology programs wherever possible. Early project emphasis was applied to efforts to predict and measure target response and dispersion of agents associated with attacks against NBC facilities using existing conventional weapons. Current emphasis is to mitigate collateral effects through advanced weapon development and greatly enhanced deliberate target planning leading to optimized weapon employment. The near-term focus is the demonstration of target planning tools, weapons and sensors supporting direct attacks on an expanded set of NBC targets. In the longer-term, the project emphasis will change to stand-off penetrating weapons, collateral effects assessment and the supporting planning tools. Prototype or modified systems integrating these technologies will then be evaluated in an Advanced Concept Technology Demonstration (ACTD), and a residual operational capability provided to the warfighters.

A second counterforce CP ACTD is approved by DUSD(AT) and is awaiting signature of the management plan. The original CP ACTD has been retitled CP1 ACTD for the first CP ACTD. The second CP ACTD is called the Second Counterproliferation Counterforce Advanced Concept Technology Demonstration (CP2 ACTD). FY 98 is the transition year with CP1 ACTD concluding and CP2 ACTD starting.

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Project P539 - Counterforce (cont'd) -
This project builds on previous Agency projects to develop and mature sensor systems to provide additional capabilities for pre-, trans- and post-attack target characterization, and damage and collateral effects assessments. The project further develops and accelerates capabilities in collateral effects prediction, target/weapon interaction prediction, and funds the integration of these capabilities into Service/CINC target planning systems. The project also builds on Service programs in advanced weapon guidance, penetration and fuze enhancements. Service weapon development expertise will be used to integrate complementary, demonstrated technologies into prototype weapons that can improve prompt response, enhance lethality and control collateral effects. The project milestones are broken into four major product areas or subprojects: sensors, collateral effects, target planning and weapons, plus the operational demonstrations.

Sensors - This effort will provide improved warfighting residual capabilities for facility characterization, battle damage assessment (BDA) and collateral effects assessment against the spectrum of NBC facilities. Research and development is currently in progress to characterize signatures from shallow underground facilities for exploitation by tactical unattended ground sensors (TUGS). Objectives of the current program include development of techniques for source identification, localization, and performing change detection in trans-attack signatures for weapon effectiveness analysis. Current intelligence community (IC) and Department of Energy (DoE) programs involve research and development to assess sensor performance and approaches for optimum sensor application for surface target detection and underground facility detection and characterization. Other project activities include enhancing the performance of existing forward looking infrared (FLIR) sensors and a weapon based sensor to provide high confidence BDA. This sub-project will leverage existing programs to (1) define concept of operations and sensor system (ground, air, and weapon based) architectures for BDA, collateral effects assessment and facility characterization; (2) develop and demonstrate sensor technologies and prototype sensor systems for BDA and facility characterization; (3) produce data fusion and processing module for BDA and facility characterization to meet user requirements on existing platforms; (4) produce an integrated BDA module to support airborne sensors; (5) develop and demonstrate a man-emplaced TUGS system that includes multi-sensor arrays; (6) integrate stand-off and point chemical sensors onto an unmanned air vehicle (UAV) and an expendable mini-UAV, respectively, and demonstrate the ability to confirm, identify, and assess the release of chemical agents in support of attacks on NBC facilities. CP2 ACTD sensors and data fusion will address confirming the presence of chemical agents post attack and assist in predicting transport patterns by updating pre-strike predictions of the potentially hazardous plume with real-time data. The CP2 ACTD sensor program will leverage on-going

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Project P539 - Counterforce (cont'd) - chemical sensor efforts within the chemical and biological defense community to minimize program risk in developing chemical sensors for counterforce missions. This program will also monitor the progress of remote biological agent detectors for potential incorporation into the collateral effects assessment systems.

Collateral Effects - The Collateral Effects program provides predictive tools for NBC expulsion and dispersion resulting from attacks on WMD facilities as well as acts of terrorism and hostile use of WMD for a variety of applications supporting NBC target attack planning. Requirements include high resolution weather models, weather measurement systems, and population databases. A key element in developing these collateral effects codes is chemical/biological expulsion tests and modeling. Modeling of chemical/biological expulsion sources will be based on theoretical model and empirical data. Codes will be validated from existing data, other predictive models and special collateral effects experiments. The collateral effects tools will provide pre-attack prediction and post-attack assessment. The Hazard Prediction and Assessment Capability (HPAC) is a major product that predicts the release and transport of NBC materials and the subsequent collateral effects. The high resolution weather prediction capability, another area of emphasis in the subproject, will provide timely wind, cloud, and precipitation data necessary for NBC collateral effects predictions. Weather data currently does not have the resolution or quality necessary. This weather data will also be available to other users in the theater such as Joint Warning Network (JWARN). These tools will also be integrated into the target attack planning tools to assess the consequences of attacks on WMD facilities.

Target Planning - This effort will provide a new deliberate planning combat assessment capability and a major upgrade for existing theater level planning capabilities for defeating or denying NBC facilities and capabilities. This effort builds upon the Integrated Munitions Effects Assessment (IMEA) planning tool developed for CP1. IMEA provides a forward deployable target planning capability for NBC targets. IMEA is an integration of the Munitions Effects Assessment (MEA) tool providing targeting solutions using conventional weapons for a variety of structures and equipment and the HPAC developed under the Collateral Effects subproject. The current effort will produce the Integrated Target Planning Tool Set (ITPTS) that will provide a spectrum of planning capabilities from deliberate to crisis. ITPTS includes IMEA II and high resolution weather prediction. IMEA II will import target data and import attack assessment data from prior planned strikes. ITPTS will also predict weapons performance and associated NBC collateral effects, develop targeting solutions that minimize collateral effects, and provide the results through the appropriate interfaces for a variety of targets including functionally and structurally complex facilities. The major differences between IMEA and IMEA II

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Project P539 - Counterforce (cont'd) - is a greatly enhanced interface to the Intelligence community and upgrades to handle additional target types including complex facilities, to handle additional weapons and platforms, to provide more operator friendly displays, to import attack assessment data, and to efficiently interface with Service planning systems. The ITPTS interfaces include but are not Limited to Global Command and Control System, the Service targeting and strike execution control systems, strategic and tactical intelligence and sensor systems, the weather community, and the NBC warning system. A key interface for CP applications is with the Tactical Multi-Sensor Fusion (TMSF), providing critical pre- and post-strike target characterization information. The "plug and play" architecture is required to accommodate differing CONOPS, theaters, and performers in several geographic locations. The deliberate planning capability requires significant input from the intelligence community including data regarding NBC facilities, processes, and surrounding populations. This effort will support the intelligence community in developing the necessary interfaces to provide for the efficient transfer of intelligence data. ITPTS will include IMEA II, IMEA II Prime, an advanced wind and weather prediction capability, and a "plug and play" architecture. This effort will execute a full verification and validation program for all delivered capabilities including extensive field testing at all functional levels.

Weapons - Conventional explosive-filled weapons are often relatively ineffective in destroying large underground reinforced concrete facilities. Even if the weapon detonates inside the facility, substantial interior walls and/or floors often confine the blast and fragmentation thus causing significant overpressure and venting through the penetration hole. Likewise conventional explosive-filled weapons often result in complete and uncontrolled destruction of soft buried and aboveground facilities. When these facilities protect NBC, the random use of conventional weapons greatly increases the risk of agent dispersal that may result in extensive civilian or force casualties. This sub-project will develop, integrate and demonstrate advanced conventional weapons technologies to improve mission effectiveness against NBC facilities while mitigating collateral effects. For CP1 ACTD, these technologies include improvements in adverse-weather/precision guidance, enhanced penetrating capabilities, and advanced fuzing options. Technologies that have been successfully demonstrated will be weaponized into prototype systems. Advanced fuzes will enable weapons employment options to maximize lethality and/or control collateral effects. The focus for CP2 ACTD is to provide the warfighter with a demonstrated option to attack NBC facilities in a stand-off mode. CP2 ACTD will improve on existing stand-off weapon platforms to provide enhanced penetration, advanced fuzing, and enhanced payloads that can reduce collateral effects by neutralizing agents before they are released or reducing the amount released. Stand-off weapons to be enhanced include the conventional Tomahawk Land Attack Missile (TLAM-C) and the Conventional Air Launched Cruise Missile (CALCM). Enhanced payloads will explore

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Project P539 - Counterforce (cont'd) - alternate warhead options to conventional blast/fragmentation with the objectives of mitigating collateral effects associated with dispersal of NBC materials while also minimizing the number of weapons required to functionally defeat WMD facilities.

Operational Demonstrations - The Counterproliferation ACTD will improve the operational capability for holding NBC targets at risk with minimum collateral effects. The objective is to integrate available or near-term technologies for sensors, weapons, collateral effects prediction and target planning tools, evaluate the technologies in an operational context, and transition improved capabilities rapidly to warfighters. Specifically, this project will enhance and accelerate existing programs to provide integrated target planning to include collateral effects prediction codes and sensors for facility characterization and BDA, and advanced weapons development programs to meet NBC target defeat requirements. This project will also support demonstration operations to include system operational concept, demonstration planning, scenario development, execution of the ACTD and post-demonstration analysis. Planning and execution of the ACTDs uses a time phased approach to screen candidate technologies for maturity, develop prototype systems and demonstrate enhancements in military capability against a warfighter prioritized subset of all potential NBC target types. This approach results in a cycle of prototype development and testing followed by periods of operational demonstration.

Two operational demonstration series were defined for the CP1 ACTD. The first demonstration, named Dipole Orbit (DO), was successfully completed in February 1997. This first demonstration used new target planning tools to determine the "best" employment of current weapons with a smart fuze against simulated biological agents housed in soft above-ground bermed structures. The second and final demonstration series, named Dipole Jewel (DJ), is scheduled for completion in July 1998. This demonstration will assess improved capabilities in weapons, sensors, and enhanced planning tools against a simulated, hardened chemical weapons production facility in a shallow-buried, cut-and-cover structure. After the start of CP1 ACTD, the sponsoring command identified a need to understand their ability to conduct counterforce operations against soft above-ground simulated chemical production facilities using the TLAM-C. The Dipole Tiger (DT) demonstration series was added as a quick response to the users' request. DT started in April 1997 and will end in FY 98.

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Project P539 - Counterforce (cont'd) - Four operational demonstration series are planned during CP2 ACTD over the period of FY 1999-2002 to provide the sponsor and participating commands with the opportunity to assess the utility of the selected technologies. The objective of the first demonstration series in CP2 ACTD, called Dipole Xeric (DX), is to employ current technology products in weapons and improved target planning tools, using new weapon delivery tactics, and operationally demonstrate their enhanced penetration capabilities against a simulated chemical agent production and storage facility considerably harder than the structure used during CP1 ACTD Dipole Jewel Series. The objective of the second demonstration series, called Dipole Yukon (DY), is to exploit near-term technology by demonstrating the baseline capabilities of the Joint Air-to-Surface Stand-off Missile (JASSM) to conduct chemical/biological (C/B) counterforce missions through operationally realistic attacks against a simulated biological weapons storage facility. The objective of the third demonstration, called Dipole Zodiac (DZ), is to assess the suitability of the CALCM with a penetrating warhead and a Predator UAV-based stand-off sensor providing collateral effects assessment. The objective of the fourth demonstration series, called Divine Canberra (DC), is to evaluate the end-to-end set of products of the CP2 ACTD including the target planning tool, in its final operational context, a TLAM stand-off attack penetrating weapon capability, and remote combat assessment using a small expendable mini - UAV with a chemical point sensor on-board (and deployed from the Predator UAV demonstrated in DZ) against a relatively hard chemical production and storage facility. DC also includes demonstration of a weaponized enhanced payload.

FY 1999 Plans

Sensors ($15,850K)

- Refine hardware and communications design for TUGS.
- Evaluate performance of upgraded remote or standoff chemical agent detectors for the counterforce role, and initiate CONOPS development, data fusion and define Predator UAV interface requirements.
- Complete testing of mini-UAV chemical point sensors for CP counterforce mission.
- Design, configure and fabricate components for combat assessment mini-UAVs and initiate ground and airborne testing.
- Continue design modifications of Predator UAV platform for remote sensing and delivery of mini-UAV.
- Continue Predator UAV sensor system integration and subsystem test and evaluation.

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Project P539 - Counterforce (cont'd) -

Collateral Effects ($8,100K)

Deliver a theater weather server and provide high resolution predictive weather capability for regional operations.

Execute validation tests for Collateral Effects models.

Deliver HPAC 4.0 to support the FY 99 Dipole Xeric ACTD.

Deliver Wet Biological Source Term Model.

Initiate Collateral Effects Urban Transport Model.

Target Planning ($5,500K)

Develop and deliver a comprehensive multiple weapon attack planning capability.

Execute precision sub-system level tests to generate target planning tool validation data.

Complete software architecture development and initiate development of ITPTS.

Develop interface software for ITPTS.

Complete and deliver IMEA 3.2 software to support Dipole Xeric Demonstration.

Weapons ($18,779K)

Design and test ITAG enhancements.

Fabricate and test HTSF hardware for expanded capabilities.

Conduct CALCM penetrator systems design and integration.

Conduct TLAM penetrator systems integration.

Initiate TLAM air-vehicle modification design and fabrication.

Continue smart fuze design to meet Navy certification requirements.

Continue penetrator warhead design, fabrication, and test for TLAM.

Complete scale tests of selected high temperature incendiaries (HTI) and chemical neutralization agents against simulated chemical and biological agents.

Fabricate static test articles for payloads program.

Initiate full scale static tests of selected payloads concepts.

Begin weaponization of selected payloads concept.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Advanced Technology Development - BA3	R-1 ITEM NOMENCLATURE Counterproliferation Support-Advanced Development; 0603160BR

Project P539 - Counterforce (cont'd) -

Continue modeling and simulation to support concept screening and down-select.

Continue development of enhanced weapon lethality models.

Operational Demonstration ($6,719K)

Complete CP1 ACTD analysis/report.

Conduct Dipole Xeric demonstration.

Complete target construction for Dipole Yukon.

Initiate Dipole Yukon demonstration.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/Advanced Technology Development - BA3**	R-1 ITEM NOMENCLATURE **Counterproliferation Support-Advanced Development; 0603160BR**

B. Program Change Summary	FY1997	FY1998	FY1999
Previous President's Budget	0.0	0.0	0.0
Current President's Budget	0.0	0.0	70.6

Change Summary Explanation:

SOF Projects funding increase based on findings recently amplified in the Quadrennial Defense Review (QDR) to increase funding for special operations forces counterproliferation activities; funding increase for CALCM based on findings recently amplified in the Quadrennial Defense Review (QDR) to strengthen U.S. counterproliferation capabilities.

In accordance with the November 1997 Defense Reform Initiative, resources for FY 1999 and out which were previously addressed in PE 0603160D8Z have been transferred to this PE.

C. Other Program Funding Summary. None.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/RDT&E Management Support - BA6**					R-1 ITEM NOMENCLATURE **Counterproliferation Support; 0605160BR**			
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
Total 0605160BR Cost	0.0	0.0	9.9	9.7	10.3	8.5	8.7	Continuing
Project P542 CP Architecture Studies and Management Oversight	0.0	0.0	7.9	7.7	8.0	6.2	6.3	Continuing
Project P545 Nuclear Matters	0.0	0.0	2.0	2.0	2.3	2.3	2.4	Continuing

A. Mission Description and Budget Item Justification - In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and U.S. Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

The November 1997 Defense Reform Initiative (DRI) directed the establishment of a Defense Threat Reduction and Treaty Compliance Agency effective 1 October 1998. As a result of the DRI, resources for FY 1999 and out which were previously addressed in Program Element (PE) 0605160D8Z have been transferred to this PE.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 1998**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/RDT&E Management Support - BA6**	R-1 ITEM NOMENCLATURE **Counterproliferation Support; 0605160BR**

Project P542 - Counterproliferation Architecture Studies and Management/Oversight: This project provides essential technical, architectural, and integration support to the CP Support Program. The project will: (1) conduct analyses and planning activities necessary for program development, project prioritization and management oversight; (2) prepare required program deliverables such as the annual CP Report to Congress and internal DoD and interagency documents; and (3) provide technical and analytical support to the established CP review groups, including the congressionally mandated Counterproliferation Program Review Committee (CPRC). This project provides the critical manpower necessary in conducting the day-to-day operations of the CP Support Program and in providing the required OSD management oversight as described in the CP Support Program's Program Management Plan.

FY 1999 Plans

Systems Engineering and Technical Analysis ($3,360K)

- Continue CP program management, programmatic and technical planning support.
- Continue CP technical analyses support and technical program oversight support.
- Continue CP interagency program coordination and integration activities (CPRC, Nonproliferation and Arms Control Technology Working Group).
- Continue CPRC Annual Report to Congress.
- Continue support to PA&E and Joint Staff for WMD effects analyses.

CP architectural studies and assessments ($4,502K)

- Continue trade-off analyses of contributions of selected DoD acquisition efforts to DoD counterproliferation capabilities.
- Assess technology needs to enable U.S. forces to counter WMD proliferation.
- Assess hard target kill technologies including mission planning tools, battle damage assessment and intelligence preparation of the battlefield.
- Assess first responder/SOF WMD technology needs.
- Continue CP Capabilities Working Group.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 1998**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/RDT&E Management Support - BA6**	R-1 ITEM NOMENCLATURE **Counterproliferation Support; 0605160BR**

Project P545 - Nuclear Matters: Nuclear weapons receive special consideration within OSD because of the political and military importance, their destructive power and the potential consequences of an accident or an unauthorized act. Consequently, nuclear weapons issues must receive senior level attention and action/support. Complex and demanding issues exist pertaining to stockpile levels and stockpile maintenance and stewardship in collaboration with the Department of Energy, especially in view of an aging stockpile and the moratorium on underground nuclear testing. Project 545 provides support for analysis and assessments of issues associated with the reliability, safety, security, transportation, command and control, maintenance, storage and sustainability of the enduring stockpile.

FY 1999 Plans

Nuclear Matters ($2,012K)

- DoD oversight of DOE stockpile stewardship activities.
- Nuclear Weapons Council support.
- Support activities in the conduct of international fora.
- Support to DoD policy formulation on nuclear weapons safety, use control, survivability, certification, transportation and reliability.
- Analyses and support activities for senior level advisory groups.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 1998**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-Wide/RDT&E Management Support - BA6**	R-1 ITEM NOMENCLATURE **Counterproliferation Support; 0605160BR**

B. Program Change Summary	FY 1997	FY 1998	FY 1999
Previous President's Budget	0.0	0.0	0.0
Current President's Budget	0.0	0.0	9.9

Change Summary Explanation:

In accordance with the November 1997 Defense Reform Initiative, resources for FY 1999 and out which were previously addressed in PE 0605160D8Z have been transferred to this PE.

C. Other Program Funding Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003
0605160D8Z Counterproliferation Management Support. P542	5,485	5,500					
0603160D8Z Counterproliferation Advance Development	61,840	65,212	0	0	0	0	0
0603160BR Counterproliferation Support - AdvDev			70,611	68,110	64,180	65,004	66,280