Table of Contents for Volume 2 in R-1 order

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 2 - Applied Research

PE NUMBER AND TITLE: 0602173C Support Tech - Applied Research

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	93466	88365	37747	13839	14177	55754	51160	TBD	TBD
1180 Surveillance Technology	310	3994	0	0	0	0	0	TBD	TBD
1280 Interceptor Technology	955	0	0	0	0	0	0	TBD	TBD
1461 BMC4I	6758	11164	0	0	0	0	0	TBD	TBD
1651 Innovative Science and Technology (IST)	22843	17475	7862	8832	9186	13746	14714	Continuing	Continuing
1660 Statutory and Mandated Programs	62600	55732	29885	5007	4991	42008	36446	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element includes in project 1651 the only applied research project in the Department of Defense, which focuses specifically on future BMDO technical requirements.

To prepare to meet critical future active defense needs, the Innovative Science and Technology (IS&T) project invests in an aggressive program of high leverage technologies that yield markedly improved capabilities across a selected range of boost phase methods and terminal defense interceptors, advanced target sensors, and innovative science. Program investments are to provide 1) component technologies that offer improved performance or reduced costs for BMDO acquisition programs, 2) better understanding of the material characteristics and physics for processes that form the basis of technologies, and 3) technical solution options to mitigate far-term and unpredicted threats. Unlike other BMDO projects that fund near term technology and testing efforts, this advanced technology initiative invests seed money in high-risk technologies that could significantly change how BMDO develops future systems. Specific technology areas of interest include 1) sensing, imaging, ranging, and discrimination, 2) phenomenology studies, 3) electronic and photonic materials and devices, 4) information processing and computing technologies, 5) directed energy, non-linear optical devices and processes, 6) agility and kill enhancement, and 7) power generation and conditioning. This project conducts proof-of-concept research and matures novel technologies for transition to advanced development. IS&T programs more closely aligned with existing BMDO Surveillance, Interceptor, and BMC4I technology efforts are managed under these programs respectively.

Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs are managed under project 1660. Pursuant to PL 102-564, a two-phased competition for small businesses with innovative technologies is conducted, focusing on relevant BMDO technologies with an emphasis on technologies with commercial application potential.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

The program objective of the Technology Applications (TA) Program, established in 1986, is to develop and support the transfer of BMD derived technology to other Department of Defense agencies as well as other federal, state, and local government institutions, laboratories, universities, and industry. Incorporation of these by the private sector and other government agencies can result in reduced unit costs and further improvements to be made available for future applications in BMDO systems.

The Historically Black Colleges and Universities/Minority Institutions (HBCU/MI) program is also managed in project 1660 under this program element. The HBCU/MI Program increases and improves the participation of minority colleges and institutions in the BMDO program. It also responds to Section 832 of Public Law (PL) 101-510, which establishes a specific goal for HBCUs and MIs within the overall five percent goal for minority research grants, and introduces them to BMDO technologies and the particulars of the BMDO procurement process.

Many of today's baseline technologies on BMDO systems like Theater High Altitude Area Defense (THAAD), Patriot Advanced Capability (PAC3), and Ground Based Radar (GBR) are viable due to the wise investment in innovative technologies some 10 or more years ago. Examples include: indium antimonide and mercury cadmium telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight satellite structures; interferometric fiber-optic gyroscopes for miniaturized guidance and control systems; and solid-state gallium arsenide transmitter/receivers for advanced BMDO radars.

Acquisition Strategy: The IS&T R&D program solicits proposals by an annual Broad Agency Announcement (BAA) of research opportunities. Proposals received are competitively judged according to BMD innovation, relevance, cost, and capabilities of the offeror. The HBCU/MI program also receives proposals in response to a biannual BAA. For the SBIR and STTR programs, strong emphasis is placed on the commercial nature of the proposed effort. BMDO conducts an annual SBIR/STTR solicitation and competition, and the executing agents award and manage the contracts. BMDO employs government executing agents, called Science and Technology Agents (STAs) from the three services and NASA, with each STA responsible for a specific technical area. The STA's are the appropriate points of contact to, and for, the research community.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

FY 1999 Accomplishments:

•	22843	IS&T (1651) Two key technologies developed by the IS&T program were transitioned to flight demonstration in joint agency programs in FY99. First, Hall thruster technology was launched and demonstrated in a joint BMDO/Navy/NASA/NRO program and Solar Concentrator Arrays with Refractive Linear Element Technology (SCARLET) initiated in IS&T flew on NASA's Deep Space 1 probe. These technologies can greatly reduce required spacecraft mass in BMDO-related missions such as SBIRS-low (estimated savings in applications of this class are $5M/spacecraft). The Dual Mode Experiment on Bowshock Interactions (DEBI) completed CDR and is on schedule for flight in FY00. Continued development of imaging technologies for extremely bright background scenarios provided direct coverage of various National missions including, for example, NASA's Cassini probe (launch critical), Navy TMT-2 and TTV-1, and THAAD. Continued development of several innovative sensing technologies including a computer tomography imaging spectrometer, and multiwavelength devices. Transferred new ASIC technology for massively paralleled miniature, autonomous tracking and recognition systems. Developed and demonstrated a shoe box size, gray scale optical correlator for on-board ATR. Continued development of active sensors, ranging LADAR, and algorithms for sensor data fusion. Demonstrated six degree of freedom platform stabilization to milliradian tolerances. Initiated research on antenna-coupled bolometers for very innovative LWIR sensors and polarimetry. Initiated research on new guidance and control algorithms for advanced, high performance interceptors. Completed investment in electric propulsion technology – transfer to NASA for flight demonstration. Demonstrated key new propulsion technologies and developed simulations and system requirements for miniature interceptor systems.
•	1270	Tech Apps. (1660): TA Database: Maintained up-to-date information on potential BMD programs that have commercial applications. Updated graphics and interactive modes into national information infrastructure on BMD-sponsored technologies. Panel Reviews: Provided assistance to large, medium and small businesses wishing to bring BMD-supported technology to the commercial market. Outreach: Developed assistance publications, brochures and target articles for journals and newspapers, quarterly newsletters, conference exhibits, and advertisements in reports on BMDO technology. Networking: Expanded results of technology transfer by working with other Federal technology transfer organizations and activities such as the OSD Director DDR&E Office of Technology Transition, NASA, and DOE. Interacted with professional/technical associations and societies involved with technology transfer.
•	57101	SBIR/STTR (1660): 183 Phase 1 SBIR Awards to 150 firms and 70 Phase II SBIR awards to 60 firms.
•	1349	HBCU/MI (1660): Will incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.
•	2880	Civilian Salaries for Executing Agents (EAs).
•	8023	Demonstration projects for fault tolerant computing, high rate data processing, satellite to ground laser communications, Gallium Nitride (GaN) power amplifiers, innovative sensor fusion algorithms and processors, and miniature interceptor technologies formerly executed under Project 1651 executed under Projects 1180, 1280, and 1461 in FY1999.
Total	93466	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

FY 2000 Planned Program:

•	17475	IS&T (1651) As funding permits, continue innovative applied research tasks. Fly the Dual Mode Experiment on Bowshock interactions and compare results to existing phenomenology model. Continue plume phenomenology investigations for discrimination, typing, and hardbody handover. Continue development of innovative sensor technology including the computer tomographic spectrometer, antenna-coupled bolometers, and multiwavelength imagers. Develop ultrafast switches and wavelength multiplexed transmitters for advanced communications systems. Continue development of advanced algorithms for guidance and control. Continue development of advanced neural networks and other technologies for on-board autonomous navigation and control. Initiate innovative ultra wide band radar development effort. Continue development of advanced miniature interceptor technology, propellant technology, and kill enhancement technologies. Continue development of active sensing technology and phenomenology for hypersonic interceptors. Continue to provide testbed for advanced sensor demonstrations and to provide coverage for national missions.
•	952	Tech Apps. (1660): TA Database: Maintain up-to-date information on potential BMD programs that have commercial applications. Update graphics and interactive modes into national information infrastructure on BMD sponsored technologies. Panel Reviews: Provide assistance to large, medium, and small businesses wishing to bring BMD supported technology to the commercial market. Outreach: Develop assistance publications, brochures and target articles for journals and newspapers, quarterly newsletters, conference exhibits, and advertisements in reports on BMDO technology. Networking: Expand results of technology transfer by working with other Federal technology transfer organizations and activities such as the OSD Director DDR&E Office of Technology Transition, NASA and DOE. Interact with professional/technical associations and societies involved with technology transfer and commercialization.
•	48419	SBIR/STTR (1660) : Estimated 195 Phase 1 SBIR Awards to 160 firms and 75 Phase II SBIR awards to 70 firms
•	1244	HBCU/MI (1660): Will incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.
•	5117	Civilian Salaries for EAs
	15158	Continue development of multi-spectral image sensors to enhance capabilities for detection of ballistic and cruise missiles. Continue development of laser communications system technology and testing of high bandwidth optical communications between multiple platforms. Conduct high frequency (HF) radar research.
Total	88365	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

FY 2001 Planned Program:

- 7862 IS&T (1651): As funding permits, continue to investigate critical technologies in the seven key areas noted above subject to progress in the technical areas.
- 994 Tech Apps. (1660): TA Database: Maintain up-to-date information on potential BMD programs that have commercial applications. Update graphics and interactive modes into national information infrastructure on BMD sponsored technologies. Panel Reviews: Provide assistance to large, medium, and small businesses wishing to bring BMD supported technology to the commercial market. Outreach: Develop assistance publications, brochures and target articles for journals and newspapers, quarterly newsletters, conference exhibits, and advertisements in reports on BMDO technology. Networking: Expand results of technology transfer by working with other Federal technology transfer organizations and activities such as the OSD Director DDR&E Office of Technology Transition, NASA and DOE. Interact with professional/technical associations and societies involved with technology transfer and commercialization.
- 24767 SBIR/STTR (1660): Estimated 175 Phase 1 SBIR Awards to 145 firms and 70 Phase II SBIR awards to 65 firms
- 1294 HBCU/MI (1660): Will incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.
- 2830 Civilian Salaries for EAs

Total 37747

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	0	97436	65328	52992
Congressional Adjustments			24000	
Appropriated Value			89328	
Adjustments to Appropriated Value				
a. Congressional General Reductions			-959	
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming			-4	
e. Rescissions				
Adjustments to Budget Years Since FY 2000 PB	0	-3970		-15245
Current Budget Submit (FY 2001 PB)	0	93466	88365	37747

Change Summary Explanation:

Significant changes due to funding of SBIR in FY00 and elimination of FY01-05 SBIR funding to implement OSD Program Budget Decision.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603173C Support Tech - Adv Tech Dev

	COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	273397	212837	93249	91625	89117	88428	88644	Continuing	Continuing
1180	Surveillance Technologies	35598	30652	26037	24562	25552	20635	20798	Continuing	Continuing
1280	Interceptor Technologies	72100	60950	38297	39998	37355	42485	40933	Continuing	Continuing
1360	Directed Energy Program *	120975	73199	0	0	0	0	0	TBD	TBD
1461	BMC4I	11845	5266	7765	7003	7803	7798	7326	Continuing	Continuing
1660	Statutory and Mandated Programs	0	2930	2925	2934	2949	2992	3035	Continuing	Continuing
3354	Targets	0	12863	0	0	0	0	0	TBD	TBD
3360	Test Resources	2210	0	0	0	0	0	0	TBD	TBD
4000	Operational Support	30669	26977	18225	17128	15458	14518	16552	Continuing	Continuing

* FY01-05 funding transferred to PE 0603174C.

A. Mission Description and Budget Item Justification

To prepare for critical future active defense needs, BMDO will conduct a balanced program of high leverage technologies, including international cooperative efforts, that yield improved capabilities across a selected range of advanced interceptor, sensor, and battle management technologies as well as advances in innovative science. The objectives of these investments are components and subsystems with improved performance and reduced costs for acquisition programs.

The BMD technology program is designed to resolve many key R&D issues for future Theater and National Missile Defense systems. BMDO crafts the program as a component of the overall Department technology area plan. The efforts include:

- Advanced active and passive sensor technology development, which is needed to detect, track, discriminate, and intercept advanced BMD threats. This includes the detection and tracking of low observable targets and other high-leverage sensor technologies (Project 1180).
- Development and integration of the critical technologies for performing hypervelocity hit-to-kill intercepts of ballistic missiles within and outside the atmosphere. Development and demonstration of advanced interceptor sensor processing and power components; interceptor guidance and divert subsystems, multifunctional materials and structures; low cost interceptor composite manufacturing processes; and low cost flight test demonstrations. (Project 1280).

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

- Development and integration of advanced chemical laser systems technologies in pursuit of an integrated ground demonstration in a project structure leading to an Integrated Flight Experiment (IFX) in FY12-13 demonstrating the feasibility of a space-based boost phase intercept system. A new Program Element (0603174C – Space Based Laser) has been created to provide funding for this effort starting in FY01. (Project 1360).
- BMD Battle Management Command, Control, Communication, Computers and Intelligence (BMC4I) Advanced Technology programs to develop kill assessment, high-speed computing, secure & reliable communications, sensor fusion and interoperability technologies for NMD and TMD programs. (Project 1461).
- Development of low cost ballistic missile launch vehicle alternatives. (Project 3354).
- Required manpower and the associated costs specifically aligned with the performance of these programs (Project 4000).

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of each Program Element Summary.

FY 1999 Accomplishments:

- 35598 Surveillance Technology: Continued satellite operation and data analysis for the Midcourse Space Experiment (MSX), including support of the AFSPC/OSD Advanced Concept Technology Demonstration (ACTD) for space surveillance. Completed performance analysis of Solar Concentrator Array with Refractive Linear Element Technology (SCARLET) flight experiment data. Delivered Space Technology Research Vehicle-1d (STRV-1d) flight experiments. Funded Advanced Radar Technology (ART) work in the areas of Transmitter/Waveform Generators, Antennas, and Receiver/Signal Processors used by MDAP systems. Established tri-service integrated product teams (IPTs) and working-level IPTs to assist the selection and management of future ART and Advanced Passive Technologies (APT) projects.
- 72100 Interceptor Technology: Completed AIT Integrated Test Bed (ITB) technology trades. Conducted initial testing of Jet Interaction, strapdown IR seeker (SIS) and solid divert and attitude control system (SDACS). Continued DITP Laser Radar, Passive Sensor, and Fusion Processor/Algorithm component development. Conducted laboratory testing of intermediate GFE subsystems. Continued definition of Master Frequency Generator (MFG). Completed development of interceptor thermal battery. Continued development of lightweight high performance multi-functional structures for interceptors. Continued development of advanced technology components for future interceptor systems.
- 11845 BMC4I Technology successfully launched Advanced Plasma Experiment Rocket and conducted space plasma experiment for use in kill assessment phenomenology project. Continued development of phase array antenna for reliable communications links to ground-based interceptor. Initiated national level hardware-in-loop (HWIL) test bed to allow real time, high fidelity TMD & NMD simulations. Completed program prioritization for Technology Master Plan. Continued development of an ultra-high speed laser communications experiment for satellite to ground communication. Continue Gallium Nitride Power Amplifier Program for radars.
- 120975 SBL: Awarded contract to a Joint Venture with scope permitting an Integrated Flight Experiment (IFX). Completed first of two phases of a High Energy Laser Affordability and Architecture Study. Reviewed previous high power test data; upgraded facilities and diagnostics; identified anomalies; and conducted two high power laser optimization tests. Completed low power beam control test series and developed beam profile generator. Initiated field testing for the High Altitude Balloon Experiment (HABE) of Acquisition, Tracking and Pointing (ATP) technologies and passively tracked targets of opportunity. Procured uncooled resonator optics processing equipment, selected cutting fluid, and selected coating vendor.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

•	2210	Operations and Maintenance: Provided funds for the Aero-Optic Evaluation Center (AOEC) located at the Calspan-University of Buffalo Research Center (CUBRC) and the Army Missile Optical Range (AMOR) located on Redstone Arsenal, Alabama.
•	30669	Management and Operational Support: Continued providing management and support for BMDO and TO overhead/indirect fixed costs, and continued to provide management and analysis support to the technology program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.
Total	273397	

FY 2000 Planned Program:

•	30652	Surveillance Technology: Continue intermediate level analysis of Midcourse Space Experiment (MSX) data in support of Space Based Infrared System (SBIRS) and NMD/GBI. Support the final year of the Space Based Space Surveillance Operations (SBSSO) Advanced Concept Technology Demonstration (ACTD) in conjunction with the Air Force Space Command. Continue to provide research and development of radar technologies in the areas of Transmitter/Waveform Generators, Antennas, Threats/Environments, Receiver/Signal Processors, Controller/Data Processors, and Electro-Mechanical Support used by MDAP systems. Launch STRV-2 and STRV-1d flight experiments. Continue development of advanced technologies for space surveillance systems. Complete data analysis of SCARLET flight experiment. Conduct engineering analysis including update of Technology Master Plan.
•	60950	Interceptor Technology: Complete Jet Interaction testing and initial model validation, SIS prototype design, SDACS prototype design. Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR) of Multi-Frequency Generator (MFG) for PAC-3. Deliver and test Discriminating Interceptor Technology Program (DITP) sensor subsystems. Begin integration of DITP sensor subsystems. Ground test DITP fused-sensor brassboard system. Begin trade studies for design of multi-functional interceptor structure. Continue development of advanced technology components for future interceptor systems.
•	5266	BMC4I Advanced Technology: Continue APEX data reduction and intercept debris model development from kill assessment experiments; conduct satellite laser communications experiments; continue development of a high fidelity geographically distributed virtual computing test bed to connect BMDO simulation and HWIL assets. Continue development and research for NMD and TMD Kill Assessment modeling and simulation. Leverage communications infrastructure to extend range and bandwidth of missile defense nodes. Initiate development of advanced metric tracking and discrimination, correlation, fusion processing and networking technology to improve Situational Awareness and Engagement.
•	73199	SBL: Create a project baseline in an Integrated Program Execution Plan (IPEP) outlining the design, development, test, and risk reduction activities leading to an integrated ground demonstration known as an Integrated Payload Technology Demonstration (IPTD) on the path to an Integrated Flight Experiment (IFX). Complete phase II of the HEL AAS. Publish environmental assessment report for candidate sites of the new test facility. Conduct risk reduction activities such as: high power laser optimization for flow conditions, alignment, and reverse wave suppression; beam control system improvements; high power autonomous alignment tests; uncooled resonator and gain generator ring fabrication; and ATP tests at WSMR against full scale boosting targets. Define SBL operational concept from operational and architectural perspectives.
•	2930	Civilian Salaries for BMDO.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

•	12863	EXCALIBUR: Conduct continued development of low cost ballistic missile launch vehicle alternatives. Funding will provide for award of a follow-on Phase III SBIR effort to build a liquid fueled target based on the Excalibur design engine for a short duration test firing, and to conduct additional design studies and prototype development for vehicle subsystems. SCORPIUS: Continue development of a low cost expendable space-launch vehicle. Funding will provide for technology demonstration vehicles that will have application as TBM targets.
•	26977	Management and Operational Support: Continue providing management and support for BMDO and ST overhead/indirect fixed costs, and continue to provide management and analysis support to the technology program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.
Total	212837	

FY 2001 Planned Program:

•	26037	Surveillance Technology: Complete analysis of MSX data in support of SBIRS and NMD/GBI programs. Continue research development and evaluation of radar technologies in the areas of Transmitter/Waveform Generators, Antennas, Threats/Environments, Receiver/Signal Processors, Controller/Data Processors, and Electro-Mechanical Support used by MDAPs. Refine the MDAP technology transition framework for sufficiently matured radar technologies. Complete STRV-2 and STRV-1d on-orbit space experiments and continue analysis of experiment data. Begin design of SPEDE flight experiment as funding permits.
•	38297	Interceptor Technology: Complete Jet Interaction model validation. Deliver prototypes for SIS and SDACS. Deliver MFG to PAC-3. Deliver test equipment and fused-sensor system for DITP Flight Test-1. Ground test DITP flight hardware. Begin design of advanced multi-functional interceptor structure. Continue development of advanced technology components for future interceptor systems.
•	7765	BMC4I Advanced Technology: Complete data reduction on kill assessment experiments; provide kill assessment debris model to NMD and TMD programs. Complete operation and testing of a high speed, high fidelity virtually distributed in the Hardware-in-the-loop (HWIL) test bed; develop and provide accurate kill assessment models for BMDO interceptors; continue NMD and TMD Kill Assessment modeling and simulation. Initiate development of advanced interoperability messaging and translation protocols to improve communications. Initiate development of pre-planning and adaptive battle management tools to improve real-time battle status assessment. Continue to develop advanced metric tracking and discrimination, correlation, fusion processing and networking technology to improve Situation Awareness and Engagement (SAE). Begin to develop modeling and simulation tools and HWIL test-to evaluate BMC4I technologies integrated with representations of the actual sensors and weapons systems under development. Complete demonstration of satellite to ground laser communications experiment.
•	2925	Civilian Salaries for BMDO.
•	18225	Management and Operational Support: Continue providing management and support for BMDO and ST overhead/indirect fixed costs, and continue to provide management and analysis support to the technology program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.
Total	93249	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603173C Support Tech - Adv Tech Dev

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	272820	173704	180826
Congressional Adjustments		+41000	
Appropriated Value		214704	
Adjustments to Appropriated Value			
a. Congressional General Reductions		-1858	
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming		78	
e. Rescissions			
Adjustments to Budget Years Since FY 2000 PB	+577		-87577
Current Budget Submit (FY 2001 PB)	273397	212837	93249

Change Summary Explanation: Significant FY00 increase due to Congressional action. Significant FY01 decrease due to transfer of SBL program funding to new SBL PE 0603174C.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603174C Space Based Laser

PROJECT: 1360

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1360 Directed Energy Program	0	0	74537	74475	74410	74325	74253	Continuing	Continuing

A. Mission Description and Budget Item Justification

BMDO has the charter to provide for defense against current and future missile threats. An effective ballistic missile defense against a wide variety of current and near-term projected threats will require boost phase intercept capability. The Space Based Laser (SBL) Project was created to provide the nation with a highly effective, continuous, global boost phase intercept option for both national and theater missile defense (NMD and TMD). While BMDO is pursuing numerous terminal and midcourse intercept concepts, this program element (0603174C, formerly part of PE 0603173C), project number 1360, and the companion AF program element (0603876F) fund technology development for the only boost phase intercept concept that can provide national missile defense and operate in all theaters, regardless of size, geometry, or weather conditions. This system may also provide many ancillary capabilities, including air defense, global surveillance, and target detection and designation for other systems. Unique features of an SBL missile defense system include global, 24-hour boost phase intercept capability and defense against surprise first strikes. An SBL system could destroy missiles whose range is greater than 75 miles, providing a robust first layer for missile defenses-in-depth. The SBL system does not require prior knowledge of enemy launch site locations. The footprint of one SBL platform can cover approximately 10% of the earth. A constellation of twenty SBL platforms could provide overlapping full-time coverage of missile threats from theaters anywhere. Each SBL platform would be capable of destroying approximately 100 missiles with the initial fuel load. Capability for on-orbit refueling would be provided. An SBL system could defend against missiles without putting the lives of US military personnel at risk. With its long range and speed-of-light engagement capability, it accomplishes boost phase intercept at the earliest possible moment, offering the highest probability that intercepted missile fragments (possibly containing active chemical/biological or nuclear materials) will fall within the attackers territory, not on defended assets.

The SBL project was structured to address the key critical technical issues: (1) Can a chemical laser be built powerful enough to destroy a missile at militarily useful ranges? (Alpha program); (2) Can mirrors and optics be built large enough and easily enough? (Large Advanced Mirror Program (LAMP) and Large Optical Segment (LOS)); (3) Can the high power beam be controlled adequately? (Large Optics Demonstration Experiment, LODE); (4) Can the high power components of a Space Based Laser be integrated on the ground and operated as a system? (Alpha LAMP Integration (ALI)); (5) Can missile targets be acquired and tracked from space and can a laser be pointed and fired accurately enough? (Acquisition, Tracking, Pointing, and Fire Control (ATP/FC)); (6) Can these key components be integrated into a functional unit suitable for space flight and remote operation? (Space Based Laser integrated ground demonstration known as the Integrated Test Unit (ITU)); (7) Can the fully integrated system operate adequately on-orbit? (SBL Integrated Flight Experiment (IFX)).

Progress To Date: The Project demonstrated the answer to questions 1 through 4 (and partially 5) is "yes," and has built devices to perform the respective functions. (1) The Alpha program high energy chemical laser achieved weapons-class power in 1991. (2) LAMP and LOS demonstrated the ability to build optics of the required dimensions with the successful fabrication of a 4-meter segmented mirror in 1989 and a key segment of an 11 meter mirror in 1993. (3) The Large Optics Demonstration Experiment (LODE) demonstrated the ability to control the projected (or outgoing) beam in low power laser experiments in 1987. (4) The Alpha LAMP Integration (ALI) experiment demonstrated integrated open loop and closed loop fast steering mirror (FSM) and deformable mirror (DM) system operation in 1997. (5) The basic technologies of acquiring and tracking missiles and pointing a high power laser beam from ground and space were demonstrated by a number of programs. The necessary ATP/FC technologies (sensors, optics, processors, etc.) were demonstrated at or near performance levels required for the SBL system. Stable low power laser beam pointing from a space platform was demonstrated at the precision level required for an operational SBL in 1991 during the flight of the Relay Mirror Experiment (RME).

	DATE **February 2000**
BUDGET ACTIVITY **3 - Advanced Technology Development**	PE NUMBER AND TITLE **0603174C Space Based Laser**

The high power components of an SBL payload were integrated at the Capistrano Test Site (CTS) and successfully achieved project objectives, thereby validating the SBL beam generation and control concepts. The ALI experiment successfully achieved all of its objectives: 1) the integration of the Alpha high power laser with a LODE-derived beam control system and a beam expander using the LAMP 4 meter mirror; 2) the use of uncooled optics in a high power beam train; and 3) the high power operation of the integrated hardware (LAMP with Holographic Optical Elements (HOEs), Outgoing Wavefront Sensor (OWS) behind the secondary mirror, and FSM and DM control optics).
On 20 Feb 97, the first integrated high power test of SBL technologies was successfully conducted at CTS. The second high power test was completed on 16 Jul 97, with the OWS controlling the steering of the high power beam through the 4 meter LAMP mirror. The third, and final, high power test of the ALI experiment was completed on 22 October 1997, with the OWS controlling the steering and wavefront error of the high power beam through the 4 meter LAMP mirror. The water-cooled deformable mirror was replaced by an uncooled deformable mirror, and it performed successfully during a high power test on 9 June 1998. Data from high power laser optimization tests on 10 and 19 August 1999 are being analyzed. These tests are meant to demonstrate alignment correctability and performance repeatability. The next major tests planned for CTS are low and high power laser and beam control system performance optimization experiments.

In the HABE ATP/FC program, passive and active laboratory testing was successfully accomplished. Laboratory testing of the gimbal control loops, the line of sight stabilization and passive tracking were completed in FY98. Laboratory testing of the active tracking system and integrated ground testing against scaled rockets was conducted. Future testing in the HABE ATP/FC effort is uncertain at this time, it may be continued with hardware replacements at some later date.
By previous guidance in PBD 224C (28 Dec 98) the BMDO and USAF SBL project is pursuing an integrated ground demonstration. It is known as the IPTD. Additional guidance was provided by the Undersecretary of Defense for Acquisition and Technology (USD(A&T)) memorandum to BMDO Director dated 25 Feb 99) to structure a project plan leading to an SBL IFX in FY12. Furthermore, the SBL project has been designated as a Pre-MDAP by the Undersecretary of Defense for Acquisition and Technology. A letter contract was awarded 8 February 1999 conveying total system authority (TSA) on an interim Joint Venture (JV) Team comprised of Lockheed Martin, TRW, and Boeing. Under TSA the government specifies broad objectives, and the JV is responsible for the content of the SBL IFX, including the ITU. The descriptions of certain activities beyond 1QFY00 will be contingent upon the baseline design and the Integrated Project Execution Plan (IPEP) developed by the JV.
Visits to candidate sites for a new performance test facility resulted in a site survey report in March 1998 and in an environmental assessment report in January 2000. It is anticipated the site selection will be made in time to support the project schedule provided by the contractor team in the IPEP.
Testing of a linear array of hypersonic low temperature (HYLTE) gain generator nozzles with the potential for more efficient laser operation was successful. Testing continues, and fabrication techniques for a cylindrical gain generator are being developed. The phase conjugation experiment will begin testing in the second quarter of FY00. Phase conjugation is being explored for application to an advanced, possibly upgraded, operational system.
In FY00, Congress provided additional project funding for the new performance test facility to permit site specific facility design, site geotechnical surveys, and other facility planning activities.

Current Status: The key technical challenge for the Project is to develop large, lightweight deployable optics. Other remaining tasks are: to demonstrate and develop additional components which may provide space platform weight and system cost reductions; to continue integration of components and high power beam control system testing; to field test ATP/FC hardware and software; to integrate the high power laser and the large optics beam director hardware with ATP/FC hardware and test; to integrate the system in a space qualified SBL experimental vehicle for ground and flight testing.
In FY99-00, a space high energy laser (HEL) affordability and architecture study (A&AS) is being conducted to determine if technically- or mission-derived constraints have changed sufficiently such that the SBL concept is no longer the most cost effective solution as determined by similar studies in the past. Also, the Joint Venture was formed and a contract was awarded to pursue the ground and flight demonstrations of flight configured hardware. The JV has been given TSA for the ground demonstration and flight experiment, if approved.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 3 - Advanced Technology Development	PE NUMBER AND TITLE: 0603174C Space Based Laser / PROJECT: 1360

FY01 will be the first year under the new PE 0603174C. FY98-00 funding and descriptions for the SBL project from BMDO PE 0603173C and from AF PE 0603876F are identified in Section C.

FY 1999 Accomplishments:

Total 0 See Section C for FY 1999 funding

FY 2000 Planned Project:

Total 0 See Section C for FY 2000 funding

FY 2001 Planned Project:

- 69500 SBL Integrated Flight Experiment – Conduct ITU/IFX SRR; Continue fabrication, risk reduction, and design validation efforts for the laser, beam control system, beam expander, and ATP/FC.
- 5037 Mission Definition and Requirements Analysis – Continue operational system concept definition and alternate technology development; Update the operational system baseline minimum technical data set; Continue operations concept and objectives development with AF Space Command; Continue lethality and system effectiveness assessments.

Total 74537

B. Project Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	0	0	N/A
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressional General Reductions			
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming			
e. Rescissions			
Adjustments to Budget Years Since FY 2000 PB			+74537
Current Budget Submit (FY 2001 PB)	0	0	74537

Change Summary Explanation:

The SBL Project was conducted in Program Element 0603173C, titled "Support Tech – Adv Tech Dev" along with several other projects. This was based on previous guidance to maintain the SBL project as a technology development program to preserve a far-term ballistic missile defense option. New guidance to pursue an integrated ground demonstration in a project structure leading to an SBL integrated flight experiment in FY12 and the designation of the SBL project as a Pre-MDAP resulted in the

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE: February 2000
BUDGET ACTIVITY: 3 - Advanced Technology Development	PE NUMBER AND TITLE: 0603174C Space Based Laser / PROJECT: 1360

segregation of the SBL Project from other "Advanced Technology Development" budget activities and the creation of a new Program Element (PE 0603174C). All SBL Project funds were transferred from PE 0603173C to PE 0603174C.

C. Other Program Funding Summary ($ in Thousands)

	FY 1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	Cost to Complete	Total Cost
1360 Directed Energy, PE 0603173C	120975	73199	0	0	0	0	0	N/A	N/A
Space Based Laser, AF PE 0603876F	32792	63840	63779	63674	63565	64244	64938	Continuing	Continuing

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL

PROJECT: 2260

COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense (THAAD)	431948	523525	0	0	0	0	0	0	4229753

A. Mission Description and Budget Item Justification

The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBMs) at long ranges and high altitudes. Its long-range intercept capability will make possible the protection of broad areas, dispersed assets, and population centers against TBM attacks. The THAAD System includes missiles, Palletized Load System (PLS) launchers, Battle Management/Command and Control (BM/C2) units, THAAD Radars, nd support equipment. The THAAD Radar provides threat early warning, threat type classification, interceptor fire control, external sensor cueing, and launch and impact point estimates for the THAAD System. The THAAD Radar is based on state-of-the-art, solid-state, X-band radar technology. THAAD will be interoperable with both existing and future air defense systems. This netted and distributed BM/C2 architecture provides robust protection against the TBM threat spectrum.

The Program Definition and Risk Reduction (PDRR) program is completing the development of the requirements for the THAAD system and has demonstrated the capabilities of the system in a series of 11 flight tests. The PDRR Hardware, consisting of flight test missiles, 2 THAAD radars, 4 launchers and 2 BM/C2 units have been acquired and delivered and were employed to support the PDRR flight test program and soldier training. The THAAD system design will be developed and tested in the Engineering and Manufacturing Development (EMD) phase leading to low rate initial production and subsequent FUE in FY07.

From FY95 to FY99 the PDRR flight test program was conducted at White Sands Missile Range (WSMR), New Mexico. The flight test schedule consisted of flight and system tests, which began on April 21, 1995 with a successful first flight of the THAAD missile. Eleven flight tests were conducted. The targets for the flight test program were developed under the Tactical Missile Defense Targets contract (Project 3354). Based on successful intercepts on flights 10 and 11 and on previous program achievements, the Undersecretary of Defense for Acquisition, Technology, and Logistics cancelled the remaining PDRR flight tests and directed that the program prepare to enter EMD.

The Department of Defense just completed (December 1999) an extensive review of the THAAD and Navy Theater Wide (NTW) programs. The Department focused on an alternative acquisition approach that provides a phased introduction of capability. Prior to this review, the THAAD program was pursuing a standard acquisition approach to field an objective capability, i.e., define requirements, design and fabricate hardware, conduct ground and flight testing and eventually field a capability that meets threshold operational requirements. In order to better balance requirements, pace the threat, and obtain early capability with reduced risk, an evolutionary approach was proposed. This results in a FUE for an initial configuration (termed C1) in fiscal year 2007. C1 will include the capability to defeat all expected upper tier threats in that timeframe, and will meet the key performance parameters outlined in the Operational Requirements Document (ORD). Sophisticated counter measures and battalion operational software is deferred to the next configuration (termed C2) planned for fielding in the 2011 timeframe.

FY 1999 Accomplishments:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL; PROJECT: 2260

•	300617	Major Contracts: Successfully completed system flight test program and support. Continued the Integrated Risk Mitigation Restructure (IRMR) effort, focusing on Pre-EMD Risk Mitigation activities. Conducted Missile Requirement Review and System Software Review. Conducted Radar Preliminary Design Review, and prepared for the MSII DAB.
•	47949	Support Contracts: Continued software independent verification and validation. Continued nuclear environment survivability analysis. Continued hit assessment, discrimination, and guidance, navigation and control algorithm development. Continued hit to kill lethality analysis. Continued integration and support to THAAD flight testing.
•	47762	Government Furnished Equipment (GFE)/Other: Continued integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C2, weapon system deck model, and simulation efforts. Continued system threat vulnerability assessment. Maintained integrated logistics and product assurance efforts. Provided system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continued pursuing integration of THAAD BM/C2 with PM, AMDCCS to take advantage of previous Army developments of force operations software.
•	19127	In-house support: Funded government salaries and benefits, travel, training, etc.
•	9937	Targets: Continued development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintained infrastructure to support TMD targets.
•	5198	Lethality Analysis: Continued lethality simulation code validation.
•	1358	Operational Test and Evaluation (OT&E): Conducted independent assessment of the THAAD System.
Total	431948	

FY 2000 Planned Program:

•	412889	Major Contracts: Complete pre-EMD risk mitigation activities; conduct Launcher PDR; and finalize preparations for the MSII DAB. Initiate Breadboard Fabrication.
•	51869	Support Contracts: Continue software independent verification and validation. Continue nuclear environment survivability analysis. Continue hit assessment, discrimination, and guidance, navigation and control algorithm development. Continue hit to kill lethality analysis
•	21217	Government Furnished Equipment (GFE)/Other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C2, weapon system deck model, and simulation efforts. Continue system threat vulnerability assessment. Maintain integrated logistics and product assurance efforts. Provide system engineering support to THAAD test analysis and planning to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C2 with PM, AMDCCS to take advantage of previous Army developments of force operations software.
•	19300	In-house support: Funded government salaries and benefits, travel, training, etc.
•	6805	Targets: Continue development of targets to support future THAAD flight tests and THAAD Radar system tests. Fund infrastructure to support TMD targets.
•	6638	Lethality Analysis: Continue lethality simulation code validation.
•	1238	Operational Test and Evaluation (OT&E): Continue independent assessment of the THAAD System.
•	3569	White Sands Missile Range (WSMR)/OGA test support planning.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL

PROJECT: 2260

Total 523525

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	433922	527871	3519
Congressional Adjustments			
Appropriated Value	445252	527871	
Adjustments to Appropriated Value		-2254	
a. Congressional Reductions (FFRDC, Inflation, etc)	-15986		
b. OSD Reductions			
c. Emergency Supplemental			
d. Internal Reprogramming		-2192	
Adjustments to Budget Years Since FY 2000 PB	2682		-3519
Current Presidents Budget (FY 2001 PB)	431948	523525	0

Change Summary Explanation: FY 00 (-4346) Project funding realigned

C. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
THAAD EMD– 0604861C	0	79462	549945	685168	789736	755134	591049	TBD	TBD

D. Acquisition Strategy: The THAAD Acquisition Strategy approved for the PDRR phase specified full and open competition for THAAD system integration, missiles, launchers, and BM/C2. The TMD Ground Based Radar (GBR) Acquisition Strategy also specified full and open competition forPDRR. The Concept Definition phase, completed in 1992, involved three contractor teams and defined concepts and preliminary designs for the THAAD System. The THAAD Dem/Val contract was competitively awarded to Lockheed Missiles and Space Company in September 1992. The PDRR program developed a design for the THAAD System. The THAAD Radar PDRR contract was competitively awarded to Raytheon Company in September 1992. The PDRR phase included the development and test of one Dem/Val radar and two UOES radars.

E. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Software Specification Review	4Q						
Integrated Risk Mitigation Change Order	2Q						
Integrated System Tests Complete	4Q						
Milestone II		3Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL

PROJECT: 2260

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. LMMS	CPFF/CPAF		2116128	412889		0		0	2529017	2529017
b. Raytheon	CPIF/AF/FF		585612			0		0	585612	585612
Subtotal Product Development:			2701740	412889					3114629	3114629

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA	CPAF		164014	24493		0		0	188507	188507
b. Other Spt Cont	Various		292085	27376		0		0	319461	319461
c. OGAs	MIPR		182837	21217		0		0	204054	204054
d. Program Mgmt	Various		120708	19300		0		0	140008	140008
Subtotal Support Costs:			759644	92386					852030	852030

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. WSMR	MIPR		83226	3569		0		0	86795	86795
b. OT&E			10250	1238		0		0	11488	11488
c. TARGETS			132055	6805		0		0	138860	138860
d. LETHALITY			18545	6638		0		0	25183	25183
Subtotal Test and Evaluation:			244076	18250					262326	262326

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL

PROJECT: 2260

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										

Remark:

Project Total Cost:			3705460	523525					4228985	4228985

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL

PROJECT: 1266

COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1266 Navy Theater Wide *	366325	375764	382671	287274	214301	246657	429674	TBD	TBD

A. Mission Description and Budget Item Justification

The requirement for the Navy Theater Wide (NTW) Theater Ballistic Missile Defense (TBMD) system is to provide protection to U.S. and allied forces against medium to long range theater ballistic missiles (TBMs), which may be equipped with Weapons of Mass Destruction (WMD). This protection includes those political and military assets designated as vital to U.S. interests. NTW will provide an effective defense when the ship is positioned near the enemy TBM launcher to effect ascent phase intercepts; along the TBM trajectory as the TBM passes over water, or inland along the coast to effect midcourse intercepts; and, near the defended area to provide terminal phase intercepts and achieve an additional layer of defense for lower-tier TBMD systems.

The NTW system builds upon the existing AEGIS Weapon Systems (AWS) and the STANDARD Missile (SM) infrastructure as a further evolution to the Navy Area TBMD system. The AWS (as modified for Navy Area TBMD) will be evolved to support exoatmospheric ascent, midcourse, and terminal phase engagements. The Navy SM-2 Block IV will be modified to accommodate a kinetic warhead (KW), a new third stage propulsion system, and exoatmospheric guidance. The new variant of the SM is the SM-3.

The NTW AEGIS Lightweight Exoatmospheric Projectile [LEAP] Intercept (ALI) Program consists of a series of near-term flight tests with the primary objective of demonstrating that LEAP technologies can be integrated with a modified SM-2 Blk IV and AWS to hit a TBM target in the exoatmosphere.

In April 1999, the NTW Program was reviewed by the Defense Acquisition Board (DAB) resulting in an Acquisition Decision memorandum (ADM), signed on 4 May 1999, endorsing the overall program approach. DAB approved the block approach to the objective NTW capability. As part of the Block II, a cooperative program has been initiated with the Government of Japan.

From an acquisition viewpoint, the Department has directed the Navy to continue this evolutionary block approach, through an initial system flight-test program (AEGIS LEAP Intercept (ALI)), followed by three developmental increments of the Block I system. These increments, Block IA, IB and IC, provide the warfighter with ascent-phase TBMD capability that evolves toward the Block II objective system using a spiral evolution acquisition strategy. The NTW program can deliver a warfighting capability by delivering first a contingency capability followed by successive capability deliveries leading to a full ORD compliant NTW Block I system. The decision to fully fund the NTW program has not been made pending results of ALI flight testing. Upon completion of the ALI tests, the Department will make the decision to fund and at what level based on performance.

***NOTE**: Included in the funding for NTW are dollars through the FYDP for cooperative development efforts with the Government of Japan for NTW Block II technologies. The funding is as follows:

FY99	FY00	FY01	FY02	FY03	FY04	FY05
20000		15901	10228	9921	34657	14701

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL
	PROJECT: 1266

FY 1999 Accomplishments:

•	322984	Conducted successful AUTUMN EVENTS Risk Reduction Activity in Nov 98 where TBM targets were detected, tracked, and had simulated engagements conducted against them using the AEGIS LINEBACKER equipped cruisers, the High Range Resolution radar equipped AEGIS destroyer, and the SM-3 Kinetic Warhead Seeker Captive Carry Testbed. Successfully passed LINK 16 TBM data between LINEBACKER cruisers and THAAD and Patriot Information Control Center. Continued the execution of the ALI Flight Demonstration Program (FDP), ALI and Block I associated risk reduction activities, including radar improvements competition for the radar discrimination RRA, and NTW Block I TBMD system engineering and planning. Continued the design, development, manufacturing, integration, and testing of ALI Control Test Vehicles (CTV), ALI/Threat Representative Testing (TRT) Flight Test Rounds (FTRs), and associated ground hardware and test equipment. Performed AEGIS Combat System (ACS) development engineering to support the ALI program. Continued the NTW test and evaluation process to include participation in the TMD Critical Measurements Program (TCMP)-3A where threat representative data was collected by NTW weapon system components and interoperability with other BMD systems was demonstrated within the evolving USACOM sponsored TMD Family of Systems architecture. ($10M of the $322.984M will be used for FY00 requirements.)
•	4183	Conducted successful full scale, direct hit sled test. Continued lethality requirement definition support and lethality performance testing of NTW KW
•	19158	Continued targets procurement to support NTW test and evaluation, and provide test facilities support.
•	20000	Commenced cooperative development efforts in FY99 ($10M) with the Government of Japan on selected NTW Block II technologies and will continue effort in FY00 ($10M). Initial Requirements Analysis and Design (RA&D) MOU signed 16 Aug 1999.
Total	366325	

FY 2000 Planned Program:

•	356911	Continue the execution of the ALI and Block I associated risk reduction activities, including advanced radar improvements for the radar discrimination RRA, and NTW Block I TBMD system engineering and planning. Continued the design, development, manufacturing, integration, and testing of ALI/TRT Flight Test Rounds (FTRs) and associated ground hardware and test equipment. Continued the NTW test and evaluation process.
•	2188	Continue lethality requirement definition support and lethality performance testing of NTW KW.
•	14975	Continue targets procurement to support NTW test and evaluation.
•	1690	Explore NTW application of advanced technologies through the Small Business Innovative Research (SBIR) Program..
Total	375764	

FY 2001 Planned Program:

•	353875	Continue the execution of the ALI and Block I associated risk reduction activities and NTW Block I TBMD system engineering and planning. Continued the design, development, manufacturing, integration, and testing of ALI/TRT Flight Test Rounds (FTRs) and associated ground hardware and test equipment. Continued the NTW test and evaluation process.
•	6619	Continue lethality requirement definition support and lethality performance testing of NTW KW.
•	6276	Continue targets procurement to support NTW test and evaluation.
•	15901	Continue RA&D cooperative development efforts with the Government of Japan on selected NTW Block II technologies.
Total	382671	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL

PROJECT: 1266

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	364284	329768	369049
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressional General Reductions			
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming			
e. Rescissions	+2041	-4004	-2378
Adjustments to Budget Years Since FY 2000 PB		+50000	+16000
Current Budget Submit (FY 2001 PB)	366325	375764	382671

Change Summary Explanation:

Funding: FY00 increase represents Congressional add for advanced radar improvements. FY01 increase represents NTW Cooperative Development efforts with the Government of Japan for the Requirements Analysis and Design (RA&D) phase. FY02 on out increase represents funding to support the Upper Tier Strategy as identified by Department Guidance.

Schedule: Adequate resources provided to achieve AEGIS LEAP Intercept (ALI) flight testing through FY02 and maintain industrial base capability through FY05.

Technical: None.

C. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
Navy Area – 0604867C	241782	307274	274234	228596	85866	33293	29369	Cont	TBD
Navy Area Procurement - 0208867C	42671	18143	0	6983	56892	150882	176524	Cont	TBD
THAAD – 0603861C	429266	523525	0	0	0	0	0	0	TBD
THAAD – 0604861C	0	79462	549945	685168	789736	755134	591049	Cont	TBD

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL

PROJECT: 1266

D. Acquisition Strategy: The Navy strategy for NTW TBMD development calls for the evolution of the existing AEGIS Weapon System (AWS), STANDARD Missile (SM), Vertical Launching System (VLS), and Battle Management, Command, Control, Communications, Computers, and Intelligence (BMC4I) systems. This evolutionary approach leverages previous investments and takes advantage of already existing trained crews, industrial capability, engineering support, and previously developed assets such as the Lightweight Exo-Atmospheric Projectile (LEAP).

E. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Control Test Vehicle 1	4Q								
Complete Navy TBMD COEA Phase II		1Q							
Target Test Vehicle 1			1Q						
DAB Review			3Q						
Control Test Vehicle 1A			4Q						
Flight Test Round 1				4Q					
Flight Test Round 2					1Q				
Flight Test Round 3					1Q				
Flight Test Round 4					2Q				
Flight Test Round 5					3Q				
Flight Test Round 6					4Q				
Flight Test Round 7					4Q				
Flight Test Round 8								1Q	
Flight Test Round 9								2Q	
Flight Test Round 10								3Q	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL

PROJECT: 1266

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Missile & Radar Dev	CPAF	Raytheon	720004	179010	CONT	210200	CONT	TBD	TBD	
b. AWS & VLS Dev	CPAF	Lockheed Martin	197562	50924	CONT	60672	CONT	TBD	TBD	
c. Radar Development	845	Lockheed Martin	9750	13000		0		0	22750	
d. VLS Development	CPAF	United Defense	12047	3043	CONT	2550	CONT	TBD	TBD	
e. Missile Dev/System Engineering/BMC4I	CPFF	JHU/APL	74351	18375	CONT	19327	CONT	TBD	TBD	
f. System Engineering	CPFF	TSC	6800	1300	CONT	1500	CONT	TBD	TBD	
g. AWS & Missile Dev/System Engineering/ BMC4I	WR	NSWC Dahlgren	99038	16664		18336		TBD	TBD	
h. System Engineering/ RRA/BMC4I	MIPR	MIT/LL	19394	9083		9518		TBD	TBD	
i. Various		BMDO	89271	15245		0		0	108520	
j. Various		Misc	35059	4146		4240		TBD	TBD	
Subtotal Product Development:			1263276	310790		326343			TBD	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Engineering Support	CPFF	Anteon	5984	435	CONT	620	CONT	TBD	TBD	
b. Engineering Support	CPAF	Marconi	3672	600	CONT	500	CONT	TBD	TBD	
c. Engineering Support	CPFF	SSI/PSI	1873	445	CONT	540	CONT	TBD	TBD	
d. Engineering Support	CPFF	SPA	1681	0		0		0	1681	
e. Mgmt & Prof Supt Svcs		Misc	358	250		250		TBD	TBD	
Subtotal Support Costs:			13568	1730		1910			TBD	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. DT&E	CPAF	Lockheed Martin	2000	535	CONT	1000	CONT	TBD	TBD	
b. DT&E	CPAF	Raytheon	0	2421	CONT	2500	CONT	TBD	TBD	

								DATE	**February 2000**	
BUDGET ACTIVITY			PE NUMBER AND TITLE							
4 - Demonstration and Validation			**0603868C Navy Theater Wide - DEM/VAL**							
c. DT&E	CPFF	JHU/APL	5589	2379	CONT	1614	CONT	TBD	TBD	
d. DT&E	WR	NAWC Point Mugu	2200	872	CONT	900	CONT	TBD	TBD	
e. Lethality / DT&E	WR	NSWC Dahlgren	17049	4733		6660		TBD	TBD	
f. DT&E	WR	NSWC Port Hueneme	3685	3333		3168		TBD	TBD	
g. DT&E	MIPR	NAIC	6118	500		0		0	6618	
h. DT&E	WR	PMRF	9656	6601		5097		TBD	TBD	
i. Targets	MIPR	SMDC Army	41461	14975		6276		TBD	TBD	
j. DT&E		Misc	14389	5366		2820		TBD	TBD	
k. Facilities	MIPR	NHTF	2501	0		0		0	2501	
Subtotal Test and Evaluation:			104648	41715		30035			TBD	

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Internal Operating	WR	NAVSEA	4800	2345		2500		TBD	TBD	
b. Program Management	CPFF	Anteon	8000	6428	CONT	6380	CONT	TBD	TBD	
c. Program Management	CPAF	Marconi	2000	975	CONT	960	CONT	TBD	TBD	
d. Program Management	CPFF	SSI/PSI	1500	1212	CONT	1260	CONT	TBD	TBD	
e. Program Management	WR	NSWC Dahlgren	23476	4356		6300		TBD	TBD	
f. Program Management	WR	NRL	3524	965		1100		TBD	TBD	
g. Program Management	WR	NAWC China Lake	11873	2676		2906		TBD	TBD	
h. Program Management	WR	NWAD	2430	1106		1200		TBD	TBD	
i. Program Management	WR	NSWC Indian Head	3189	772		1055		TBD	TBD	
j. Program Management		Misc	3000	371		387		TBD	TBD	
k. Internal Operating		Misc	3027	323		335		TBD	TBD	
Subtotal Management Services:			66819	21529		24383			TBD	

Project Total Cost:			1448311	375764		382671			TBD	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603869C MEADS - DEM/VAL (PD-V)

PROJECT: 1262

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1262 Medium Extended Air Defense System (MEADS)	11675	48594	63175	73645	131953	268558	274239	Continuing	TBD

A. Mission Description and Budget Item Justification

The Medium Extended Air Defense System (MEADS) will defend the maneuver force and other critical forward-deployed assets against short and medium range Theater Ballistic Missiles (TBMs), cruise missiles, and other air-breathing threats throughout all phases of tactical operations. MEADS will operate both in an enclave with upper-tier systems in areas of debarkation and assembly, and provide continuous coverage alone or with Forward Area Air Defense systems in the division area of the battlefield during movement to contact and decisive operations. MEADS will be interoperable with other airborne and ground-based sensors and utilize a netted and distributed architecture and modularly-configurable battle elements to provide a robust, 360-degree defense against the full spectrum of TBMs, cruise-missiles, unmanned-aerial-vehicles, tactical air to surface missiles, rotary-wing, and fixed-wing threats. MEADS will offer a significant improvement in tactical mobility and strategic deployability over comparable missile systems.

The MEADS program has been restructured to leverage the interceptor from the PATRIOT Advanced Capability – 3 (PAC-3) program and to extend the Program Definition / Validation (PD/V) phase with a three-year Risk Reduction Effort (RRE) that focuses on developing the critical technologies required for maneuver force protection and overall risk reduction.

There remains a critical void in maneuver force defense against short and medium range TBMs, cruise missiles, and low-to-medium altitude advanced air-breathing threats. This program will meet this challenge by integrating the PAC-3 missile and developing the critical technologies required for maneuver force protection, including development of a prototype lightweight launcher, 360-degree radar, and tactical operation center. Concepts will be validated through proof-of-principle testing capitalizing on the already programmed Air-Directed Surface-to-Air Missile (ADSAM) demo efforts. The PAC-3 missile will be the baseline interceptor considered for the effort. Sensor and battle management software technology from both U.S. and international programs will be examined to enhance and augment organic-equipment functions, reducing development cost and risk. Improvements will be balanced against costs and the projected threat to develop a U.S. and allied capability to counter the maneuver force threat. This approach emphasizes prototyping of system-specific and surrogate hardware in key areas of Battle Management/Command, Control, Communications, Computers, and Intelligence (BM/C4I), fire control radar, and lightweight launcher to satisfy mobility, strategic deployability and interoperability requirements. Cost As an Independent Variable (CAIV) analysis will be applied to the currently defined requirements. The Ballistic Missile Defense Organization (BMDO) is responsible for overall program management and direction. The US Army, Program Executive Officer for Air and Missile Defense and the MEADS National Product Office execute the program for BMDO.

FY 1999 Accomplishments:

•	9915	Transferred to Joint Land Attack Elevated Network Sensor (JLENS) Program Office for ADSAM to demonstrate advanced operational and weapons employment concepts.
•	1760	MEADS/ADSAM Studies.
Total	11675	

FY 2000 Planned Program:

•	38580	U.S. contribution to the international program office operational budget for the MEADS Risk Reduction Effort contract for initial development of digital end-to-end simulation and initial development of prototype launcher, fire control, BMC4I hardware and associated software.
•	4156	Funding for government agencies and support contracts to provide technical analysis and tools in speciality areas of lethality, BMC4I, System simulations, FAAD/MEADS integration as well as support of conducting independent evauations of contractor trades and analysis.
•	5858	Funding for MEADS program management, support, and salaries for both the national and international program offices. Includes U.S. support contractors and other efforts tied to national support of executing the replanned program.
Total	48594	

FY 2001 Planned Program:

•	50980	Continue U.S. contribution to the international program office operational budget for the MEADS Risk Reduction Effort contract for continued development of digital end-to-end simulation, continued development of prototype launcher, fire control, BMC4I hardware and associated software, and test planning.
•	5837	Continue funding for government agencies and support contracts to provide technical analysis and tools in speciality areas of lethality, BMC4I, System simulations, FAAD/MEADS integration as well as support of conducting independent evauations of contractor trades and analysis.
•	6358	Funding for MEADS program management, support, and salaries for both the national and international program offices. Includes U.S. support contractors and other efforts tied to national support of executing the replanned program.
Total	63175	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603869C MEADS - DEM/VAL (PD-V)

PROJECT: 1262

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	9915	48597	63568
Appropriated Value		48597	
Adjustments to Appropriated Value			
a. Congressional General Reductions		-140	
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming	-215	137	
e. Rescissions			
Adjustments to Budget Years Since FY 2000 PB	+1975		-393
Current Budget Submit (FY 2001 BES)	11675	48594	63175

Change Summary Explanation:
Funding: FY1999 (-215) Below Threshold Reprogramming
Funding: FY1999 (+1915) provided to ADSAM consistent with FY2000 Appropriation language

C. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
N/A									

D. Acquisition Strategy:

The MEADS acquisition strategy included competition among two transatlantic industrial teams in the PD-V phase. The international program office awarded contracts in October 1996 to conduct the international industrial teaming and development. Deliverables included a total system concept based upon the International Technical Requirements Document, engineering design trades, and system models and simulations. During the PD-V phase, the two international entities prepared proposals and competed for the Design and Development and Production phases. As the Department and partner nations restructured the program, this phase concluded with the selection of a single contractor team to conduct the RRE. In this phase, technology from Germany, Italy and the United States, including the PAC-3 missile will be leveraged to define the most cost-effective solution to meet the MEADS operational requirements. The MEADS Product Office is also pursuing integration of MEADS BMC4I with the Project Manager, Air Defense Command and Control Systems (ADCCS) to take advantage of other Army developments that can be incorporated into the MEADS program.

E. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Complete PD-V Source Selection	3rd Qtr						
Transition effort 6-month contract signed		1st Qtr					
Three-year risk reduction effort contract signed		3rd Qtr					

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603869C MEADS - DEM/VAL (PD-V)**

Program review			1st Qtr	1st Qtr			
Component testing completed					1st Qtr		
Demonstrate MEADS functionality					2nd Qtr		
Design and development phase contract award							

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603869C MEADS - DEM/VAL (PD-V)

PROJECT: 1262

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. International Teaming	FFP	LM/H&R Teams	9605						9605	
b. Proj Def-Val (PD-V)	FFP	NAMEADSMA	101672						101672	
c. Risk Reduction (RRE)	TBD	NAMEADSMA		38580	May 00	50980		TBD	TBD	
Subtotal Product Development:			111277	38580		50980		TBD	TBD	

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	4001	Target Value of Contract
a. U.S. Anl of Alternatives	LOE/MIPR	MEADS Prod Ofc	2298						2298	
b. U.S. Contracts	LOE	MEADS Prod Ofc	3439						3439	
c. U.S. Other Govt Agcy	MIPR	MEADS Prod Ofc	5282	4156		5837		TBD	TBD	
Subtotal Support Costs:			11019	4156		5837		TBD	TBD	

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Redstone Tech Test Ctr	MIPR	Huntsville, AL	253						253	
b. ADSAM		SMDC	9915						9915	
Subtotal Test and Evaluation:			10168						10168	

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Internal Operating	In-House	MEADS Prod Ofc/NAMEADSMA	9507	5858		6358		TBD	TBD	
Subtotal Management Services:			9507	5858		6358		TBD	TBD	

Project Total Cost:			141971	48594		63175		TBD	TBD	

Remarks:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603870C Boost Phase Intercept - D/V

PROJECT: 1294

COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1294 UAV Boost Phase Interceptor	6335	4961	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

The Unmanned Aerial Vehicle (UAV)- Boost Phase Intercept (BPI) project is a continuation of two tasks: Task 1 Israeli Boost Phase Intercept System (IBIS) Risk Mitigation and Boost Phase Launcher Intercept (BPLI) concept development; and Task 2 cooperative UAV-based BPI and BPLI Concepts. Task 1 is a cooperative U.S./Government of Israel (GOI) BPI program which involves further refinement (risk mitigation) of the UAV-based BPI concept which destroys tactical ballistic missiles in the boost phase of flight and an evaluation of a BPLI concept which destroys the Transporter-Erector Launcher (TEL) shortly after launch. Task 1 efforts are performed in Israel and focus on risk reduction on key elements of the Israeli Boost Phase Intercept System (IBIS) concept and concept development and evaluation of a BPLI system. Task 2 of this cooperative effort is performed in the U.S. and will support and expand key elements of both concepts. It includes developing the UAV-based BPI and BPLI system requirements for scenarios of operation and employment in support of U.S. expeditionary forces. The requirements will address development of search and track sensors, Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I) and a Concept of Operations (CONOPS) based on readily available U.S. technologies. Task 2 will leverage Service capabilities by addressing issues outlined in the BMDO Technology Master Plan (TMP).

The BPI and BPLI concept defines a means of destroying hostile ballistic missiles over enemy territory. UAVs armed with interceptors show significant near term promise. Previous cooperative investigations of the UAV-based BPI concept and the recent Air Force Airborne Laser (ABL) Analysis of Alternatives (AoA) study (May 97) concluded that such a BPI system could be cost effective and complementary to terminal missile defense systems. Current studies are evaluating the effectiveness of the BPLI concept to determine its cost effectiveness in complementing BPI and terminal defenses.

The BPI program is also a risk mitigation effort for the ABL program and could provide complementary support to ABL. The program uses cooperative activities in the U.S. and Israel to mitigate risk of developing UAV-based BPI systems. The GOI is lead on the BPLI concept and the lead on the risk mitigation of the unmanned aerial vehicle (UAV) platform and interceptor while the U.S. is lead on the Infrared Search and Track (IRST) activities. The Battle Management and Control (BMC) and system engineering and integration responsibilities are shared. The U.S. and GOI share costs on a 75/25 percent ratio for Task 1, Task 2 is being accomplished by BMDO/Service Integrated Product Teams (IPT) and Industry.

FY 1999 Accomplishments

- 3700 Completed the IBIS Risk Mitigation Effort. Initiated a 7-month concept development effort for the Boost Phase Launcher Intercept (BPLI) concept.
- 2296 Analyzed the IBIS system survivability. Evaluated contribution of UAV system in a complementary role to ABL. Evaluated the use of the Global Hawk as a possible platform for the concepts.
- 339 Completed development of the IRST hardware. Initiating flight testing of the IRST.

Total 6335

FY 2000 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603870C Boost Phase Intercept - D/V	1294

- 2500 Continue evaluation/refinement of Israeli BPI concepts in the areas of IR sensor development and command and control.

- 2461 Initiate flight testing of Raytheon developed IRST. Prepare an evaluation of Israeli BPI/BPLI concepts and provide a report to Congress.

Total 4961

FY 2001 Planned Program:

- 0

Total 0

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)		6426	0	0
Congressional Adjustments			+5000	
Appropriated Value			5000	
Adjustments to Appropriated Value				
a. Congressional Reductions				
b. OSD Reductions (FFRDC, Inflation, etc)			-146	
c. Emergency Supplemental				
d. Internal Reprogramming			107	
Adjustments to Budget Years Since FY 2000 PB		-91	+4961	
Current Budget Submit (FY 2001 PB)		6335	4961	0

Change Summary Explanation: Changes due to FY99 and FY00 appropriations and subsequent OSD reductions.

C. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

D. Acquisition Strategy: UAV BPI/BPLI Program is accomplished through cooperative US/GOI efforts. Efforts utilize combination of BMDO, Service, GOI, and industry to accomplish requirements and concept development.

E. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603870C Boost Phase Intercept - D/V

PROJECT: 1294

IBIS risk Mitigation Contract (HQ 0006-97-C0010) +Extension		2Q					
BPLI Concept Study (HQ 0006-97-C0010)+ext.	4Q	3Q					
IRST contract (Raytheon) -IRST hardware development complete -IRST flight testing	4Q	3Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603870C Boost Phase Intercept - D/V

PROJECT: 1294

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Israeli MOD	FFP	Israel	31403	2779				TBD	34182	
b. ONR/NAWC-CL	MIPR	Texas,CA, Michigan	7945	300				TBD	8245	
c. Engine /Simulations	MIPR	Air Force	302	300				TBD	602	
d.										
e.										
Subtotal Product Development:			39650	3379					43029	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ANSER	CPFF	Washington D.C.	3315	1582				TBD	4897	
b.										
c.										
Subtotal Support Costs:			3315	1582					4897	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Test Resources	MIPR	USAF/WL/M	80					TBD	80	
b.										
c.										
Subtotal Test and Evaluation:			80						80	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603870C Boost Phase Intercept - D/V

PROJECT: 1294

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
b.										
c.										
Subtotal Management Services:										

Remarks:

Project Total Cost:			43045	4961					48006	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

COST *(In Thousands)*	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2400 National Missile Defense	1678201	950248	1740238	849969	791700	688614	681174	Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Missile Defense (NMD) program will be designed to protect the nation against long range ballistic missile threats. The NMD Program contributes to each of the three components of the nation's broad strategy to deal with proliferation: preventing and reducing the threat, deterring the threat, and defending against the threat.

The NMD Program has three objectives: 1) to develop and demonstrate an integrated system that has the potential capability to meet the threat requirement (for presentation in FY2000 at a Deployment Readiness Review (DRR)); 2) to complete system development and field an initial capability system by the end of FY2005 and an expanded capability by the end of FY2007 (if directed to do so after the DRR in FY2000); and 3) to assess the technical feasibility, schedule, and cost associated with maintaining a system development path which allows evolutionary upgrading of system capabilities to counter more complex threats.

During the Initial Development Phase, which culminates at the Deployment Readiness Review (DRR) in FY2000, the DoD will assess the maturity of the NMD technology and proposed system's potential operational effectiveness in support of a subsequent Presidential decision on deployment of an NMD system. During this initial phase the program develops and integrates the NMD elements into a system, demonstrates the "hit-to-kill" capability of the system, and prepares for initial deployment. If the program satisfies certain decision criteria at the DRR and the Department receives direction to deploy an initial system in Alaska by FY2005 and an expanded capability by FY 2007, the NMD Program Manager (PM) will implement the NMD System Deployment phase. This deployment phase beginning in FY2000, completes development and testing of the initial system, constructs the deployment sites, and deploys the system. All development activities are planned to be compliant with the Anti-Ballistic Missile (ABM) Treaty. The U.S. Government will seek any appropriate modifications to the ABM Treaty.

To execute the program, a competitively awarded Lead System Integrator (LSI) contract was awarded to Boeing North America in April 1998. The LSI is contractually accountable for meeting NMD system performance requirements, while the NMD PM implements and manages an accelerated and evolutionary acquisition strategy to design, develop, integrate, and test the NMD system.

The NMD system elements are comprised of a ground-based interceptor weapon system (consisting of a cannisterized kill vehicle and booster and a weapon support system), ground-based sensors, space-based sensors, and a Battle Management, Command, Control, and Communication (BM/C3) system. The ground-based sensors include the development of X-band radar and the upgrade of existing early warning radars. The BM/C3 system includes integration with existing national command and control systems, a ground communication network, and a communication system to transmit data to and from the interceptor while in flight. The NMD system will also use space-based assets for threat detection and tracking, such as the Air Force Defense Support Program (DSP), and eventually the Air Force Space Based Infrared System (SBIRS). SBIRS is an integral part of enhancing future NMD capabilities.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

NMD INTEGRATION provides for the Lead System Integrator (Boeing North America), the single largest contract in the NMD program, to develop and integrate the individual NMD elements into a cohesive NMD system. The LSI shall provide development and integration of system hardware and software to demonstrate the ability to achieve the C1 System Requirements and to provide the flexibility and robustness for a variety of deployment options. The C1 architecture includes up to 20 ground-based interceptors at a single site, a ground-based X-Band radar, upgraded early warning radars and DSP and eventually SBIRS. The program is being expanded to meet a larger and more realistic threat. The program will provide 100 ground based interceptors by the end of FY2007, provide an upgraded capability XBR, and support the upgrading of 5 early warning radar facilities. The LSI provides for ground and flight test evaluation of the NMD system design and element implementation to validate system performance. The LSI contractor will perform the necessary system-level trade studies to appropriately allocate element requirements with full consideration of Cost As an Independent Variable (CAIV). The LSI will operate and maintain NMD models and simulations to include ISTC, System HWIL, and LIDS. The LSI contractor maintains a primary and backup Exoatmospheric Kill Vehicle (EKV) development effort. The backup EKV will be maintained for risk mitigation until the primary EKV is sufficiently proven. Until booster development is complete, EKV flight tests will be flown on the Payload Launch Vehicle (PLV), which is a booster, comprised of a Minuteman II second and third stages. Development of the Commercial Off-the-Shelf (COTS) booster consists of integrating a Gemini-40 first stage and Orbus-1A second and third stages. The booster will be tested during three verification flights in FY00. BM/C3 incremental prototypes will be integrated and demonstrated in a distributed fashion at multiple locations, and assessed with user participation to refine and focus the BM/C3 development and system behavior. In FY99, the EKV, PLV and Integrated System Test Capability (ISTC) contracts were assumed by the LSI contractor. At the end of FY00, the last of the NMD legacy contracts, the GBR-P contract, will transition to the LSI contractor. The LSI will develop, test, and demonstrate prototype software upgrades and hardware changes to existing Early Warning Radars required to support the NMD mission.

SENSOR TECHNOLOGY includes research and development efforts for critical sensor components which support infrared surveillance, acquisition, tracking, and discrimination functions for use in the SBIRS Low system. Projects in radiation hardened electronics and spacecraft computers, focal plane arrays (FPAs), long-life cryogenic coolers, signal/data processing and optics are developing state-of-the-art technologies essential to operating in a space environment and viewing targets against the earth limb and space backgrounds. The projects provide enabling, risk reduction and cost reduction technologies for SBIRS Low.

The WEAPON SYSTEM(WS) formally called Ground-Based Interceptor (GBI) contracts (EKV and PLV) transitioned to the LSI in FY99. Before the EKV contracts were transitioned to the LSI, EKV sensor flight tests were successfully accomplished in 3Q/97 and 2Q/98. COTS booster development began in FY98 with expected completion late in FY00. The WS Project Management Office manages and provides specific Government Furnished Equipment (GFE) to include transportation, testing, and facilities maintenance. Additionally, this office will conduct Independent Verification and Validation (IV&V) of LSI WS hardware and software efforts and other Independent Performance Assessments as required. The Weapon System provides government oversight of the LSI Weapon System Integrated Product Team.

The BATTLE MANAGEMENT, COMMAND, CONTROL AND COMMUNICATIONS (BM/C3) contract transitioned to the LSI in FY98. In addition to providing government oversight of the LSI Command Control and Communications Integrated Product Team, the BM/C3 functional area will provide IV&V and Verification, Validation and Accreditation (VV&A) of BMC2, and technical oversight of the procurement of NMD Long-Haul Communication efforts.

X-BAND RADAR (XBR) is the primary sensor providing surveillance, acquisition, tracking, discrimination, fire control support, and kill assessment for the NMD system. The XBR development leverages off of the Theater Missile Defense Ground Based Radar (TMD-GBR) program. An XBR prototype, designated as GBR-P, installed at USAKA, Kwajalein Missile Range (KMR), participates in Risk Reduction Flights and Integrated Flight Tests. The XBR contract will continue to be

managed by the XBR Project Office until the contract expires in FY00. At that time, the XBR efforts will be managed by the LSI contractor, and the XBR Project Office provides government oversight of the LSI X-band radar Integrated Product Team.

UPGRADED EARLY WARNING RADARS (UEWR) hardware efforts and software upgrades were transitioned to the LSI in FY98. The UEWRs will detect, count and track the individual objects in a ballistic missile attack early in their trajectory. The UEWR data will be used for interceptor commit and other X-band radar cueing. Efforts include IV&V and VV&A along with independent discrimination analysis. The UEWR Project Office provides government oversight of the LSI UEWR Integrated Product Team.

SYSTEM ENGINEERING develops the NMD system-level performance and integration requirements as prescribed in the Capstone Requirements Document (CRD), and Operational Requirements Document (ORD), and then flows them down to the individual NMD elements. In addition, the Systems Engineer plans and directs Command and Control Simulations (C2Sims) in which analyses, simulations, and tests are performed. C2Sims address both system effectiveness and proposed NMD system architectures and concept of operations against near and far-term ballistic missile threats. The Systems Engineer develops functional definitions for the candidate deployment options needed to meet user requirements, and in this capacity, manages all interactions with the user in areas relating to requirements. In addition, the Systems Engineer focuses on system-level balancing, verification, and validation of the integrated NMD system. At the request of Ballistic Missile Defense Organization (BMDO), as well as OSD and other external agencies, the NMD System Engineer conducts ad hoc studies in support of treaty analysis, policy guidance, and other NMD derived missions. The Systems Engineering area provides government oversight of the LSI Systems Integration Integrated Product Team

DEPLOYMENT & SUSTAINMENT comprises development of plans and analysis to support system deployment and sustainment to include Manpower Personnel Training (MPT) analysis and maintenance and supply support planning. This includes identifying and executing critical actions and time-lines associated with fielding the NMD system. A key goal is reducing the time and risks inherent in such a deployment. Additionally, this effort includes developing environmental analyses and documentation; conducting siting analyses and supporting site selection; establishing facilities requirements, assessing existing facilities, and developing preliminary designs; analyzing the industrial base and assessing production capacities; and meeting other beneficial occupancy issues. This effort also coordinates and manages the GFE/GFS provided to the LSI. The Deployment Planning area manages the Production, Deployment and Sustainment Working Integrated Product Team and provides government oversight of the LSI Deployment Integrated Product Team.

SYSTEM TEST AND EVALUATION activities involve managing and overseeing the NMD test and evaluation program, including execution of the lethality ground and flight test programs, and development of program test documentation such as the Test and Evaluation Master Plan (TEMP). Managerial oversight and execution responsibilities ensure the following are available: 1) test infrastructure (including test ranges and instrumentation); 2) provides government oversight of LSI Ground-Based Test Models & Simulations 3) target development for sensor and intercept tests; and, 4) providing upgrades to government test facilities for the LSI. Management activities include development of the NMD TEMP, and Detailed Test Plans, and Post-Test Analysis Plans for each ground and flight test. Post-test evaluation, analysis, review and reporting are also provided for under this project. The responsibility to develop and maintain the Integrated System Test Capability (ISTC) transitioned to the LSI in FY99. The government maintains oversight of the LSI Test Integrated Product Team.

DISCRIMINATION provides the U.S. with the capability to generate high confidence target signatures for ballistic missile defenses. This is a critical adjunct to the design and evaluation of NMD system performance across the full spectrum of threats and engagement scenarios. This program provides signature collection sensors for live-fire missions and storage of the resulting test data. Additionally, predictive models of target signatures are developed as well as algorithms for the critical functions of discrimination, target handover and aimpoint selection.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
PROJECT: 2400	

MANAGEMENT AND OPERATIONAL SUPPORT provides personnel and related support costs common to all NMD projects including support to the Office of the Director, BMDO and his staff located in Washington, DC, as well as BMDO's Executing Agents within the U.S. Army Space and Missile Defense Command, U.S. Army PEO Missile Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office and the Joint National Test Facility. This project supports funding for overhead/indirect personnel costs, benefits and infrastructure costs such as rents, utilities and supplies. Additionally, this project maintains NMD Joint Project Office (JPO) operations. NMD JPO scientific, engineering and technical assistance activities are funded to provide required contractor support to the JPO. Additionally, Government salaries for NMD JPO personnel as well as Army NMD personnel in Huntsville are funded. Other Internal Operating Budget (IOB) costs such as travel, office expenditures, etc., are also provided through this project. The NMD JPO provides service headquarters type functions that are normally located in other appropriations (i.e., O & M accounts) such as personnel and support costs.

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy.

FY 1999 Accomplishments:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
PROJECT: 2400	

- 591013 NMD Integration: Includes $150M from the FY 1999 Ballistic Missile Defense Emergency Supplemental Appropriation that was allocated to the NMD program which is applied to the LSI contractor to continue development and integration of the NMD system in FY 1999. Transition of the EKV, PLV, and ISTC contracts to LSI contract was completed. Conducted element level Preliminary Design Reviews (PDR). Conducted NMD System Preliminary Design Review (SPDR). Prepared for IFT-3, the first intercept demonstration, which was conducted in early 1Q00. Conducted Risk Reduction Flights 5 and 6 (RRF-5 and RRF-6). Conducted LSI Integrated Distributed System (LIDS) run (2, 3). Began work on Integration Assembly Test and Checkout (IAT&C) facility at Redstone Arsenal. Continued System Integration Lab (SIL)/GBI Development Integration Lab (GDIL) construction and instrumentation.

- 590000 Includes $590M from Fy 1999 Emergency Supplemental that will fund FY 2000 LSI activities. See FY 2000 for description.

- 9786 Sensor Technology: Continued development and testing of Long Wave Infra-Red Focal Plane Arrays (LWIRFPA). Continued testing on prototype cryocoolers. Continued development of prototype contamination control device . Continued development, fabrication, and testing of advanced, radiation-hardened electronic components. Continued rad-hard visible star tracker effort.

- 146889 Weapon System: Integrated and fabricated EKV and PLV for IFT-3 and IFT-4. Completed all IFT-3 pre-launch activities. Transitioned PLV and EKV contracts to the LSI. Completed mission and launch control upgrades at the KMR EKV/PLV integration facility. Provided GFP boosters for PLV and sensor calibration facilities. Partially fabricated EKV for third intercept flight (IFT-5), incorporating technology improvements and lessons learned from IFTs 1 and 2. Supported conduct of and assessed weapon PDR. Continued Government portion of COTS booster development/preparations for three FY00 booster verification tests. Conducted Kwajalein Missile Range (KMR) silo modification and upgrades. Performed element level VV&A and IV&V efforts. Delivered readout electronics, and flight ready SHIELD and PET Focal Plane Arrays. Delivered 20/20GHz transceiver hardware to support IFT-5 3Q/00. Provided government oversight of the weapon system related efforts on the LSI contract.

- 21605 BM/C3: Conducted Government oversight of the LSI BMC3 development and deployment activities including system integration and test activities for Capability Increment 3A (CI-3A) in preparation for support of IFT-5, the first Integrated System Test. Continued development of Build Increment 1 (BI-1), integration of the 2nd IFICS Prototype at Kwajalein Missile Range (KMR), and support of NMD system tests by providing integrating BM/C3 products for IGT's 3 and 4, and IFT-3. Initiated design effort for NMD long haul and metropolitan communications network. Supported Cheyenne Mountain integration planning and provided User interaction with USSPACECOM. Supported BMC3 participation in C2 Simulations and Battle Planning Exercises. Continued international BMC3/UEWR technology experiments that demonstrate algorithms capable of improving target detection and sensitivity, identification and tracking.

- 34694 XBR: Participated in Radar Credible Target (RRF-6). Prepared for IFT-3, 1Q00. Completed development of GBR-P flight test software. Delivered software block 2.3. Validated GBR-P hardware and continued regression testing software. The XBR contract will continue to be managed by the XBR Program Office until the contract expires in FY00. At that time the LSI will continue development of the objective XBR. Maintained the GBR-P at KMR Performed element level VV&A and IV&V. Continued software algorithm development efforts. Conducted XBR Preliminary Design Review (PDR). Funding for this line supported Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603871C NMD - DEM/VAL	2400

- 6263 UEWR: Completed transition of legacy technical effort to LSI contract. Managed the UEWR portion of the LSI contract (CPR analysis, CDRL review/comment, etc.). Supported LSI UEWR development efforts such as algorithm downselect and integration into the UEWR Test Article (UTA), assessment of DII-COE implementation strategy, and program definition/risk reduction. Delivered Test Representations and Advanced Algorithms. Funding for this line supported Government LSI oversight.

- 29186 System Engineering: Continued engineering and integration activities at the system level. Assessed and refined user requirements (CRD, ORD, and CONOPs). Continued C1/C2/C3 requirements refinement (NMD SRD). Updated NMD Cost Analysis Requirements Description (CARD) to support Program Life Cycle Cost Estimate reflecting LSI proposed architecture. Conducted NMD SPDR. Updated the NMD System Threat Assessment Report (STAR). Developed/updated detailed threat "design-to" and "analyze-to" parameters and scenarios. Conducted C2Sim exercises and tabletops. Continued integration with the SBIRS Program Office in support of the NMD program requirements. Performed nuclear environment calculations/requirements verification. Conducted data fusion/system discrimination development. Performed system verification, validation and accreditation (VV&A). Maintained independent validation and verification (IV&V) capability to perform system VV&A. Supported Government LSI oversight.

- 23128 Deployment & Sustainment: Refined the NMD Integrated Deployment Plan(IDP) and the NMD Capstone Site Activation Plan(CSAP) to reflect programmatic changes and refinements in the NMD architecture. Updated the Operational Suitability (OS) Assessment Report. Developed the Joint Manpower Estimate (JME). Conducted NMD Site Evaluation. Developed an integrated Facilities Siting and Environmental (FS&E) Acquisition Management Plan and schedule. Completed the 35% facilities design for tactical and tactical support facilities for WS & XBR. Continued to define facility requirements and master construction schedule. Supported the 60% Design Review. Continued to manage funding required for design and construction of NMD program related test and deployment facilities to meet 100% design prior to DRR. Published the Notice of Intent (NOI) for public notification. Scoping process was conducted to identify environmental concerns and issues addressed in the Environmental Impact Statement (EIS). Supported Site Specific Environment Analysis (EIS/EA). Finalized system and site specific Facility Requirements Documents (FRDs). Continued to evaluate the Industrial Base for C1 Deployment. Evaluated the Industrial Base for C2 deployment. Continued the Metrology projects for development of standards for the Infrared Sensors Managed GFE/GFS to support LSI efforts. Funding for this line supported Government LSI oversight

- 115565 System Test and Evaluation: Supported System Integration Testing at the ISTC. ISTC contract transition to the LSI was completed. IGT-3 and IGT-4 were initiated and completed. Updated the TEMP with support of the NMD System T&E Integrated Product Team (IPT). Supported program documentation efforts, pre-mission flight tests 3 & 4, pre-launch preparations, as well as Risk Reduction Flights (RRF) 5 and 6. Conduct Kodiak-2 Test to exercise UEWR Prototype at Beale AFB. Conducted oversight of IFT-3 preparations. Evaluated various post-test results. Completed VV&A of IFT-4 and 5 targets. Implemented lethality and live fire-testing plan. Coordinated test range infrastructure and upgrades to support EKV flight tests from KMR. Coordinated test range instrumentation upgrades and provided data collection and analysis for NMD testing. Oversaw LSI test program. Continued development and validation of Parametric Endo-Exoatmospheric Lethality Simulation (PEELS) model for system performance verification. Developed and procured backup target system. Funding for this line supported Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603871C NMD - DEM/VAL	2400

- 400 Discrimination: Continued optical and radar data analysis for NMD system design and test. Provided discrimination algorithms to GBR, SBIRS, and GBI programs to counter advanced threats. Updated modeling capabilities in the NMD scenario.

- 2450 Systems Architecture and Engineering: Continued systems analysis work on NMD issues. Provided system-level capability to address emerging BM/C3 architectures and requirements in a synergistic manner across all NMD/TMD efforts and facilitated the translation of operational requirements to interoperable, affordable, evolvable, and supportable systems.

- 3000 Threat and Countermeasures: Continued development of threat system scenario descriptions.

- 700 Modeling and Simulations: Continued the development of Wargame 2000 simulation. The BMDO Data Centers continued to archive, manage, develop data products, distribute and provide remote access to all relevant BMDO test, experiment, M&S and wargame data.

- 1680 Test Resources: Provided ground test facility infrastructure and upgrades for NMD testing including: Integrated System Test Capability and the GBR HWIL at the Advanced Research Center; command/control technology evaluation at CERES and the JNTF ; lethality testing at the Hypersonic Ballistic Range G, Arnold Engineering Development Center (AEDC); and IR sensor testing at the 7V/10V Chamber at AEDC, aerodynamic testing at AEDC Hypervelocity Tunnel 9 and the Portable Optical Sensor Tester (POST) . Provided test range infrastructure and upgrades to support integrated system testing including: Kwajalein Missile Range instrumentation, launch control and silo upgrades, and data collection and analysis. Provided target launch support at Vandenberg AFB.

- 101842 Management and Operational Support: Continued providing management and support for overhead/indirect fixed costs, and continued to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.

Total 1678201

FY 2000 Planned Program:

- 522826 NMD Integration: Includes $117M from the 1999 Emergency Supplemental that the President requested as an emergent requirement in FY 2000. In addition, $590M that was previously designated as an emergency supplemental will be applied to the LSI contractor. Conduct four Integrated Flight Tests (IFT-3, 4, 5, and 6). IFT-3 is the first intercept demonstration. IFT-5 is the first Integrated System Flight Test, and will demonstrate the potential system capability to meet the threat requirement. Complete IAT&C facility at Redstone Arsenal. Complete GDIL/SIL. Initiate and complete three Integrated Ground Tests (IGT's 5, 6, 7) utilizing the ISTC at the Advanced Research Center. Conduct 3 LSI Integrated Development Systems (LIDS) runs (4, 5, and 6). Conduct three Booster Verification Tests (BV-1, 2, 3). Release BM/C3 Build Increment 1 software build. Prepare and complete documentation in preparation for the Deployment Readiness Review in 3Q00. Conduct Weapon System Critical Design Review (CDR). Conduct Risk Reduction Flight 7 (RRF-7). Conduct In Flight Interceptor Communication System (IFICS) hardware CDR.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
PROJECT: 2400	

- 5484 Sensor Technology: Continue development and testing of Long Wave Infrared Radar (LWIR) FPAs with extended wavelength cut-off; initiate a focal plane producibility effort to support fabrication of flight units and reduce manufacturing costs. Initiate FPA program for SBIRS Low surveillance mission. Continue visible array rad hard star tracker program. Continue FPA performance testing. Continue testing and development of cryocooler efforts. Continue development of cryogenic integration technologies. Initiate development of 10K cryocooler prototype. Continue development of rad hard electronics components.

- 36652 Weapon System: Provide technical oversight for three booster verification tests to prepare for transition from PLV to COTS booster. Conduct IFT-3 and provide support for the NMD IFT-4 and Integrated System Test (IFT-5). Support IFT-6 and IGT's 5, 6,7. Funding for this line supports Government LSI oversight. Develop tactical CLE Build 1 and Build 2. Support BV-1 and BV-2 flight test with Build 1 and Build 2 of Command Launch Equipment (CLE) HW/SW. Support pre-mission testing. Complete silo upgrade at KMR. Conduct IV&V and VV&A assessments. Support conduct of and assess Weapon System CDR. Conduct production planning. Oversee Weapon System IPT activities.

- 25982 BM/C3: Conduct BMC3 engineering and integration activities to support BM/C3 development. Provide technical oversight for capability increment-3A to support IFT's 4 & 5 in 2Q and 3Q/00, and Build Increment-1 to support the NMD DRR in 3Q FY00. Support IGT's 5, 6, 7 and IFT's-3, 4, 5, and 6. Complete IFICS Prototype integration at KMR.. Support, plan, and coordinate Cheyenne Mountain Operations Center (CMOC) integration. Provide technical oversight of the procurement of Long-Haul Communication. Conduct IV&V and VV&A assessments. Initiate support for production, fielding and deployment of the BMC3 Element. Funding for this line supports Government LSI oversight.

- 27939 XBR: Participate in IFT-3 & IFT-4 with GBR-P on-line, and the Radar Credible Target-2 mission (RRF-7) and IFT-5 and IFT-6 with GBR-P in-line. Complete system segment specification test and evaluation for government acceptance of XBR-P from Raytheon. Complete necessary requirements to provide GBR-P as Government Furnished Property to LSI. Transition XBR contract management from the XBR Program Office to the LSI. Provide management of the XBR portion of the LSI contract. Conduct IDR for C1 XBR. Conduct IV&V and VV&A assessments. Funding for this line supports Government LSI oversight.

- 9585 UEWR: Continue to support LSI's UEWR development activities and preparation for the critical NMD milestones, including the IST and DRR. Continue to participate in and support the Real Time DII-COE TWG/IPT. Support system flight and ground test planning, execution and limited post-test independent analysis. Support evaluation of algorithms and integration into the deployable system. Funding for this line supports Government LSI oversight.

- 33005 System Engineering: Continue engineering and integration activities at the system level. Assess and refine user requirements (CRD, ORD, and CONOPs). Continue C1/C2/C3 requirement refinement (NMD SRD). Update NMD CARDs against technical requirements. Conduct NMD System Engineering Interim Design Review in 2/3Q/00 and support the Deployment Readiness Review in 3Q/00. Update the NMD STAR. Develop/update detailed threat "design-to" and "analyze-to" parameters and scenarios. Conduct C2Sim exercises and tabletops (C2Sim99 in 1Q/00). Continue integration with the SBIRS Program Office in support of the NMD program requirements. Perform nuclear environment calculations/requirements verification. Conduct data fusion/system discrimination development. Coordinate system VV&A. Continue to maintain IV&V capability to perform system VV&A. Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
PROJECT: 2400	

- 25359 Deployment & Sustainment: Implement the acquisition logistics strategy and analysis process which enables the Government to properly assess the LSI's acquisition logistics program. Continue development of the initial NMD System sustainment program planning. Publish the NMD IDP and the NMD CSAP with changes driven by Expanded C1. Update the O&S Assessment Report. Update the Joint Manpower Estimate (JME) with Expanded C1 manpower impacts. Continue facility design based on impacts of Expanded C1. Support 90% Design Review. Prepare advance planning/pre-award documentation for future award of NMD System deployment construction contracts. Conduct public hearings on the EIS at the candidate interceptor and radar sites. Complete National Environmental Policy Act (NEPA) environmental compliance process, to include any additional actions necessary for Expanded C1 deployment. Update Environmental Safety and Health (ESH) plans. Evaluate the Industrial Base's ability achieve Expanded C1 Deployment. Develop and issue System Producibility and Manufacturing (P&M) Plans updated for Expanded C1. Implement a System Safety Program Plan. Provide and manage Government Furnished Equipment (GFE) and Government Furnished Services (GFS). Implement approach to meeting Test, Training and Exercise Capability requirements. Review MPT issues and ensure MPT is on track and ready for IOC. Funding for this line supports Government LSI oversight.

- 138422 System Test and Evaluation: Support IGTs 5, 6 and 7 at the ISTC. Update TEMP with support of the NMD System T&E IPT. Complete program documentation, pre-mission flight tests for IFT-4, IFT-5 and IFT-6, pre-launch preparations and oversee execution of IFT-3, 4, 5, 6 and RRF 7, and a Target of Opportunity at Kodiak. Evaluate post-test results to support DRR data gathering. Complete VV&A of IFT 6 and 7 targets and accredit the ISTC. Implement lethality and live fire testing plan. Coordinate test range infrastructure and upgrades to support EKV flight test from KMR. Coordinate test range instrumentation upgrades and provide data collection and analysis for NMD testing. Conduct target launches for IFT-3, 4, 5 and 6 from Vandenberg AFB (VAFB). Support two Booster Verification Tests at VAFB, and one at KMR. Conduct orbital sub-orbital program (OSP) demonstration flight of new targets launch program. Develop and procure backup target Multi Service Launch System (MSLS). Funding for this line supports Government LSI oversight.

- 7000 Special Studies: Follow-on NMD architectures study.

- 494 Test Resources: Provide ground facility infrastructure and upgrades for NMD testing including: lethality testing at the AEDC Range G; and IR sensor testing at the 7V/10V Chamber at AEDC, aerodynamic testing at AEDC Hypervelocity Tunnel; and POST.

- 117500 Management and Operational Support: Continue providing management and support for overhead/indirect fixed costs, and continue to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.

Total 950248

FY 2001 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
	PROJECT: 2400

- 1367821 NMD Integration: Prepare for Defense Acquisition Board (DAB) review. Conduct NMD System level Critical Design Review (CDR). Conduct C2 Ship Readiness Review (SRR). Conduct three Integrated Flight Tests (7, 8, and 9), two Risk Reduction Flights (8, 9), one LIDS run (6), and three Integrated Ground Tests (8, 9, and 10). IFT-7 will be the first mating of an EKV with the tactical booster. An XBR and UEWR Critical Design Review (CDR) will be held. UEWR software releases 5 & 6 will be implemented. A Build Increment #2 (BM/C3) Readiness Review will be conducted. Complete GBR contract transition to LSI. Participate in the NMD integrated system test IFT-7 and IFT-8, and IFT-9 with GBR-P in-line. Continue GBR algorithm development to meet C2/C3 requirements. Continue to provide oversight of the LSI's UEWR development and test activities and support award of the LSI contract options beyond the 3-year base period of the contract.

- 9806 Sensor Technology: Deliver Lot 3(final) FPAs of LWIR focal plane program. Initiate a focal plane producibility effort to support fabrication of flight units and reduce manufacturing costs. Continue Silicon FPA program for SBIRS Low. Continue visible array rad hard star tracker program; continue FPA performance testing. Complete cryocooler efforts through life and performance testing. Continue development of cryogenic integration technologies in cooperation with SBIRS Low contractual designs. Continue performance and life testing of cryocoolers. Continue development of cryocooler prototype. Continue development of rad hard electronics components/devices. Flight test a space optics cleaner prototype and finalize the design.

- 19601 Weapon System: Monitor EKV flight unit integration for IFTs 7, 8, 9, RRFs, and pre-mission flight tests. Oversee completion of COTS booster-EKV integration for IFTs 7, 8, 9. Support IFTs 7-9 conduct and post test data reduction. Management and oversight of LSI weapon system efforts. Conduct IV&V and VV&A assessments. Funding for this line supports Government LSI oversight.

- 17567 BM/C3: Conduct Government oversight of the LSI BMC3 development and deployment activities including provision of BI-1 to support IFTs -8, 9 and 10. Continue technical oversight of engineering and acquisition activities for NMD long haul communications. Conduct IV&V and VV&A assessments. Support initiation of Cheyenne Mountain integration and provide user interaction with USSPACECOM. Support BMC3 participation in C2 Simulations and Battle Planning Exercises. Continue support for production, fielding and deployment of the BMC3 Element.

- 11301 XBR: Validate XBR hardware and software. Support system flight and ground test planning, execution, and limited post-test independent analysis. Support CAIV and trade studies as required. Support evaluation of algorithms and integration into the deployable system. Support system flight and ground test planning, execution and limited post-test independent analysis. Support CAIV and trade studies as required. Support evaluation of algorithms and integration into the deployable system. Funding for this line supports Government LSI oversight. Conduct IV&V and VV&A assessments.

- 7465 UEWR: Provide oversight of the UEWR portion of the LSI contract (CPR analysis, CDRL review/comments, etc.). Continue Real Time DII-COE evaluation for UEWR. Support system flight and ground test planning, execution and limited post-test independent analysis. Support CAIV and trade studies as required. Support evaluation of algorithms and integration into the deployable system. Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

- 30340 System Engineering: Continue JPO level system engineering and integration activities. Assess and refine user requirements (CRD, ORD, and CONOPs). Continue requirement refinement for NMD SRD. Update NMD CARDs against technical requirements. Analyze results of the Deployment Readiness Review. Conduct System CDR in 2Q/01. Update the NMD STAR. Develop/update detailed threat "design-to" and "analyze-to" parameters and scenarios. Conduct C2Sim exercises and tabletops (C2Sim00 in 1Q/01). Continue integration with the SBIRS Program Office in support of the NMD program requirements. Perform nuclear environment calculations/requirements verification. Conduct data fusion/system discrimination development. Coordinate system VV&A. Maintain IV&V capability to perform system VV&A. Funding for this line supports Government LSI oversight.

- 30793 Deployment & Sustainment: Continue the development of NMD System sustainment program planning to include maintenance and supply support for the Expanded C1 architecture. Complete facility design. Oversee construction contractor and site preparation and initiate the Site Activation Task Force, if a decision is made to deploy the NMD Expanded C1 System. Complete element RAM and supportability testability data and issue analysis reports. Provide FY02 Human System Integration (HIS) domain assessment criteria to Service Components for review. Elevate Independent HSI Domain Assessment Reports to JPO risk management IPT, identifying cost, schedule, and performance concerns, issues, and recommended risk mitigation. Develop plan for employing the Test, Training, and Exercise Capability. Review MPT Issues & ensure MPT is on track to provide trained personnel for IOC. Develop and issue System P&M Plans. Continue to track industrial base capacity. Funding for this line supports Government LSI oversight.

- 115569 System Test and Evaluation: Support IGT 8, 9, 10. Update TEMP with support of the NMD System T&E IPT. Complete program documentation, pre-mission flights for IFT-7, 8 & 9, pre-launch preparations and oversee execution of IFTs 7, 8 and 9. Evaluate post-test results. Oversee Risk Reduction Flights. Conduct pre-mission work. Complete VV&A of IFT 8 and 9 targets and re-accredit the ISTC. Continue lethality and live fire testing plan. Coordinate test range infrastructure and upgrades to support EKV flight test from Kwajalein Missile Range (KMR). Coordinate Test range instrumentation upgrades and provide data collection and analysis for NMD testing. Conduct target launches for IFT 7, 8 and 9 from Vandenberg AFB. Oversee LSI test program. Funding for this line supports Government LSI oversight.

- 474 Test Resources: Provide ground facility infrastructure and upgrades for NMD testing including: aerothermal testing at Tunnel 9; lethality testing at the AEDC Range G; and IR sensor testing at the 7V/10V Chamber at AEDC, and POST.

- 129501 Management and Operational Support: Continue providing management and support for overhead/indirect fixed costs, and continue to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.

Total 1740238

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	1533532*	836555	866680

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE: February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
	PROJECT: 2400

Adjustments to Appropriated Value			
Appropriated Value	1533532*		
a. Congressional General Reductions	-3284	-5209	
b. STTR			
c. Internal Reprogramming	2670	1902	
d. Omnibus or Other Above Threshold Reductions			
e. 1999 BMD Emergency Supplemental	140000**	117000***	
f. Rescissions/Adjustments	5283		526086
g. Adjustments to Budget Years Since FY 2000 PB			347472
Current Budget Submit (FY 2001 / 2002 PB)	1678201	950248	1740238

*Includes $600 million FY99 supplemental appropriation. $150 million was executed in FY99 and $450 million will be executed in FY00.
** $140 million was reallocated to NMD and will be executed in FY00.
***President designated this as an emergency requirement in FY00 and Congress specified an additional $117 million from the FY99 supplemental be provided to NMD.

Change Summary Explanation:

Funding: FY99 – OSD Reductions, 1999 BMD Emergency Supplemental Appropriation Additions, BMDO Management Account Re-programming.

FY00 – OSD Reductions, 1999 BMD Emergency Supplemental Appropriation Additions.
FY01 – Procurement redesignated to RDT&E based on refined estimate.

Schedule: S/PDR moved from 3Q FY99 to 4Q FY99
IGT-4 moved from 3Q FY99 to 4Q FY99
IFT-3 moved from 3Q FY99 to 1Q FY00
IFT-4 moved from 4Q FY99 to 2Q FY00

Technical: N/A

C. **Other Program Funding Summary**	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
PE 0603871C NMD MILCON Design	9669	15000	14500						39169
PE0603871C NMD MINOR MILCON			1995	2000	2000	2000	0		8000
PE 0603871C NMD MILCON Construction			85100	189940	124450	36350	15300		451135
PE 0208871C NMD Procurement			74530	1536483	1221549	1238207	1078649	1655822	6832663

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE: February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

D. Acquisition Strategy: The Initial Development Phase includes activities from the original program: development and integration of the system elements, and demonstration of system capabilities. Activities added to this phase include those necessary to plan and implement the revised program from FY2000 to FY2005 and to accelerate deployment if necessary. This phase culminates in the previously scheduled Deployment Readiness Review (DRR) in FY2000, at which the DoD will assess the maturity of the NMD technology and proposed system's potential operational effectiveness in support of a subsequent Presidential decision on deployment of an NMD system. The planned activities between FY2000 and FY2007 are focused on completing development and deployment of a Capability-1 system by 2005 and an Expanded C1 system by 2007. In addition, some activities are dedicated to assessing the technical feasibility, schedule, and cost associated with evolving the system to counter more complex threats.

E. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Engineering Milestones								
a. NMD S/PDR		4Q						
b. NMD DRR			3Q					
c. Treaty/HNA			3Q					
d. NMD DAB				3Q				
e. NMD S/CDR				2Q				
f. Weapon PDR		1Q						
g. Weapon CDR			2Q					
h. Weapon ATP						3Q		
i. XBR PDR		3Q						
j. XBR CDR				1Q				
k. XBR ATP				3Q				
l. UEWR PDR		3Q						
m. NMD DAB						2Q		
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
n. BMC3 IFICS H/W CDR			3Q					
o. UEWR CDR				2Q				
p. Site NOI		1Q						
q. Site Environmental Impact Study Complete			3Q					
r. Site Design Complete			3Q					
s. Site Construction Complete							4Q	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

Test and Evaluation Milestones								
t. C2 Sim 97B	1Q							
u. C2Sim 98		1Q						
v. C2Sim 99			1Q					
w. C2Sim 00				1Q				
x. C2Sim 01					1Q			
y. IFT-2	2Q							
z. BM/C3 Capability Increment 3	2Q							
aa. IGT-1A	3Q							
bb. IFT-3			1Q					
cc. IFT-4			2Q					
dd. BM/C3 Capability Increment 3A		2Q						
ee. IGT-3		2Q						
ff. IGT-4		4Q						
gg. IGT-5			1Q					
hh. IGT-6			2Q					
ii. IFT-5			3Q					
jj. BV-1			2Q					
kk. BV-2			3Q					
ll. BV-3			4Q					
mm. IGT-7			4Q					
nn. IFT-6			4Q					
oo. BM/C3 Build Increment 1			2Q					
pp. BM/C3 Build Increment 2				2Q				
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
qq. IFT-7				2Q				
rr. IFT-8				3Q				
ss. IFT-9				4Q				
tt. IFT-10					1Q			
uu. IGT-8				1Q				
vv. IGT-9				3Q				
ww. IGT-10				1Q				

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603871C NMD - DEM/VAL**

Contract Milestones								
xx. BMC3 Contract Transition	4Q							
yy. PLV Contract Transition		4Q						
zz. EKV Downselect		1Q						
aaa. NMD Lead System Integrator Contract Award	3Q							
bbb. EKV Contract Transition		2Q						
ccc. GBR-P Contract Transition			4Q					
ddd. SEI Contract Transition	3Q							
eee. UEWR Contract Transition		2Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
NMD INTEGRATION												
	CPAF	Boeing*	199815	1181013	N/A	522826	N/A	1367821	N/A	CONT	TBD	TBD
WEAPON SYSTEM												
	CPFF	Raytheon	246315	31175	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPFF	Boeing	255394	37600	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPIF	Lockheed	193944	45200	N/A	0	N/A	0	N/A	0	TBD	TBD
	TM	NRC	6269	3792	N/A	6315	N/A	TBD	N/A	CONT	TBD	TBD
	CPFF	Sparta	5642	1525	N/A	2138	N/A	TBD	N/A	CONT	TBD	TBD
	TM	Mevatec	583	2307	N/A	5126	N/A	TBD	N/A	CONT	TBD	TBD
	CPFF	SY Technology	4375	1662	N/A	653	N/A	TBD	N/A	CONT	TBD	TBD
	TM	TBE	13202	4677	N/A	4735	N/A	TBD	N/A	CONT	TBD	TBD
	CPFF	Stone Engineer	730	1795	N/A	1917	N/A	TBD	N/A	CONT	TBD	TBD
	CPFF	Tybrin	0	100	N/A	0	N/A	0	N/A	0	TBD	TBD
	N/A	OGA's	9444	15966	N/A	15069	N/A	18902	N/A	CONT	TBD	TBD
	TBD	Misc Contracts	19244	1090	N/A	699	N/A	699	N/A	CONT	TBD	TBD
BM/C3												
	N/A	NWSC	3900	4476	N/A	1000	N/A	800	N/A	CONT	TBD	TBD
	CPAF	TRW	9401	3623	N/A	4400	N/A	4100	N/A	CONT	TBD	TBD
	FFRDC	MITRE Corp.	7587	1875	N/A	2328	N/A	1894	N/A	CONT	TBD	TBD
	BPA (ITSP)	Sencom (ITSP)	4749	1348	N/A	1311	N/A	1300	N/A	CONT	TBD	TBD
	CPFF	Sparta	2717	2376	N/A	2583	N/A	3206	N/A	CONT	TBD	TBD
	TM	NRC	3656	1382	N/A	450	N/A	1250	N/A	CONT	TBD	TBD
	MIPR	GFE	0	1288	N/A	2700	N/A	0	N/A	0	TBD	TBD
	TBD	Misc Contracts	0	2768	N/A	6210	N/A	3198	N/A	CONT	TBD	TBD
	N/A	DISA	108	1320	N/A	5000	N/A	1819	N/A	CONT	TBD	TBD
	N/A	USASMDC	0	1149	N/A	0	N/A	0	N/A	0	TBD	TBD
XBR												
	CPFF	Raytheon	141530	14041	N/A	12039	N/A	0	N/A	N/A	TBD	TBD
	CPAF	TBE	7941	2900	N/A	2900	N/A	2900	N/A	CONT	TBD	TBD
	CPAF	Colsa	13215	2024	N/A	2024	N/A	2024	N/A	CONT	TBD	TBD

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

	CPAF	NRC	2810	1925	N/A	1925	N/A	1925	N/A	0	TBD	TBD
	MIPR	MITRE (Lincoln Labs)	9500	2150	N/A	2150	N/A	2150	N/A	CONT	TBD	TBD
	CPAF	Raytheon	5605	2905	N/A	0	N/A	0	N/A	CONT	TBD	TBD
	N/A	Misc	10521	2099	N/A	1428	N/A	1302	N/A	CONT	TBD	TBD
	N/A	Misc/OGA	0	6650	N/A	5473	N/A	1000	N/A	CONT	TBD	TBD
UEWR												
	MIPR	MITRE	8574	3068	N/A	5443	N/A	4300	N/A	4200	TBD	TBD
	BPA (ITSP)	SENCOM	3144	1621	N/A	2445	N/A	2200	N/A	2400	TBD	TBD
	BPA (ITSP)	TECOLOTE	888	476	N/A	223	N/A	200	N/A	500	TBD	TBD
	GSA	FEDSIM (STA)	330	130	N/A	0	N/A	0	N/A	0	TBD	TBD
	BPA (ITSP)	STA	0	0	N/A	200	N/A	200	N/A	200	TBD	TBD
	MIPR	MIT Lincoln Lab	75	350	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPAF	TRW @ JNTF	325	319	11/99	574	N/A	0	N/A	0	TBD	TBD
	N/A	Misc.	4047	299	N/A	700	N/A	565	N/A	0	TBD	TBD
SENSOR TECH												
	N/A	Cubic	0	340	N/A	25	N/A	0	N/A	0	TBD	TBD
	CPAF	Ball	0	50	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPFF	Raytheon	300	359	N/A	650	N/A	706	N/A	CONT	TBD	TBD
	N/A	Phillips	0	640	N/A	1047	N/A	760	N/A	0	TBD	TBD
	MIPR	AFRL	4135	1630	N/A	718	N/A	1200	N/A	CONT	TBD	TBD
	CPFF	TRW	0	116	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPAF	Dynacs	0	225	N/A	92	N/A	250	N/A	0	TBD	TBD
	CPFF	Swales	750	35	N/A	192	N/A	100	N/A	CONT	TBD	TBD
	CPAF	Ball	3345	309	N/A	0	N/A	800	N/A	CONT	TBD	TBD
	CPAF	Ball	0	255	N/A	0	N/A	260	N/A	0	TBD	TBD
	CPFF	Raytheon	874	1370	N/A	1720	N/A	1200	N/A	CONT	TBD	TBD
	CPAF	Rockwell	2030	1250	N/A	1040	N/A	1080	N/A	CONT	TBD	TBD
	N/A	USASMDC	3276	1020	N/A	0	N/A	1000	N/A	0	TBD	TBD
	CPFF	NRC	0	220	N/A	0	N/A	500	N/A	0	TBD	TBD
	N/A	MRC	404	782	N/A	0	N/A	800	N/A	CONT	TBD	TBD
	MIPR	SPAWAR	0	410	N/A	0	N/A	400	N/A	0	TBD	TBD
	N/A	TBE	0	95	N/A	0	N/A	100	N/A	0	TBD	TBD
	N/A	ADI	0	400	N/A	0	N/A	450	N/A	0	TBD	TBD
	N/A	Raytheon	0	280	N/A	0	N/A	200	N/A	0	TBD	TBD
Subtotal Product Development:			1210694	1400250		628468		1433561		7300	TBD	TBD

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING												
	CPFF	BMD/CSC	79824	14891	N/A	14750	N/A	15500	N/A	CONT	TBD	TBD
	N/A	USSPACECOM	4859	2615	N/A	0	N/A	0	N/A	CONT	TBD	TBD
	N/A	JNTF	11774	2089	N/A	4700	N/A	4200	N/A	CONT	TBD	TBD
	MIPR	DSWA	4965	1450	N/A	0	N/A	0	N/A	CONT	TBD	TBD
	N/A	USAF/SMC/ SBIRS	1000	1140	N/A	2500	N/A	0	N/A	CONT	TBD	TBD
	N/A	NSWC	1017	200	N/A	5000	N/A	4200	N/A	CONT	TBD	TBD
	N/A	Threat and CM	3515	282	N/A	2290	N/A	2500	N/A	CONT	TBD	TBD
	MIPR	POET	48	815	N/A	0	N/A	0	N/A	CONT	TBD	TBD
	MIPR	MIT/Lincoln Lab	0	5000	N/A	3575	N/A	2500	N/A	CONT	TBD	TBD
	N/A	Misc	0	704	N/A	190	N/A	0	N/A	0	TBD	TBD
	N/A	DTRA	0	0	N/A	0	N/A	1440	N/A	CONT	TBD	TBD
DEPLOYMENT & SUSTAINMENT PLANNING												
	MIPR	NIST	1939	2662	N/A	2880	N/A	2970	N/A	CONT	TBD	TBD
	N/A	USAF/SMC	1215	10000	N/A	1180	N/A	5800	N/A	CONT	TBD	TBD
	N/A	USSPACECOM	3690	9370	N/A	13618	N/A	15500	N/A	CONT	TBD	TBD
	CPFF	TBD	2610	0	N/A	0	N/A	0	N/A	CONT	TBD	TBD
	MIPR	USA Corp of Eng	1100	1096	N/A	1681	N/A	2523	N/A	CONT	TBD	TBD
	TBD	Misc contracts	8873	0	N/A	0	N/A	0	N/A	CONT	TBD	TBD
	MIPR	USASMDC	0	0	N/A	6000	N/A	4000	N/A	CONT	TBD	TBD
SPECIAL STUDIES	N/A	TBD	0	0	N/A	7000	N/A	0	N/A	0	TBD	TBD
MANAGEMENT AND OPERATIONAL SUPPORT												
	CPAF/CPFF	CSC	69387	31841	N/A	33447	N/A	43224	N/A	CONT	TBD	TBD
	N/A	SFAE-MD	32069	26287	N/A	28824	N/A	17834	N/A	CONT	TBD	TBD
	N/A	GOVT PERS	5715	3672	N/A	6159	N/A	6000	N/A	CONT	TBD	TBD

											DATE	February 2000
BUDGET ACTIVITY						PE NUMBER AND TITLE						
4 - Demonstration and Validation						0603871C NMD - DEM/VAL						
	N/A	Misc RES.	9331	0	N/A	0	N/A	0	N/A	0	TBD	TBD
	N/A	USSPACECOM	0	4946	N/A	11665	N/A	14000	N/A	CONT	TBD	TBD
	N/A	Operational accounts	69057	35096	N/A	29895	N/A	42733	N/A	CONT	TBD	TBD
	N/A	Mgt account	0	0	N/A	1800	N/A	0	N/A	0	TBD	TBD
	N/A	GOVT PERS (HSV)	0	0	N/A	5710	N/A	5710	N/A	CONT	TBD	TBD
DISCRIMINATION												
	CPFF via NRL	PRA	17932	400	2Q99	0	N/A	0	N/A	0	TBD	TBD
SYSTEM ARCH AND ENGINEERING												
		Misc contracts	1744	2450	N/A	0	N/A	0	N/A	0	TBD	TBD
THREAT AND COUNTERMEASURE												
	N/A	Misc contracts	10269	3000	N/A	0	N/A	0	N/A	0	TBD	TBD
Subtotal Support Costs:			341933	160006		182864		190634			TBD	TBD

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
TEST AND EVALUATION												
	CPAF/TM	TBE	29090	15472	N/A	1472	N/A	2042	N/A	CONT	TBD	TBD
	CPFF	Colsa	10965	16766	N/A	5687	N/A	6750	N/A	CONT	TBD	TBD
	CPFF	Boeing	7400	1380	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPFF	Raytheon	5900	1000	N/A	500	N/A	0	N/A	0	TBD	TBD
	CPAF	TRW	246	0	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPFF	Raytheon	2900	0	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPAF	SAIC	1616	715	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPAF	Nichols	3447	0	N/A	0	N/A	3200	N/A	CONT	TBD	TBD
	MIPR	USAKA	15866	10855	N/A	12866	N/A	20000	N/A	CONT	TBD	TBD

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

	FFRDC/MIPR	Sandia	4147	0	N/A	0	N/A	0	N/A	0	TBD	TBD
	OGA/MIPR	USASMDC	2910	0	N/A	900	N/A	1000	N/A	CONT	TBD	TBD
	OGA/MIPR	JNTF	1110	575	N/A	314	N/A	0	N/A	0	TBD	TBD
	OGA/MIPR	NRL	200	1771	N/A	1679	N/A	0	N/A	0	TBD	TBD
	TBD	Misc contracts	71851	0	N/A	200	N/A	0	N/A	0	TBD	TBD
	MIPR	VAFB	0	760	N/A	2001	N/A	0	N/A	0	TBD	TBD
	TM	MEVATEC	0	1181	N/A	2640	N/A	3000	N/A	CONT	TBD	TBD
	MIPR	Space&Msl Cmd	0	327	N/A	483	N/A	600	N/A	CONT	TBD	TBD
	CPFF	Lockheed MMS	0	3020	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPFF	CAS	0	250	N/A	0	N/A	0	N/A	0	TBD	TBD
	CPFF	SYTECH	0	600	N/A	300	N/A	400	N/A	CONT	TBD	TBD
	OGA/MIPR	SBIRS SPO	0	1531	N/A	1300	N/A	600	N/A	CONT	TBD	TBD
	MIPR	AMCOM	0	2110	N/A	200	N/A	0	N/A	0	TBD	TBD
	MIPR	USARSPACE	0	620	N/A	400	N/A	0	N/A	0	TBD	TBD
	MIPR	Eglin AFB	0	1622	N/A	300	N/A	0	N/A	0	TBD	TBD
	N/A	SATCOM	0	480	N/A	734	N/A	0	N/A	0	TBD	TBD
	OGA/MIPR	OGAs	0	0	N/A	2017	N/A	4058	N/A	CONT	TBD	TBD
	N/A	VRC	0	1660	N/A	1160	N/A	1860	N/A	CONT	TBD	TBD
	N/A	EAC	0	250	N/A	250	N/A	250	N/A	CONT	TBD	TBD
	N/A	TEXCOM	0	390	N/A	390	N/A	390	N/A	CONT	TBD	TBD
	N/A	HRED	0	120	N/A	120	N/A	120	N/A	CONT	TBD	TBD
	N/A	SLAD	0	160	N/A	160	N/A	160	N/A	CONT	TBD	TBD
	N/A	CEI	0	1500	N/A	1000	N/A	1590	N/A	CONT	TBD	TBD
	CPFF	COLSA	0	550	N/A	550	N/A	550	N/A	CONT	TBD	TBD
	CPFF	TRW	0	1770	N/A	1770	N/A	1830	N/A	CONT	TBD	TBD
	N/A	VARIOUS OGA'S	0	823	N/A	823	N/A	823	N/A	CONT	TBD	TBD
	CPFF	SAIC	0	662	N/A	662	N/A	782	N/A	CONT	TBD	TBD
	MIPR	MIT LLNL	0	1350	N/A	3130	N/A	2295	N/A	CONT	TBD	TBD
	CPFF	ITT	0	630	N/A	954	N/A	1917	N/A	CONT	TBD	TBD
	OGA/MIPR	AEDC	0	1600	N/A	2150	N/A	2365	N/A	CONT	TBD	TBD
	N/A	SANDIA	0	2120	N/A	3815	N/A	3345	N/A	CONT	TBD	TBD
	N/A	MEVATEC	0	60	N/A	75	N/A	75	N/A	CONT	TBD	TBD
	N/A	TBE	0	200	N/A	676	N/A	950	N/A	CONT	TBD	TBD
	N/A	SMDC	0	40	N/A	83	N/A	93	N/A	CONT	TBD	TBD
	N/A	NICOLS	0	0	N/A	10	N/A	18	N/A	CONT	TBD	TBD
NMD TARGETS												
	FFRDC/MIPR	Sandia	43734	4734	N/A	34474	N/A	6273	N/A	CONT	TBD	TBD

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL

PROJECT: 2400

	OGA/MIPR	USASMDC	1754	1978	N/A	2473	N/A	1975	N/A	CONT	TBD	TBD
	OGA/MIPR	SMC	11483	30534	N/A	47824	N/A	43900	N/A	CONT	TBD	TBD
	MIPR	USASMDC	0	1454	N/A	1730	N/A	2058	N/A	CONT	TBD	TBD
	N/A	VARIOUS OGA	0	1945	N/A	150	N/A	300	N/A	CONT	TBD	TBD
MODELLING AND SIMULATION												
	N/A	USASMDC	3190	700	N/A	0	N/A	0	N/A	0	TBD	TBD
TEST RESOURCES												
	N/A	Misc contracts	13300	1680	N/A	494	N/A	474	N/A	CONT	TBD	15948
Subtotal Test and Evaluation:			231109	117945		138916		116043			TBD	TBD

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Management Services:												
Project Total Cost:			1783736	1678201		950248		1740238		CONT	TBD	TBD

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

	COST *(In Thousands)*	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	204213	196556	0	0	0	0	0	TBD	TBD
1170	TMD Risk Reduction	25820	0	0	0	0	0	0	TBD	TBD
2160	TMD Existing System Modifications	2447	0	0	0	0	0	0	TBD	TBD
3155	System Engineering & Integration	0	46433	0	0	0	0	0	TBD	TBD
3251	System Engineering & Tech Support	16485	0	0	0	0	0	0	TBD	TBD
3265	User Interface	15266	0	0	0	0	0	0	TBD	TBD
3352	Modeling & Simulation	16539	0	0	0	0	0	0	TBD	TBD
3354	Targets Support	17615	48056	0	0	0	0	0	TBD	TBD
3359	System Test and Evaluation	3966	21363	0	0	0	0	0	TBD	TBD
3360	Test Resources	45846	13734	0	0	0	0	0	TBD	TBD
4000	Operational Support	60229	66970	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

The Theater Missile Defense (TMD) program's goal is to develop, maintain and deploy a cost-effective, Anti-Ballistic Missile (ABM) Treaty compliant system designed to protect deployed forces and areas of operation against the immediate and growing threat from shorter range theater ballistic missiles. The TMD core programs are PATRIOT Advanced Capability (PAC)-3, Theater High Altitude Area Defense (THAAD) System, and Navy Area Theater Ballistic Missile Defense (TBMD) formerly (Lower Tier) and Navy Theater-Wide TBMD formerly (Upper Tier).

Theater Missile Defense programs, projects, and activities in Advanced Development that have as a primary objective the development of technologies capable of supporting systems, components, and architectures that could produce highly effective defenses against theater missile threats. Includes manpower authorizations and the associated costs specifically identified and measured to the performance of these programs.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

Starting in FY 01, all projects in the JTMD program element have been transferred to either the Family of Systems program element (0603873C) or the Technical Operations program element (0603874C). The decision to transfer the funds from the JTMD program element was to ensure and maintain adequate visibility into all Theater Missile Defense efforts.

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of each Program Element Summary.

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	200464	195722	218608
Congressional Adjustments		+2500	
Appropriated Value		198222	
Adjustments to Appropriated Value			
a. Congressional Reductions (FFRDC, Inflation, etc)		-935	
b. OSD Reductions			
c. Emergency Supplemental			
d. Internal Reprogramming		-721	
Adjustments to Budget Years Since FY 2000 PB	3749		-218608
Current Budget Submit (FY 2001 PB)	204213	196566	0

Change Summary Explanation:

For FY00, a Congressional Plus-Up of $2.5M was provided for the development of Liquid Fueled Targets (Project 3354).

Starting in FY 01, all JTMD funding will transfer to either the Family of Systems program element (0603873C) or to the Technical Operations program element (0603874C).

C. Acquisition Strategies:
See Individual R2a summaries.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 1170

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1170 TMD Risk Reduction	25820	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project is the primary Theater Missile Defense (TMD) Family of Systems (FoS) Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I) risk mitigation program for assessing target/threat signature (and the signature-to-system interfaces) issues for all FoS elements during system development. This project, once encompassing six elements, is now comprised solely of the TMD Critical Measurements Program (TCMP) which builds, flies, observes, and analyzes ballistic missile targets similar to foreign threats.

The purpose of TCMP is to provide the FoS elements with signature and related data collected on tactical ballistic missile targets to mitigate the significant risks associated with TMD weapon system development. The data provided by this project supports the FoS elements throughout their life cycle, from their initial design and testing, to their subsequent product improvement activities. The list of critical data needs is compiled for the principle BMC4I functions of target acquisition, bulk filtering and track, discrimination, threat handover, aimpoint selection, interceptor guidance and control, and finally kill assessment.

Program requirements for this multi-flight test program are derived from the FoS elements through the TCMP User Requirements process. The flight tests are developed to be conducted at the Kwajalein Missile Range using the Kiernan Reentry Measurement System (KREMS) radars and other key ancillary sensors to provide radar and optical "truth" data in the following areas of need: resolved infrared (IR) data of an intact missile, exo to low endoatmospheric booster fragmentation, target object maps of closely spaced objects, intact missile intercept debris, tumbling intact missile/warhead, fuel debris, simple decoys, inadvertent and crude maneuvering reentry vehicle, and intact missile breakup. Radar and infrared signature measurements may be performed on both the TCMP flight test articles and foreign threat theater ballistic missiles to ensure the TCMP targets exhibit their intended characteristics and mitigate the risk of test failure. The FoS elements participate in the missile campaign to exercise and assess their sensor and BMC4I capabilities.

Funding for this project was transferred to PMA 3155 beginning in FY00. Subsequently, the funding for this Project will transfer to the PE 0603873C – Family of Systems Engineering and Integration beginning in FY01.

FY 1999 Accomplishments:

- 8497 Range and sensor support for TCMP 3A flight test
- 6439 Completed payload development/fabrication, documentation, technical support/mission planning for TCMP 3A flight test
- 7257 Conducted TCMP 3A flight test - launch vehicle / launch services
- 490 Continued to plan and execute collection of intercept data. Assessed NTW Blk II sensor alternatives for kill assessment.
- 3137 Government project personnel and support

Total 25820

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603872C Joint TMD - DEM/VAL**

FY 2000 Planned Program:

- Funding for TCMP has been transferred to Project 3155 beginning in FY 00

FY 2001 Planned Program:

- Funding for TCMP has been transferred to Program Element 0603873C/Project 3155 beginning in FY 01

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3155 Sys Engr and Integration* PE 0603873C				15582	16153	16177	15256	15486	CONT	CONT
3155 Sys Engr and Integration* PE 0603872C			14992							

* TCMP Activities only

C. Acquisition Strategy: N/A

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
N/A										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 2160

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2160 TMD Existing System Modifications	2447	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

SHIELD (Formerly Talon Shield). The SHIELD program is developing a system that receives and fuses Defense Support Program (DSP) assets, other national intelligence data and SIGINT data on theater ballistic missile (TBM) events to provide more timely warning of worldwide TBM launch point, time, azimuth and impact point prediction to tactical units. As processing improvements and additional sources are integrated and fused, these upgraded capabilities are passed to the Air Force Attack and Launch Early Reporting to Theater (ALERT) and the Army Joint Tactical Ground Station (JTAGS) programs for incorporation in the operational systems. The SHIELD system is co-located at the Joint National Test Facility, Falcon Air Force Base, CO with ALERT.

FY 1999 Accomplishments:

- 2447 SHIELD: Continued SHIELD development, test and evaluation activities; continued to incrementally developed test and demonstrated improved processing capabilities and fusion of other intelligence and sensor data sources with DSP. Infrared and data fusion efforts were culminated with operational code for ALERT and Space Based Infrared System Increment 1 capabilities.

Total 2447

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
N/A										

C. Acquisition Strategy: N/A

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
N/A										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3155

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3155 System Engineering & Integration	0	46433	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This purpose of this project is to provide system engineering, analysis, and technical support for the development of a joint Theater Air and Missile Defense (TAMD) Family of Systems (FoS) architecture. Joint Theater Air and Missile Defense (JTAMD) is the integrated capability to detect, classify, intercept and destroy or negate the effectiveness of enemy aircraft and missiles prior to launch or while in flight, to protect US and coalition forces, selected assets, and populations centers within an assigned theater of operations. The TAMD FoS architecture will focus on the integration of theater ballistic missile defense, cruise missile defense, air defense, and attack operations.

This project funds the development, operation, and Verification, Validation and Accreditation (VV&A) of the Extended Air Defense Bed (EADTB) and the Extended Air Defense Simulation (EADSIM) simulations, which support the analysis required for TAMD program acquisition and integration. The EADTB is a flexible distributed simulation tool that can determine the performance of existing and conceptual extended air and missile defense systems with the added complexity of theater missile defense threats. This is a multi-site test bed that is comprised of high and medium fidelity models of sensors, environments, weapon systems, threats, and Battle Management Command, Control and Communication (BM/C3) systems. The capabilities of the EADTB are being incrementally developed and accredited with the Services. EADSIM is a low to medium detail simulation system that operates on a stand-alone workstation. This simulation is used for architectural analysis of EAD systems and provides user interface for scenario preparation and model description.

This project also funds the TMD Critical Measurements Program (TCMP). The purpose of the TCMP is to provide the FoS elements with signature and related data collected on tactical ballistic missile targets to mitigate the significant risks associated with TMD weapon system development. The data provided by this project supports the FoS elements throughout their life cycle, from their initial design and testing, to their subsequent product improvement activities. The list of critical data needs is compiled for the principal BMC4I functions of target acquisition, bulk filtering and track, discrimination, threat handover, aimpoint selection, interceptor guidance and control, and finally kill assessment.

Program requirements for this multi-flight test program are derived from the FoS elements through the TCMP User Requirements process. The flight tests are developed to be conducted at the Kwajalein Missile Range using the KREMS radars and other key ancillary sensors to provide radar and optical “truth” data in the following areas of need: resolved infrared (IR) data of an intact missile, exo to low endoatmospheric booster fragmentation, target object maps of closely spaced objects, intact missile intercept debris, tumbling intact missile/warhead, fuel debris, simple decoys, inadvertent and crude maneuvering reentry vehicle, and intact missile breakup. Radar and infrared signature measurements may be performed on both the TCMP flight test articles and foreign threat theater ballistic missiles to ensure the TCMP targets exhibit their intended characteristics and mitigate the risk of test failure. The FoS elements participate in the missile campaign to exercise and assess their sensor and BMC4I capabilities.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3155

This project provides support for UK developed sensor data fusion methodology, specifically, UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications.

Funding from various projects within PE 0603872C were transferred to project 3155 in FY 00 due to the Program Element restructure. Funding in this project then transferred to PE 0603873C (PMA 3155) starting in FY01.

FY 2000 Planned Program:

- 14992 TCMP – Conduct data analysis for T+30 day review as well as the T+180 day data analysis workshop for TCMP 3A. Conduct user and experiment requirements reviews as well as preliminary and critical design reviews for TCMP 3B. Complete design and purchase of payload and launch hardware for TCMP 3B. Initiate UDS documentation and technical support for TCMP 3B. Initiate mission planning for TCMP 4A&B. Conduct sensor planning for TCMP 3B.
- 12673 TMD Program Support - Using FFRDC resources, perform independent technical and engineering assessments of TMD system architectures including: system concept development and assessment; critical element technical and programmatic assessments including trade-off analyses; reviews of mandated documents, international cooperative programs, and treaty implications; multi-Service and allied BM/C3 integration; modeling, simulation, experiment and flight test support; integration of fielded components into operational units; and specific studies and analyses of critical issues. Provided scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; engineering and technical support for international programs and BM/C3 efforts; conducted EADTB distributed analyses and operations; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation.
- 10388 EADTB - Deliver EADTB enhancements to meet formal BMDO approved study/test requirements. Perform EADTB Final Formal Qualification Testing and as required, commence continued improvement of EADTB. Provide limited on-site support to a select group of EADTB sites. Continue limited EADTB VV&A activities. Provide EADSIM baseline maintenance.
- 4667 Govt Project Personnel & Support - Provide funding for government personnel and project management
- 895 International Programs - Continue UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications.
- 2828 BMD Impact Analysis and Engineering – Delivers short notice engineering and analytical recommendations and proposed solutions associated with broad ballistic missile defense issues. Provides congressional, OSD, and BMDO leadership with a range of options for dealing with threat, architectural , and system elements influencing the design and composition of US ballistic missile defenses. Includes resources to foster improvements in BMD command and control leading towards a coordinated engagement capability (CEC) and single integrated air picture.

Total 46443

FY 2001 Planned Program:

- Funding has been transferred to Program Element 0603873C/Project 3155 beginning in FY 01

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603872C Joint TMD - DEM/VAL**

3155 System Engr & Integration, PE 0603873C				42208	49263	50327	42860	42474	Continue	Continue

C. Acquisition Strategy: N/A

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
TCMP 3A Data Analysis Review					1Q					
TCMP 3A Data Assessment Workshop					3Q					
TCMP-3B Experiments Requirements Review					2Q					
TCMP-3B Payload Design Review					3Q					
TCMP-3B Critical Design Review					4Q					
Final Delivery of TOTS					4Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3155

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TCMP Payload, 3B		MIT/LL, Lexington, Mass.		5890	1Q00				5890	
b. TCMP Payload 4A& 4B		MIT/LL, Lexington, Mass		1902	1Q00				1902	
c. TCMP Launch Vehicle		OSC, Chandler, AZ		2200	1Q00				2200	
d. TCMP Booster Mods		Aerojet, CA		1950	1Q00				1950	
e. EADTB Development	CPAF	TBD (HSV)		10388	1Q00				10388	
f. TOTS UK/MOD				895	1Q00				895	
g.										
Subtotal Product Development:				23225					23225	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TCMP Technical Support/Data		TBE, Huntsville, AL		300	1Q00				300	
b. TCMP Data Analysis		PRA, Huntsville, AL		200	1Q00				200	
c. TCMP Technical Support		NRC, Huntsville, AL		150	1Q00				150	
d. TCMP Flight Analysis		AF-TRW		600	1Q00				600	
e. TCMP Flight Analysis		MIT/LL		1300	1Q00				1300	
f. Missile Def Data Center		CAS		100	1Q00				100	
g. SETA Support	CPAF	Sparta, Arlington, VA		4745	1Q00				4745	
h. POET Support		FFRDCs		5579	1Q00				5579	
i. Mission Support				2349	1Q00				2349	
j. BMD Analysis Support		Various		1400	1Q00				1400	
Subtotal Support Costs:				16723					16723	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3155

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TMD Kill Assessment		USN		0						
b. TCMP Range/Flight Ops		KMR/Raytheon		200	1Q00				200	
c. TCMP Range/Flight Ops		CDC, Wake Island		200	1Q00				200	
d. Sensor Deployment		Various		0						
e.										
f.										
Subtotal Test and Evaluation:				400					400	

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Govt Prog Pers				4667	1Q00				4667	
b. BMD Analysis Support		Various		1428	1Q00				1428	
c.										
d.										
e.										
f.										
Subtotal Management Services:				6095					6095	

Remark:

Project Total Cost:				46443					46443	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3251

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3251 System Engineering & Tech Support	16485	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project provides system engineering and technical support for the integration of Service-supplied weapon systems to facilitate the identification and resolution of inter-Service integration and interoperability issues; technical and engineering assessments and trade-off studies of Theater Missile Defense (TMD) system architectures and concepts; support for UK developed sensor data fusion methodology; Ballistic Missile Defense (BMD) system survivability oversight and assessment; risk reduction and acquisition streamlining support; modeling, simulation, experiment, and flight test support; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation associated with TMD studies and critical issues.

Funding for this project transferred to Project 3155 beginning in FY00. Subsequently, the funding for this project transferred to the PE 0603873C – Family of Systems Engineering and Integration beginning in FY01.

FY 1999 Accomplishments:

- 900 Continued UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications.
- 5407 Provided scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; engineering and technical support for international programs and BM/C3 efforts; conducted EADTB distributed analyses and operations; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation.
- 5103 Using FFRDC resources, performed independent technical and engineering assessments of TMD system architectures including: system concept development and assessment; critical element technical and programmatic assessments including trade-off analyses; reviews of mandated documents, international cooperative programs, and treaty implications; multi-Service and allied BM/C3 integration; modeling, simulation, experiment and flight test support; integration of fielded components into operational units; and specific studies and analyses of critical issues.
- 4104 Provided funding for government personnel and project management

Total 15514

FY 2000 Planned Program:

- Funding has been transferred to Project 3155 beginning in FY 00

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603872C Joint TMD - DEM/VAL**

FY 2001 Planned Program:

- Funding has been transferred to Program Element 0603873C/Project 3155 beginning in FY 01

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3155 SYS ENG. & INTEGRAT., PE 0603872C			12673						TBD	TBD
3155 SYS ENG. & INTEGRAT., PE 0603873C				10906	15438	16553	12488	11654	CONT	CONT

C. Acquisition Strategy:

Management is executed through the use of weekly task plans, monthly progress and expenditure reports, quarterly reviews, and semi-annual assessments. Each theater conducts monthly In-Process Reviews to monitor and manage the preparation for scheduled activities. ORDs/CRDs, CONOPs, and TTPs are updated throughout the year.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
N/A										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3265

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3265 User Interface	15266	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project focuses on supporting: (1) the warfighters Joint Theater Air and Missile Defense (JTAMD) requirements; (2) TMD and TAMD Master Plan demonstration projects/events and; (3) Interoperability Program Plan (IPP) Capability Increments (CIs). Warfighter support is achieved by enabling JTAMD deployment and providing the Joint Staff and the warfighting CINCs with the means to: ensure TAMD development adequately reflects evolving military needs; collect and analyze performance data on the TAMD Family of Systems (FoS), and conduct realistic meaningful JTAMD exercises involving all facets of the FoS. JTAMD demonstration projects and events are supported by providing the JTAMD exercise framework wherein the projects, events, and demonstrations objectives are tested/evaluated and wherein increments are validated. Support of the IPP is achieved by collecting data from exercises to verify the status of FoS interoperability in each theater. The long-term objective is to ensure successful transition of interoperable JTAMD FoS capabilities to the warfighters.

This project includes the following specific efforts:

Support for the warfighting CINCs preparation for future JTAMD operations, demonstration projects, events, and IPP CIs by enabling the conduct of CINC TAMD exercises. Objectives include providing TAMD overlays, simulation tools, connectivity support, hardware/software, and technical expertise to optimize the CINCs preparations for future JTAMD operations. This task also investigates the Joint Information Control Officer and Single Integrated Air Picture within an exercise framework. Further, it serves to verify IPP CIs and collects data on TAMD objectives to identify problems and take corrective action.

Support of FoS interoperability by assisting CINCs' efforts to develop JTAMD doctrine, Concepts of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTPs). This task is linked to Task 1 (JTMD Requirements) in that it uses the TAMD exercise framework and support to foster document development. The objective is to provide the environment and support necessary to develop, test, and refine these documents as TAMD FoS interoperability evolves.

Development of allied involvement in TAMD doctrine, CONOPS, TTPs, and exercises. The objective is to assist our allies in developing interoperable TAMD capabilities which will augment US capabilities. Beginning in FY00 these funds and objectives are integrated into Task 1 (JTMD Requirements under project 3359).

Support the conduct of TAMD and FoS simulations, seminars, and desktop/interactive and planning exercises. The objectives are to use simulations/ scenarios/ evaluations/ demonstrations to orient/indoctrinate the warfighter community to the challenges involved in carrying out effective JTAMD operations and in achieving FoS interoperability. Through planning activities this task also provides a forum for discussing specific aspects of the threat, weapons systems requirements, changes to CONOPS and TTPs, and addresses strategies for acquiring TAMD systems.
Funding for this project was transferred to project 3359 starting in FY 00.

FY 1999 Accomplishments:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3265

- 2946 Supported CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results from Joint Project Optic Windmill.
- 2946 Supported CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results from Lucky Sentinel and Ultimate Resolve.
- 2746 Supported CINC USACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results from Roving Sands.
- 2720 Supported USFK by adding TAMD overlays to selected exercises, collecting data, and analyzing results from Foal Eagle and Ulchi Focus Lens.
- 2611 Supported CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results from Northern Edge, Fleet Battle Experiment Echo, JTFEX 99-1 and Foal Eagle.
- 169 Supported development of JTAMD doctrine, CONOPS, and TTPs needed for FoS Interoperability.
- 423 Promoted development of allied involvement in TAMD doctrine, CONOPS, TTPs, and exercises.
- 705 Supported conduct of JTAMD FoS simulations, seminars and desktop/interactive and planning activities in Alaska Command, US Joint Forces Japan and CENTCOM.

Total 15266

FY 2000 Planned Program:

- Funding has been transferred to Project 3359 beginning in FY 00

FY 2001 Planned Program:

- Funding has been transferred to Program Element 0603873C/Project 3359 beginning in FY 01

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3359 Test, Eval, and Assessment, PE 0603872C			21363						TBD	TBD
3359 Test, Eval, and Assessment, PE 0603873C				61299	34045	50090	37803	38868	CONT	CONT

C. C. Acquisition Strategy: Management is executed through the use of weekly task plans, monthly progress and expenditure reports, quarterly reviews, and semi-annual assessments. Each theater conducts monthly In-Process Reviews to monitor and manage the preparation for scheduled activities. ORDs/CRDs, CONOPs, and TTPs are updated throughout the year.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
CINC TAMD Exercises	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q						
FoS Interoperability Procedures	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q						
Allied Involvement in TAMD	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q						
TAMD FoS Preparation Events	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3352

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3352 Modeling & Simulation	16539	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project ensures timely availability of reliable, cooperative, and cost-effective BMDO and Service-provided Modeling, Simulation, & Networks (MS&N) tools and capabilities responsive to BMDO requirements. This project provides for the planning, coordination, program management, and technical oversight of system level MS&N for the Theater Air Missile Defense (TAMD) and the National Missile Defense (NMD) Deployment Readiness Programs. This cost effective approach reduces the high cost of missile test programs and generates the information needed to make timely and informed operational, requirements, performance, design/cost/risk tradeoffs, mitigation and resource allocation decisions.

This project funds the development, operation, and Verification, Validation and Accreditation (VV&A) of the Extended Air Defense Bed (EADTB) and Extended Air Defense Simulation (EADSIM) simulations, which support the analysis required for TAMD program acquisition and integration. The EADTB is a flexible distributed simulation tool that can determine the performance of existing and conceptual extended air and missile defense systems with the added complexity of theater missile defense threats. This is a multi-site test bed that is comprised of high and medium fidelity models of sensors, environments, weapon systems, threats, and Battle Management Command, Control and Communication (BM/C3) systems. The capabilities of the EADTB are being incrementally developed and accredited with the Services. EADSIM is a low to medium detail simulation system that operates on a stand-alone workstation. This simulation is used for architectural analysis of EAD systems and provides user interface for scenario preparation and model description

Starting in FY 00, funding associated with Project 3352, EADTB have been transferred to Project 3155, Systems Engineering and Integration.

FY 1999 Accomplishments:

- 16539 Delivered EADTB development and enhancements. Performed EADTB Final Formal Qualification Testing and deliver EADTB Version 4.4R at the end of 1st quarter. Provided limited on-site support to a select group of EADTB sites. Continued limited EADTB VV&A activities. Closeout and transition to new prime contract. Provided EADSIM baseline maintenance.

Total 16539

FY 2000 Planned Program:

- Funding has been transferred to Project 3155 beginning in FY 00

FY 2001 Planned Program:

- Funding has been transferred to Program Element 0603873C/Project 3155 beginning in FY 01

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603872C Joint TMD - DEM/VAL**

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
2400 NMD Program, PE 0603871C	8099	700	0	0	0	0	0	0
3155 Sys Engr & Integration, PE 0603872C			46443					
3155 Sys Engr & Integration, PE 0603873C		19150	62488	71873	84586	104004	157137	164866
3352 Modeling & Simulation, PE 0603173C	5015	0	0	0	0	0	0	0
3352 Modeling & Simulation, PE 0603874C	0	45059	39585	27920	29379	26241	26512	26788

C. Acquisition Strategy: This funding for this effort has been transferred to PMA 3155.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Deliver EADTB Capability 4.4R				1Q						
EADTB Final Formal Qualification				2Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3354

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3354 Targets Support	17615	48056	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project provides core funding for targets and target related services needed to support the testing and evaluation of all Theater Missile Defense (TMD) programs, in particular:

- Theater High-Altitude Area Defense (THAAD) system
- PATRIOT Advanced Capability - 3 (PAC-3) system
- Navy Area Defense (NAD) system
- Navy Theater Wide (NTW) system
- and the US Air Force Airborne Laser (ABL).

This project is a segment of the BMDO Consolidated Targets Program (CTP). The CTP mission is to provide threat representative ballistic missile target system support to interceptor and sensor development and acquisition programs. Each target system is tailored and configured to meet unique mission requirements for each test. This project funds the development and demonstration of U.S. built target systems and Foreign Military Acquisition (FMA) targets to support TMD test and evaluation. The TMD programs provide funds to purchase the targets they actually use in their individual tests.

The THAAD program uses the Hera target system for launches at White Sands Missile Range (WSMR) including FT. Wingate Launch complex in New Mexico and pending launches from Wake Island into the Kwajalein Missile Range (KMR) impact area. The PAC-3 program will use Storm and Hera targets launched from WSMR and Wake Island. The Navy Area and Theater Defense programs will use Hera and other ground targets at WSMR and the Pacific Missile Range Facility (PMRF) (Barking Sands, Kauai, HI). This project is developing a short range (200-600 Km) air launch ballistic target, a long range (1000-3000 Km) air-launch target, and a short range liquid fueled target to satisfy the collective target requirements of PAC-3, THAAD, both Navy programs, and TMD Family of Systems (FoS) tests for multiple simultaneous engagements, multi-axis scenarios, and short range and long-range threat target presentations. THAAD and PAC-3 will use air-launched targets at KMR and the Navy will use air-launched targets at PMRF. The project is also developing threat representative reentry vehicles (called MBRV for Matching Ballistic Re-Entry Vehicle) to simulate a set of baseline threats.

All funding in Project 3354 has been transferred to PE 0603874C starting in FY 01.

FY 1999 Accomplishments:

- 7684 Provided for validation of TMD targets; which includes support for program management, maintenance & refurbishment, and research & development.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL
	PROJECT: 3354

- 96 Continued development and sensor characterization of FMAs.
- 2447 Provided for government project personnel and support.
- 7388 Provided for development of a MBRVs threat representative.

Total 17615

FY 2000 Planned Program:

- 18445 Provide technical support and booster hardware for target program operation.
- 21934 Continue development of LRALT, and Technical Engineering Support.
- 2157 Continue development and sensor characterization of FMAs and advanced target payloads.
- 3020 Provide for government project personnel and support
- 2500 Conduct development of liquid fueled targets and technical engineering support

Total 48056

FY 2001 Planned Program:

- Funding has been transferred to Program Element 0603874C beginning in FY 01

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	TBD	TBD
2260 THAAD, PE 0604861C		0	79462	549945	685168	789736	755134	591049	CONT	CONT
2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	TBD	TBD
1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	CONT	CONT
2263 NAVY AREA, 0604867C		241782	307274	274234	228596	85866	33293	29369	CONT	CONT
3354 TARGETS, PE 0603874C		1936	2300	49135	36211	38081	40260	40882	CONT	CONT
3360 TEST RESOURCES, PE 0603874C		41005	66237	69555	64211	54314	54375	54975	CONT	CONT
3360 TEST RESOURCES, PE 0603872C		45846	13734	0	0	0	0	0	CONT	CONT

C. Acquisition Strategy: : The Hera and Storm target systems are developed by the executing agent: U.S. Army Space and Missile Defense Command (USASMDC), Theater Targets Products Office (SMDC-TJ-TT) in Huntsville, AL. The Hera target system, developed by Coleman Aerospace Corporation (CAC) (Orlando, FL) is being procured with a contract for a quantity of 25 targets. Orbital Sciences Corporation (OSC) has delivered four Storm Maneuvering Tactical Target Vehicles (MTTV). Additional targets include the Lance target system and Foreign Material Acquisition. The development and demonstration of the air launch ballistic target system is being managed by USASMDC/TT&E office with the Air Force Space and Missile Command as the contracting agency. The Consolidated Theater Target Systems (CTTS) contract was awarded 27 February 1998 to CAC, OSC and Lockhead Martin Missile Systems (LMMS) to produce future theater targets. This contract provides increased flexibility to meet MDAP schedules and requirements.

D. Schedule Profile		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005

						DATE February 2000		
BUDGET ACTIVITY **4 - Demonstration and Validation**			PE NUMBER AND TITLE **0603872C Joint TMD - DEM/VAL**					
SRALT Demo		2Q						
Navy Area			4Q					
Navy Theater Wide		1Q	4Q					
PATRIOT		1 – 4Q	2-4Q					
THAAD		1 – 4Q						
Others (support of Technology Programs)		2 – 4Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3354

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Target Acquistion	Allot	USASMDC (Huntsville, AL)	15168	45036	1Q00			Cont Effort	60204	
Subtotal Product Development:			15168	45036					60204	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Gov Project Per & Supt	Allot	USASMDC (Huntsville, AL)	2447	3020	1Q99			Cont Effort	5467	
Subtotal Management Services:			2447	3020					5467	

Remark:

Project Total Cost:			17615	48056					65671	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3359

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3359 System Test and Evaluation	3966	21363	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project supports the following efforts:

System Lethality: System Lethality requires the development, testing, and verification of instruments to characterize the post impact cloud resulting from a hit-to-kill impact of a chemical warhead. Specifically, system lethality entails: analyzing the problem to determine what should be measured, establishing the range of expected values, identifying instruments and postulating instrument suites that may be used, and performing a series of tests to demonstrate the ability of the instrument suites to perform the task.

Lethality: Lethality supports the development of standard lethality threat-representative targets, tests, and experiments to obtain lethality data for development of interceptor targets, and models using that data. BMDO participates in Service, DoD and multi-national lethality panels, and supports development and maintenance of high velocity sled and hypervelocity gun test capabilities. Resources also support BMDO TEWG subcommittees, and Defense committees and boards with shared interest in lethality.

CINCs Experiments: This effort funds BMDO's Commanders In Chiefs (CINCs') Experiments. (The long-term goal is to ensure the successful transition of interoperable Theater Air Missile Defense (TAMD) Family of Systems (FoS) to the warfighting customers). The CINCs' Experiments program is directed toward enabling the warfighters to employ TAMD systems as they are delivered. In addition, CINCs' Experiments support the development of joint interoperability TAMD doctrine, Concepts of Operations (CONOPS), and Tactics, Techniques, and procedures (TTPs); and provides Joint/Coalition/Allied TAMD interoperability data.

FY 1999 Accomplishments:

•	3966	Completed and distributed the Post Engagement Ground Effects Model (PEGEM) Version 3.0. Executed Ground tests to understand the impact response of a Thickened Chemical Simulant at New Mexico Tech. Continued to gather aerodynamic break-up data on live chemical agent at the DERA facilities at Porton Down, England. Began work on understanding agent evaporation rates to determine the amount of droplet mass that is lost during the fall to the ground using a vertical windtunnel facility at Battelle Memorial Institute. Experiments were executed at the University of Minnesota to understand the reaction of chemical simulants being introduced to a supersonic flow environment. These shock tube experiments provided insight into the amount of chemical payload that is lost to the atmosphere when released or intercepted by a BMD system.
Total	3966	

FY 2000 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL / PROJECT: 3359

•	1822	Support CINC USACOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTP.
•	1822	Support CINC USFK by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTP.
•	1783	Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs.
•	1922	Support CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs.
	1822	Support CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTP.
•	4734	This task provides support for the BMDO lethality program. It supports the performance of necessary tests and experiments to obtain lethality data, and the development of interceptor/target lethality models with those data. It supports participation in Service, DoD and multi-national lethality panels. It provides direct support to the UK agent lethality work done at Porton Down, and to the Lethality Experts under the NATO CNAD Missile Defense Ad Hoc Group and supports the Netherlands Prins Maurits Laboratory for secondary evaporation experiments and studies. It supports development and maintenance of high velocity sled and hypervelocity gun test capabilities. It supports BMDO TEWG subcommittees and other Defense committees and boards pertaining to lethality.
•	7458	This task supports performing a series of flight tests to adequately demonstrate the ability of Ka-band radar and lidar instruments to track and characterize a cloud of chemical simulant to determine whether these systems have a high enough keep out altitude to protect against TBMs armed with persistent chemical payloads.
Total	21363	

FY 2001 Planned Program:

- Funding has been transferred in FY01 to Projects 3359 (PE 0603873C) and 3156 (PE0603874C)

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3359 System Test & Eval, PE 0603873C				61299	34045	50090	37803	38868	Cont	Cont
3156 System Lethality, PE 0603874C				7950	11915	11906	19819	19800	Cont	Cont

C. Acquisition Strategy:

Lethality program will use existing BMDO and Service Executing agent contracts to conduct lethality assessment, modeling and experimentation. The strategy complements program specific lethality testing, such as sled and light gas gun tests which are funded within the specific missile defense programs. Critical lethality related system characteristics and issues should be identified early in the process and be evaluated to allow for informed decision making. The CINC Experiments program is managed and executed through the use of weekly task plans, monthly progress and expenditure reports, quarterly reviews, and semi-annual assessments. Each theater conducts monthly In-process reviews to monitor and manage the preparation for scheduled activities. ORDs/CRDs, CONOPs and TTPs are updated throughout the year..

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
CINC Experiments	1Q – 4Q	1Q – 4Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3359

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. CINCs Experiments	SubAllocation	Theater CINCs		9171	1Q00				9171	
b. Lethality	SubAllocation	Joint Combined	3966	4734	1Q00				8700	
c. System Lethality	SubAllocation	Joint Combined		7458	1Q00				7458	
Subtotal Test and Evaluation:			3966	21363					25329	

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
Subtotal Management Services:										

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603872C Joint TMD - DEM/VAL**

Project Total Cost:			3966	21363					25329	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3360

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3360 Test Resources	45846	13734	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project provides for BMDO planning, oversight and coordination of integrated test and evaluation facilities. The project includes inter-element as well as inter-service test and evaluation efforts, and provides for ground test facilities, ranges and instrumentation used by JTMD development programs. Project 3360 funds common TMD test resources costs, including BMDO use. Individual programs pay only the direct costs associated with their specific testing efforts.

The ground test facilities, which support JTMD, include:

Kinetic Kill Vehicle Hardware in the Loop Simulator (KHILS) at Eglin AFB in Fort Walton Beach, FL
AEDC Hypervelocity Wind Tunnel Number 9 (Tunnel 9) at White Oak, MD
Infrared and Blackbody Standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD.
Hypervelocity Ballistic Range G Light Gas Gun/Von Karman Facilities (VKF) at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN
7V and 10V Space Chambers at AEDC, Tullahoma, TN
Portable Optical Sensor Testbed (POST) at Anahiem, CA
National Hover Test Facility (NHTF) located at Edwards AFB, CA
Holloman High Speed Test Track at Holloman AFB, NM

The test range facilities include national ranges such as:

White Sands Missile Range (WSMR) in Las Cruces, NM including Ft. Wingate Launch Complex near Gallup, NM
Kwajalein Missile Range (KMR) in the central Pacific Ocean
Pacific Missile Range Facility (PMRF) and Kauai Test Facility (KTF) at Kauai, HI

The range instrumentation special test equipment, data collection assets, and range instrumentation, which support JTMD, include:

High Altitude Observatory (HALO) with the Infrared Imaging System (IRIS) sensor, based at Aeromet, Inc., Tulsa, OK
Miscellaneous improvements to BMDO infrastructures and support systems

These ground test facilities, test ranges and instrumentation assets provide valuable risk reduction and test implementation capability in support of the JTMD test and evaluation. The ground test facilities provide a cost-effective method of testing and evaluating applicable component, sub-system and system level technologies. The common range facilities provide a cost-effective method of flight testing missile and target components applicable to the TMD program and FoS, BMC^3 and interoperability testing. The range instrumentation provides a cost-effective capability to collect target signature characteristics, phenomenology data, and target/ interceptor diagnostics on flight tests. These facilities and capabilities support systems design, verification and validation of target realism, and the evaluation of test results.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3360

In FY99, this program element and project also provided environmental program guidance, environmental impact analyses and documentation, real property facility siting, acquisition, and facility operational support for the Ballistic Missile Defense Organization (BMDO) Theater Missile Defense (TMD) system. This project plans, programs, budgets, and oversees facility acquisition through the Military Construction (MILCON) and RDT&E construction programs; provides guidance and supports BMDO TMD Environmental Safety and Health (ESH) Program which includes the Environmental Assessment and Environmental Impact Statement process, environmental compliance, pollution prevention, and other environmental efforts for TMD activities.

All funding in Project 3360 has been transferred to Program Element 0603874C starting in FY 01.

FY 1999 Accomplishments:

- 3164 Provided ground test facility infrastructure and upgrades for BMDO testing at KHILS to support endgame HWIL testing at integrated IR sensors systems including THAAD, AIT, and Navy Theater Wide TBMD.
- 5809 Provided planning, test range infrastructure, and caretaker activities at Wake Island in preparation for Family of Systems (FoS) and TMD testing in FY00.
- 5506 Provided HALO core-operating costs to collect optical data of BMDO development flights, target development flights and flight test intercepts.
- 1324 Integrated ESH considerations into BMDO weapon systems acquisition life cycle; to reduce overall risk and costs, while enhancing the human environment and systems' performance. ESH analyses are accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas are: 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials management, and 5) pollution prevention. Work continues on environmental analyses of TMD testing at Eglin Gulf Test Range, Pacific Missile Range Facility, the Medium Extended Air Defense System (MEADS), and target launch activities at Fort Wingate, USAKA, and Wake Island. Work also continues on the Navy Area, Navy Theater Wide, THAAD and PAC-3 systems.
- 1181 Ensured the FY99-01 MILCON, Minor MILCON, and RDT&E design and construction activities are executed in time to support BMD programs' facility requirements and ensures compliance with all applicable laws and regulations. The design emphasis will be on initiating design for the National Missile Defense (NMD) facility requirements in preparation for the Deployment Readiness Review and design for THAAD and PAC-3 systems. Provides for TMD and NMD test and evaluation facilities improvements to support increasingly complex test scenarios. The construction emphasis will be on the facilities upgrades at Pacific Missile Range Facility and other ranges where the System Integration Test will occur.
- 28862 Provided planning, instrumentation upgrades, and facility improvements at PMRF as well as test planning and infrastructure support for the KTF in preparation for JTMD related test activities.

Total 45846

FY 2000 Planned Program:

- 2300 Provide ground test facility infrastructure for BMDO testing at KHILS to support endgame HWIL testing at integrated IR sensors systems including THAAD, AIT, and Navy Theater Wide TBMD.
- 6830 Provides for the caretaker activities to maintain Wake Island facilities to support TMD target launch operations. Provides lease of Defense Information Systems Agency provided relay satellite bandwidth and the receiver earth station at Hickam AFB, Hawaii. Provides for the payment of shipments to and from Wake Island via air and sea. Provides fuel purchases. Provides environmental compliance for Wake Island.
- 4604 Provides core funding to perform all activities required to maintain a mission-ready optical data collection test asset (HALO/IRIS) to support TMD data collection missions required/requested by BMDO, MDAPs, and other Programs/Projects.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3360

Total 13734

FY 2001 Planned Program:

- Funding has been transferred to Program Element 0603874C beginning in FY 01

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	TBD	TBD
2260 THAAD, PE 0604861C		0	79462	549949	685168	789736	755134	591049	CONT	CONT
2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	TBD	TBD
1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	CONT	CONT
2263 NAVY AREA, PE 0604867C		241782	307274	274234	228596	85866	33293	29369	CONT	CONT
3354 TARGETS, PE 0603874C		1936	2300	49135	36211	38081	40260	40882	CONT	CONT
3354 TARGETS, PE 0603872C		17615	48056	0	0	0	0	0	TBD	TBD
3360 TEST RESOURCES, PE 0603871C		1680	494	474	470	466	476	486	CONT	CONT
3360 TEST RESOURCES, PE 0603874C		41005	66237	69555	64211	54314	54375	54975	CONT	CONT

C. Acquisition Strategy:

BMDO tasks the Services through Program Management Agreements to perform the required tasks in support of the BMD program and performs quarterly reviews to verify and validate completed tasks.

In providing range and test facilities support to the MDAP Program managers, as well as, technical assistance concerning facilities construction, siting, and environmental activities, BMDO implements a Reliance Process which:

- maintains perspective of national technical test capabilities relative to all BMD developmental programs,
- responds to MDAP program requirements,
- makes maximum use of existing test resources where possible,
- requires full coordination prior to development of new resources,
- and consolidates management of existing resources where possible and practicable.

This process is executed through a variety of acquisition methods. Executing Agent Project Managers for the elements and tasks under this project include the three military services and the BMDO. Service Project Manager organizations specifically include the:

- U.S. Army Space and Missile Defense Command (USASMDC)
- U.S. Air Force Materiel Command
- U.S. Navy Office of Naval Research
- U.S. Air Force Research Laboratory
- U.S. Army Corps of Engineers,
- and the U.S. Army Program Executive Officer-Missile Defense.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3360

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
KHILS – DITP (Quantum Well, Integration Tests)		1-4Q	1-4Q						
KHILS – DTRA (Nuclear Requirements)			1-4Q						
KHILS – BPI (System Studies)		1-4Q	1-4Q						
KHILS – NMD HWIL Support		4Q	1-4Q						
KHILS – Target VV&A		1-4Q	1-2Q						
HALO/IRIS Data Collection	1-4Q	1-4Q	1-4Q						
AST Data Collection	1-4Q	1-4Q							
KMR TCMP Launch		4Q	2Q						
Environmental Analysis for Eglin Gulf Test Range		1-2Q							
Environmental Analysis for Pacific Missile Range Facility		1-3Q							
Environmental Analysis for Target Missile Air Drop		1Q							
Environmental Analysis for Long Range Air Launch		1-4Q							
Environmental Analysis for Advanced Interceptor Technology		1-4Q	1Q						
THAAD 1ST Objective Battalion, Ft Bliss		1-2Q							
PAC-3 Missile Assembly Bldg, White Sands		1-2Q							
Launch Facilities Infrastructure Modernization, USAKA		1-4Q	1Q						
Fire Protection System Modernization, USAKA		1-4Q	1Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3360

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. PMRF Upgrades	Allot	Navy, PMRF	20668						20668	
b. Optical Sensor Upgrade	Allot	Navy, PMRF	4893						4893	
c. Army TMD Facility/ Environmental Programs Development	Allot	Army PEO, Huntsville	490						490	
d. Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TAD, Arlington VA	147						147	
e. Air Force TMD Facility/Environmental Programs Development	Allot	AF SMC, Los Angeles CA	10						10	
f. Environmental, Safety & Health Initiatives		TBD	166						166	
Subtotal Product Development:			26374						26374	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. KTF	Allot	Navy, Kauia Test Facility	4893	0					4893	
b. HALO/IRIS Support	Allot	SMDC, Huntsville, AL	5506	4604	10/01/99			TBD	10110	
c. Wake Island Support	Allot	SMDC, Wake Island	5809	6830	10/01/99			Continue	12639	
d. KHILS Support	Allot	Air Force, Florida	3164	2300	10/01/99			Continue	5464	
e. Facility Acquisition Life-Cycle Management		U.S. Army Corps of Engineers, Huntsville AL	100	0	10/01/00			Continue	100	
f.										
Subtotal Support Costs:			19472	13734					33206	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 3360

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Management Services:										

Remark:

Project Total Cost:			45846	13734				Continuing	59580	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 4000

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4000 Operational Support	60229	66970	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

Starting in FY 01, all projects in the JTMD program element have been transferred to either the Family of Systems program element (0603872C) or to the Technical Operations program element (0603874C). The decision to transfer the funds from the JTMD program element was to ensure and maintain adequate visibility into all Theater Missile Defense efforts.

This project funds three basic areas: personnel and related facility support costs; statutory and fiscal requirements; and support service contracts.

Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, US Army PEO Missile Defense, US Navy PEO for Theater Defense, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.

Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

Finally, assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.

FY 1999 Accomplishments:

- 60229 Provided management support for overhead/indirect fixed costs such as payroll, travel, rents, & utilities and supplies.

Total

FY 2000 Planned Program:

- 66970 Continuing provided management support for overhead/indirect fixed costs such as payroll, travel, rents, & utilities and supplies.

Total

FY 2001 Planned Program:

- 0 Funds transferred to either Family of Systems PE 0603873C or Technical Operations PE 0603874C

Total

B. Other Program Funding Summary N/A	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

C. Acquisition Strategy:

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
N/A										

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 4000

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and										

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL

PROJECT: 4000

Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										

Remark:

Project Total Cost:										

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

	COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	94422	145657	231248	261530	262606	320864	300207	Continuing	Continuing
3155	Systems Engineering and Integration	19150	62488	71873	84586	104004	157137	164866	Continuing	Continuing
3251	Systems Engineering and Technical Support	17230	0	0	0	0	0	0	TBD	TBD
3261	TMD BM/C3I (BM/C3I Concepts)	37745	53603	25756	72617	40833	59659	27972	Continuing	Continuing
3354	Targets	0	6317	0	0	0	0	0	TBD	TBD
3359	Test, Evaluation and Assessment	20297	23249	61299	34045	50090	37803	38868	Continuing	Continuing
4000	Operational Support	0	0	72320	70282	67679	66265	68501	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Theater Missile Defense (TMD) program's goal is to develop, maintain and deploy a cost-effective, Anti-Ballistic Missile (ABM) Treaty compliant interoperable system designed to protect deployed forces and areas of operations against the immediate and growing threat from shorter range theater ballistic missiles. The TMD core programs are PATRIOT Advanced Capability (PAC)-3, Theater High Altitude Area Defense (THAAD) System, Navy Area Theater Ballistic Missile Defense (TBMD) (formerly Lower Tier), and Navy Theater-Wide TBMD (Formerly Upper-Tier).

Family of Systems Engineering and Interoperability (FoS E&I) seeks to link the TMD core programs so that they fight as one system and obtain a force multiplier advantage. The projects in this Program Element builds FoS interoperability by conducting assessments of joint interoperability to identify weaknesses, defining architectural/engineering solutions to correct the weaknesses, integrating solutions, and testing the FoS fixes. Currently, the FoS interoperablity effort is focused on near term Joint Data Network interoperability. However, a continuing R&D investment in Joint Composite Tracking Network is maintained to achieve a future single integrated air picture.

Beginning with FY 01, this program element includes manpower authorizations and the associated costs specifically identified and measured to the performance of these programs.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of each Program Element Summary.

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	95721	141821	128551
Congressional Adjustments		5000	
Appropriated Value		146821	
Adjustments to Appropriated Value			
a. Congressional Reductions (FFRDC, Inflation, etc)		-837	
b. OSD Reductions			
c. Emergency Supplemental			
d. Internal Reprogramming		-327	
Adjustments to Budget Years Since FY 2000 PB	-1299		102697
Current Budget Submit (FY 2001 PB)	94422	145657	231248

Change Summary Explanation: FY 01 – Starting in FY 01, all Family of System efforts from the Joint Theater Missile Defense program element (060387C2) will transfer to this program element to maintain adequate visibility into Theater Missile Defense efforts.

C. Acquisition Strategy: See Individual R2a summaries.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3155

COST *(In Thousands)*	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3155 Systems Engineering and Integration	19150	62488	71873	84586	104004	157137	164866	Continuing	Continuing

A. Mission Description and Budget Item Justification:

The purpose of this project is to provide system engineering, analysis, and technical support for the development of a joint Theater Air and Missile Defense (TAMD) Family of Systems (FoS) architecture. Joint Theater Air and Missile Defense (JTAMD) is the integrated capability to detect, classify, intercept and destroy or negate the effectiveness of enemy aircraft and missiles prior to launch or while in flight, to protect US and coalition forces, selected assets, and populations centers within an assigned theater of operations. The TAMD FoS architecture will focus on the integration of theater ballistic missile defense, cruise missile defense, air defense, and attack operations.

In addition, BMC4I capability improvements to achieve far-term interoperability goals, such as development of the Single Integrated Air Picture (SIAP) capability, Joint Composite Tracking Network (JCTN), and efforts to address advanced capabilities such as Air Directed Surface to Air Missiles (ADSAM) will be included in this project. This project also includes researching the contributions of systems such a Spaced Based Infrared Systems (SBIRS) and Airborne Laser (ABL) to the overall TMD architecture as well as other pillars of TMD such as Attack Operations and Passive Defense. A significant amount of effort will also be put on maintaining and upgrading modeling and simulation tools, including Commander's Analysis Planning Simulation (CAPS), Extended Air Defense Test Bed (EADTB) and Extended Air Defense Simulation (EADSIM), and further development of the Theater Missile Defense System Exerciser (TMDSE). Test Planning and Execution will focus on the achievement of Capability Increments (CIs) of a Family of Systems Architecture as proposed in draft FoS Draft Interoperability Program Plan. Efforts are focussed on the verification of legacy systems. This verification will establish the Family of Systems baseline. From this baseline, additional testing and verification in the following years will help develop the joint interoperability of the Family of Systems Architecture. In addition, efforts also support TMD inter-service test planning documentation. Efforts will provide for planning and development of a Capstone TMD Test and Evaluation Master Plan (TEMP), development of a near term test plan for the Joint Data Network (JDN), and review of the programmatic and technical documentation providing the technical baseline of the test program. This project also supports the Theater Missile Defense Critical Measurements Program (TCMP) which is a risk reduction program that is an integral part of Major Defense Acquisition Program (MDAP) component testing as well as Theater Air and Missile Defense (TAMD) Family of Systems (FoS) testing. This project provides support to shared activities between BMDO and JTAMDO as both organizations work cooperatively to achieve the TAMD capability. These activities include support to Service participation to the JTAMD program specifically in providing Service systems representations for analysis activities and direct participation in the JTAMD process. The results of the JTAMD process will be documented in the JTAMD Master Plan that outlines the Operations Architecture, Systems Architecture, Technical Architecture, Acquisition Roadmap and Investment Strategy to produce a JTAMD FoS capability.

FY 1999 Accomplishments:

•	3705	SIAP Definition - Developed an operational and engineering definition of material solutions for SIAP to include Technical Requirements Documents of a Joint Composite Tracking Network and also JCTN Integration Analysis, JCTN/JDN Gateway Development, Virtual Distributed Analysis of SIAP requirements and behavior, JMAA support, and support of ADSAM related activities.
•	9154	TAMD Integration – Supported development of JTAMD Master Plan System Architecture, Acquisition Road Map and Investment Strategy, CMD Baseline analysis, Technology Options plan for 2010, Combat Identification Application analysis, system engineering, engineering and technical trades analysis
•	4991	Modeling and Simulation Development – Developed TAMD System Specific Representations and advanced modeling and simulation capabilities
•	1300	System Effectiveness – Analyzed the effectiveness of JTAMD architecture including end-game analysis, lethality analysis and supported the planning of demonstration events.
Total	19150	

FY 2000 Planned Program:

•	9717	SIAP – Continue SIAP definition analysis, address how the union of Joint Data Network and Joint Composite Tracking Network will meet SIAP requirements. Establish JCTN benchmarking to identify best data fusion and composite tracking algorithm for SIAP. Continue efforts to migrate CEC to a Joint CEC/JCTN. Begin acquisition activities for JCTN program planning and CEC cost reduction activities. Begin JCTN/JDN gateway prototype efforts with JLENS office.
•	12477	TAMD Integration – Continue to refine JTAMD systems architecture, which fully incorporates Theater Ballistic Missile Defense, Cruise Missile Defense, Attack Operations and Passive Defense. Further refine acquisition and investment strategies for JTAMD architecture
•	6881	Modeling and Simulation Development - Continue to develop TAMD System Specific Representations and advanced modeling and simulation capabilities to support TAMD requirements.
•	1831	System Effectiveness – Continue to refine analysis of the effectiveness of JTAMD architecture to include end-game analysis, lethality analysis and support the planning of demonstration events.
•	16870	TMD Systems Engineering – Provide scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; development of specifications and program documentation for JDN fixes and enhancements; engineering and technical support for international programs and BM/C3 efforts; conduct EADTB distributed analyses and operations; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation.
•	1157	Test Planning and Support – Support development of TMD inter-service test planning documentation. Conduct TMD Consolidated Evaluation Plan / Integrated Test Plan review. Produce final draft of TMD Capstone TEMP. Develop JDN test plan working draft. Coordinate and participate in Joint Test Planning Teams and Test and evaluation IPTs.
•	13555	BMD Impact Analysis and Engineering – Delivers short notice engineering and analytical recommendations and proposed solutions associated with broad ballistic missile defense issues. Provides congressional, OSD, and BMDO leadership with a range of options for dealilng with threat, architectural and system elements influencing the design and composition of US ballistic missile defenses. Includes resources to foster improvements in BMD command and control leading towards a coordinated engagement capability and single integrated air picture.
Total	62488	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I
PROJECT 3155	

FY 2001 Planned Program:

•	677	SIAP Development - Continue SIAP definition analysis, address how the union of Joint Data Network and Joint Composite Tracking Network will meet SIAP requirements. Other joint CEC/JCTN program efforts deferred pending budget readjustment for BMDO role as lead SIAP engineer.
•	6259	TAMD Integration – Continue to refine JTAMD systems architecture, acquisition strategy and investment strategy, including long range analysis through the 2010 timeframe, effects of countermeasures, technology insertion options for the architecture, and engineering and cost trade off analysis.
•	5070	Models and Simulations Development - Continue to develop TAMD System Specific Representations and advanced modeling and simulation capabilities to support TAMD requirements.
•	15582	TCMP – Finalize documentation and provide technical support and on-site support for flight 3B. Conduct TCMP-3B flight test. Complete data analysis for TCMP-3 flight tests. Conduct TCMP-3B Data Analysis Review. Conduct TCMP-3B Data Assessment Workshop. Conduct mission planning for TCMP-4. Initiate design and initiate purchase of payload hardware for TCMP-4 flight tests. Initiate design and initiate purchase of launch vehicle hardware for TCMP-4 flight test.
•	10906	TMD Program Support - Using FFRDC resources, perform independent technical and engineering assessments of TMD system architectures including: system concept development and assessment; critical element technical and programmatic assessments including trade-off analyses; reviews of mandated documents, international cooperative programs, and treaty implications; multi-Service and allied BM/C3 integration; modeling, simulation, experiment and flight test support; integration of fielded components into operational units; and specific studies and analyses of critical issues. Provide scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; engineering and technical support for international programs and BM/C3 efforts; conduct EADTB distributed analyses and operations; develop and maintain technical and programmatic databases; and preparation f technical reports, briefings, and programmatic documentation.
•	16492	TMD Systems Engineering - Provide scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; engineering and technical support for international programs and BM/C3 efforts; conducted EADTB distributed analyses and operations; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation.
•	1167	Test Planning and Support - Produce JDN Test Plan Final Draft and Final JDN Test Plan. Conduct Capstone TEMP update review. Coordinate and participate in Joint Test Planning Teams and Test and Evaluation IPTs.
•	9388	EADTB – Deliver EADTB enhancements to support formal BMDO approved study/test requirements. Begin design and development of follow-on releases. Continue VV&A efforts. Provide EADSIM baseline maintenance.
•	6332	Govt. Proj Pers & Support - Provide funding for government personnel and project management
Total	71873	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3155

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
N/A										

C. Acquisition Strategy: The TAMD Integration project acquisition strategy goal is to develop the TAMD Master Plan and the Joint Theater Air and Missile Defense (JTAMD) acquisition strategy through the use of analysis and studies that focus on existing service systems. These studies and analyses will evaluate those systems for JTAMD interoperability, CMD/TBMD capability, and Single Integrated Air Picture (SIAP) contributions. JTAMD FoS Engineering will provide for the joint systems and technical architecture for the JTAMD process as a complement to the operational architecture provided by the Joint Chiefs of Staff through JTAMDO. SIAP efforts begin the transition of CEC to a Joint CEC/JCTN, define required upgrades to JDN, and plan for acquisition program to address both near and far-term interoperability goals.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
JCTN Phase II Study		4Q								
JCTN Technical Definition			4Q							
JCTN Min-Mix Study				1Q						
TAMD Master Plan					1Q	1Q	1Q	1Q	1Q	1Q
T&E IPT					1Q-3Q					
Release JCTN Benchmark Updates to Industry					1Q-4Q					
TMD Consolidated Evaluation Plan					1Q					
2010 TMD FoS Conceptual Design supporting IPP/POM					1Q					
Final Draft TMD Capstone TEMP					2Q					
Deliver TMD FoS IPP					2Q					
Deliver Lower Tier Interoperability System Performance Specification					3Q					
JDN Test Plan Working Draft					3Q					
Deliver Draft JCTN CARD					4Q					
Delivery of JDN Lower Tier Interface Control Document					4Q					
TCMP-3B Flight Readiness Review						1Q				
TCMP-3B Flight Test						2Q				
TCMP-3B Data Analysis Review						3Q				
TCMP Data Assessment Workshop						4Q				
JCTN/JDN Gateway Tech Definition					2Q					

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3155

Final Draft Capstone TEMP					2Q					
Deliver of SSRs for EADTB f/AEGIS(NTW), THAAD, and SBIRS low					2Q					
Deliver SSRs f/EADTB for PATRIOT, JTAGS, AEGIS, BDE, AMDPCS (ADTOC), and AWACS					2Q					
Conduct Preliminary Design Reviews of TCMP-4 Launch Vehicle and Payload							1Q			
Conduct Critical Design Reviews of TCMP-4 Launch Vehicle and Payload							3Q			
Deliver Initial Prototype SIAP JCTN/JDN Gateway						1Q				
Draft Program Plan for JCTN Acquisition					4Q					
Establish SIAP Acquisition Strategy					4Q	4Q				
JCTN/SIAP Concept Definition Contracts							TBD			
Down select JCTN concept devel contract efforts								TBD		

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3155

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army, Navy, Air Force – EADTB SSR Development	Suballocation		2170	3000	1Q00	3195	1Q01	Continue	Continue	
b. Army SBIRS SSR	Suballocation		750	0		0		750		
c. JNTF EADTB SSR development, SIT II, PAC-3 IOT&E		JNTF, Colorado Springs, CO		569	1Q00	715	1Q01	Continue	Continue	
d. M&S Development US/UK			550	400	1Q00					
e. VV&A M&S Support		Various		1090	1Q00	1160	1Q01	Continue	Continue	
f. TCMP Payload 3-B		MIT/LL, Lexington, Mass.				1100	3Q01	Continue	Continue	
g. TCMP Payload 4A&B		MIT/LL, Lexington, Mass				1399	3Q01			
h. TCMP Launch Vehicle		OSC, Chandler, AZ				1530	1Q01	Continue	Continue	
i. TCMP Flight Support		USAF				600	1Q01	Continue	Continue	
j. EADTB Development	CPAF	TBD – (HSV)				9388	1Q01	Continue	Continue	
k. JCTN/JDN Gateway Prototype		JLENS Program Office – Huntsville, AL		1200	1Q00	0			Contine	
l. JCTN/JDN Gateway Prototype Eval Facility		MITRE/MASC		450	1Q00	0			Continue	
m. JCTN Benchmark		ONR with subcontracts activity to: GTRI, Atlanta, GA; Numerica, Boulder, CO; Lockheed-Martin, Moorestown, NJ; Lockheed-Martin, Sunnyvale, CA; Raytheon, Elsegundo, CA		1330	1Q00	0			Continue	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3155

n. JCTN Benchmark		SPARTA, Arlington VA		250	1Q00	0			Continue	
o. JCTN Benchmark		JNTF, Colorado Springs, CO		50	1Q00	0			Continue	
p. JCTN Benchmark & Analysis		JHU/APL, Maryland		500	1Q00	0			Continue	
q. Joint CEC Cost Reduction Tech Contracts		CEC Program Office with subcontracts to Solipsys, Laurel, MD; DSR, Faiarfax, VA		935	1Q00	0			Continue	
r. JCTN Technical Definition		SPARTA, Arlington, VA		900	1Q00	0			Continue	
s. JCTN Technical Definition		CSCI, Springfield,VA	200	0		0			200	
Subtotal Product Development			3670	10674		19087		Continue	Continue	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army - Analysis Support	Suballocation	DAMO-FDE/SMDC	500	375	1Q00	375	1Q01	Continue	Continue	
b. Navy – Analysis Support	Suballocation	OPNAV-N86	375	375	1Q00	375	1Q01	Continue	Continue	
c. Air Force - Analysis Support	Suballocation	AFSAA	375	375	1Q00	375	1Q01	Continue	Continue	
d. Marine Corps - Analysis Support	Suballocation	MARCORSYSCOM	100	125	1Q00	125	1Q01	Continue	Continue	
e. JNTF support	Suballocation	JNTF		100	1Q00	100	1Q01	Continue	Continue	
f. TCMP Technical Support/Data		TBE, Huntsville, AL				300	1Q01	Continue	Continue	
g. TCMP Data Analysis		PRA, Huntsville, AL				200	1Q01	Continue	Continue	
h. TCMP Technical Support		NRC, Huntsville, AL				150	1Q01	Continue	Continue	
i. TCMP Flight Analysis		AF-TRW				300	1Q01	Continue	Continue	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3155

j. TCMP Flight Analysis		MIT/LL				1000	1Q01	Continue	Continue	
k. Missile Def Data Center		CAS				200	1Q01	Continue	Continue	
l. SETA Support	CPAF	SPARTA – VA				4906	1Q01	Continue	Continue	
m. SIAP Analysis Support		Multiple	1800	4102	1Q00	677	1Q01	Continue	Continue	
n. POET Support		FFRDCs				6000	1Q01	Continue	Continue	
o. BMD Analysis Support		Multiple		6579	1Q00				6976	
p. M&S Analysis Support		Multiple		1822	1Q00				1822	
Subtotal Support Costs			3150	13853		15083		Continue	Continue	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. T&E SETA		Vanguard – VA		1157	1Q00	1167	1Q01	Continue	Continue	
b. TCMP Range/Flight Ops		KMR/Raytheon				6203	1Q01	Continue	Continue	
c. TCMP Range/Flight Ops		CDC, Wake Island				1000	1Q01	Continue	Continue	
d. Sensor Deployment		Various				1600	1Q01	Continue	Continue	
Subtotal Test and Evaluation:				1157		9970		Continue	Continue	

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TAMD Integration Analysis	CPAF/CPFF	SPARTA, Arlington, VA; CSCI, Springfield, VA; others	12330	11127	1Q00	4909	1Q01	Continue	Continue	
b. Govt Prog Pers						6332	1Q01	Continue	Continue	
c. Systems Engineering - Engineering fixes and enhancements to JDN/Link 16 and long-term JCTN Engineering	CPFF	TRW, Rosslyn, VA		16870	1Q00	16492	1Q01	Continue	Continue	
d. BMD Analysis Support		Multiple		6976	1Q00				6976	

e. System Effectivness Evaluation Analysis		SPARTA, Arlington, VA, Battelle, Columbus, OH, MILTEC, Huntsville, AL; Teledyne-Brown, Huntville,AL		1831	1Q00				1831	
Subtotal Mgmt Services			12330	36804		27733		Continue	Continue	

Remark:

Project Total Cost:			19150	62488		71873		Continue	Continue	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3251

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3251 Systems Engineering and Technical Support	17230	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

This project provides system engineering and technical support for the integration of Service-supplied weapon systems to facilitate the identification and resolution of inter-Service integration and interoperability issues; technical and engineering assessments and trade-off studies of Theater Missile Defense (TMD) system architectures and concepts.

Starting in FY 00, the funding for this project was transferred to project 3155.

FY 1999 Accomplishments:

- 8615 Provided TMD Family of System level system engineering and integration support that included the following efforts. Supported the Joint Theater Air and Missile Defense (JTAMD) process through the development of system requirements and architectures.
- 3153 Developed the JDN Program Plan that defines an interoperability evolutionary acquisition strategy.
- 5462 Planned and assessed TMD Integrated Testing to include HWILT, TMDSE, and Joint Service Exercises.

Total 17230

FY 2000 Planned Program:

- Beginning in FY 00, the funding for this project has been transferred to Project 3155

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
PE 0603873C PMA 3155/Task 07			16870	16492	18132	29494	30027	30669	Continue	Continue

C. Acquisition Strategy: This project used a competitively awarded SETA contract.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
N/A										

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3251

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Engineering	CPFF	TRW, Rosslyn VA	17230	0				Continue *	17230	0
Subtotal Product Development:			17230						17230	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Engineering	CPFF	TRW, Rosslyn VA	17230					Continue *	17230	
Subtotal Management Services:			17230						17230	

Remark:

* Starting in FYOO, the funding for this project was transferred to Project 3155, same Program Element.

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603873C Family of System E & I**

Project Total Cost:			17230						17230	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I PROJECT 3261

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3261 TMD BM/C3I (BM/C3I Concepts)	37745	53603	25756	72617	40833	59659	27972	Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this project is to provide the warfighter with Theater Air and Missile Defense (TAMD) Battle Management/Command, Control and Intelligence (BM/C3I) that is flexible, responsive, and interoperable. TAMD is based on a Family-of-Systems (FoS) concept where the Services' air and ballistic missile defense and command and control (C2) systems are integrated together using various existing and developing communications capabilities and systems. The resulting FoS provides the CINC with TAMD systems 'plug and fight' capability to address a wide variety of air and missile threats that can be tailored for his theater of operations.

To achieve this objective of providing the warfighter with flexible, responsive, and interoperable BM/C3I for TAMD, the Ballistic Missile Defense Organization (BMDO) uses this project to provide oversight, leadership, guidance, and support to the Services' TAMD BM/C3I programs. The focus is on Joint approaches to integrate and synergize the Services' programs to include: (1) early warning and dissemination of theater ballistic missile launch information, (2) communication, and (3) command and control upgrades. In concert with this successful approach, BMDO has developed the TAMD BM/C3I Architecture to enable further interoperability improvements. By focusing project efforts on this architecture, the integration of individual activities will be enhanced while continuing to support earlier objectives.

The TAMD BM/C3I Architecture can be viewed as a set of FoS connectivities and common mission functions integrated via three networks: (1) the Joint Data Network (JDN): a near-real-time network based primarily on the Tactical Digital Information Link [TADIL-J / LINK-16] to provide overall FoS situational awareness, command and control, and weapon coordination; (2) The Joint Planning Network (JPN): a non-real-time/near-real-time network building upon the Global Command and Control System (GCCS) to support centralized planning and guidance. The JPN will complement the JDN by enabling consistent TAMD plan development and dissemination across command levels, Services, and the CINCs; (3) The Joint Composite Tracking Network (JCTN): a real-time network based on the Navy's Cooperative Engagement Capability (CEC) to directly link sensors and shooters within a theater to provide fire-quality information to maximize the effectiveness of multiple systems.

To achieve the TAMD BM/C3I Architecture, project efforts will address the following key areas: the development of external cueing for FoS sensors; the implementation of JDN [TADIL-J / LINK-16] TAMD messages in FoS C2 nodes; and the development and integration of GCCS TAMD applications. The overall objective of this project is to ensure the integration of Service systems so that they will be both affordable and jointly interoperable.

Recent emphasis is focused on the "FoS Interoperability" project. This project contains Link-16 fixes and enhanced Communication Information Management (CIM) efforts. These tasks contribute vertical and horizontal integration of the JPN, JDN and JCTN in support of joint and coalition TAMD operations, such as: Joint Range Extension (JRE), Time Slot Reallocation (TSR) and Joint Interface Control Officer (JICO) enhancements. The project further provides system engineering and technical support for the integration of Service-supplied weapon systems to facilitate the identification and resolution of inter-Service integration and interoperability issues; technical and engineering assessments and trade-off studies of Theater Air and Missile Defense (TAMD) system architectures and concepts; support for UK

developed sensor data fusion methodology; Ballistic Missile Defense (BMD) system survivability oversight and assessment; risk reduction and acquisition streamlining support; modeling, simulation, experiment, and flight test support; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation associated with TAMD studies and critical issues.

FY 1999 Accomplishments:

- 7402 BM/C3I Integration - Army: Developed ICP and system implementation documentation for Army Air and Missile Defense (AMD) systems for JDN message development; integrated PATRIOT into DII/COE compliant Army component of the JPN; development, integration, and the certification of ADSI component of Air & Missile Defense Planning & Control Systems (AMDPCS); integrated JTT into AMDPCS at ADA Bde; and above levels; integrated AMDPCS with German SAMOC under US/GE Interoperability program; delivered Army AMDWS/JDP Interface documentation to the JDP Program office; software integration report on upgrades to TADIL-A PATRIOT cueing for TBMs; delivered ASCIET 99 Joint Network design and load files for Link-16 Net Design; delivered demonstration plan for Army JRE; delivered Army annex to Integration plan of JRE; deliver Joint Requirements documents for Army JRE.
- 8903 BM/C3I Integration - Air Force: Implemented JDP V1.0 TRNs and JTMDP V2.0 requirements in JDP 2.0; developed enhancements and fielded JDP V1.0 and V1.0.1 including enemy order of battle and JMTK; implemented model fidelity study results via Service-generated system data tables; produced JRE host integration plan with Service annexes; conducted JRE Joint Lab demonstration; integrated Navy and Army S-TADIL J UHF capability in AF JRE Gateway; developed Joint test environment to supplement live testing with operationally realistic loads (MASC); delivered Time Slot Reallocation recommendations; fielded JDP V1.0 with TBMCS V1.0; fielded JDP V1.0.1 with GCCS V3.0; initiated creation of testbed capability at identifies facility(ies); completed prototype JSTARS TAMD MSI and perform demonstration activities to determine effectiveness of prototype; implement change 8 ensure interoperability with FoS established TAMD baselines in JSTARS; developed a Joint communications plan/architecture to identify the out-of-theater, reach-back requirements for A2IPB; publish Joint Area Limitation TRD; developed a Correlation Roadmap.
- 12190 BM/C3I Integration - Navy & USMC: Integrated prototype JDP 2.0 with Navy GCCS-M; conducted JRE Joint lab demonstration; produced JRE host integration plan with Service annexes; completed Joint Service staffing requirements document; developed test plans for JTIDS TSR development; developed test plan for Common Air Command & Control system, (CAC&CS); delivered TEMP draft on CAC&CS; completed software testing on SIAP; conducted demonstration on the SIAP.
- 1285 BM/C3I Integration - Joint/Combined: Provided joint testing support for TAMD messages; continued theater/IBS integration process into TADIL-J messages; submitted “best-of-breed” candidates to CAN; develop TADIL ICP for joint correlation algorithm base; completed UK sensor management and passive warning studies; provided daily support, upkeep and maintenance to the InterPRO architecture software tool system; TMSC evaluation and testing a distributed environment; testing of TES component implementation of MIDB codes; documented and tested procedures for adding MIDB codes to TDPs; conducted tests using live TDDS and TIBs data, recording and simulation; initial preparation of the Advanced Concept Technology Demonstration (ACTD).
- 1450 Cooperative Engagement Capability (CEC) Demonstration/Impact '98: This ACTD program provided data to extend the evaluation of enhanced warfighting capabilities and provided engineering data to enable an assessment of the potential for PATRIOT, THAAD, and Cooperative Engagement Capability (CEC) contributions in: increased Theatre Air and Missile Defense defended area, initiated a U.S. Army/U.S. Navy SIAP, and increasing contingency operation capability.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I
	PROJECT: 3261

- 1515 BM/C3I Integration – JNTF: Updated VV&A plan; preformed V&V on JDP V1.0.1 for release; final updates made to JDP 2.0 requirements; performed user assessment of GCCS TAMD applications; demonstrated JDP capabilities; provided and maintained an operational representative GCCS host workshop.
- 4416 FoS Interoperability - The Army, Navy, Marine Corps, Air Force and Joint National Test Facility provided support to Inter-Service integration, interoperability, identification and resolution of interface issues. Provided support to the JTAMD Process and its associated JTAMD Master Plan development, JTAMDO sponsored WIPTs, JTAMD Systems Architecture development, and the Systems Engineering and Integration (SE&I) process. Perform special studies as assigned and provided support to AQ Systems Interoperability and Integration (SI&I) efforts.

Total 37161

FY 2000 Planned Program:

- 13072 Theater Missile Defense System Exerciser (TMDSE): This task supports the development of the TMDSE, the primary Hardware-in-the-Loop (HWIL) test tool for the TMD Family of Systems (FoS). Effort includes: evolution of TMDSE via incremental software builds and the addition of system nodes, the transition of TMDSE into the JNTF, and support of HWIL testing.
- 5660 BM/C3I Integration -Army: Continue software development and integration activities; evaluate the message proposals options for JDN/JCTN networks to determine Army impacts/recommendations for submission; upgrade and test JCOES/DII compliant AMDWS planning modules with JDP V 3.0; continue integration/interoperability testing, certification and fielding of AMDWS planning modules to ADA Brigades and theater level command and control facilities; integration and testing of THAAD, JLENS functionality into AMDWS component of JPN; participate in 2 JRE field demonstration.
- 8300 BM/C3I Integration -Air Force: Demonstrate and test JRE UHF S-TADIL J capability; integrate EHF MDR capability into JRE; implement JDP V2.0 into TBMCS V2.0 and GCCS V4.0; support JDP V3.0 GCCS/JPN development and integration and use into non-AOC TBMCS sites; implement A2IPB reach-back connectivity interfaces; conduct A2IPB prototype/reach-back field interoperability evaluations with appropriate TAMD Family of Systems; initial test of JPN performance with each service running its own version of JDP; publish JPN performance analysis report; produce JPN spiral development program that achieve incremental JPN performance improvements;
- 6893 BM/C3I Integration- Navy & USMC: Participate in two Joint JRE field demonstration; complete JDP V2.0 integration and testing with GCCS-M; continue support to Navy platform implementation.
- 2757 BM/C3I Integration- Joint/Combined: Joint testing support for TAMD messages; develop theater forwarding rules for JDM message development; support integration of multiple intel broadcasts into the integrated architecture based on common format and migration to unified joint DEDs; ATHENA participate in SIT 00; develop a draft interface change proposal for a joint method of geodetic alignment and sensor registration.
- 11250 Cooperative Engagement Capability (CEC) Demonstration/Impact '98: This ACTD program provides data to extend the evaluation of enhanced warfighting capabilities and provides engineering data to enable an assessment of the potential for PATRIOT, THAAD, and Cooperative Engagement Capability (CEC) contributions in: increasing Theatre Air and Missile Defense defended area, initiating a U.S. Army/U.S. Navy SIAP, and increasing contingency operation capability. FY00 efforts include: 1.) Demonstrate the capability to engage a low altitude surrogate cruise missile with a PATRIOT PAC-3 missile at Over-The-Horizon ranges using AEGIS/CEC data. 2.) Conduct a THAAD/CEC data collect and analysis and integration investigation.
- 342 BM/C3I Integration- JNTF: Develop Air tasking orders to support TAMD exercises; perform DII COE standards compliance validation on TAMD GCCS developed software; build out the TAMD BMC3 test center; document testing for TAMD BMC3; provide exercise support for rapid prototype testing of TAMD BMC3 concepts.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I
	PROJECT 3261

- 5329 FoS Interoperability - This task contributes to vertical and horizontal integration of the JPN, JDN and JCTN in support of joint and coalition TAMD operations, such as: Joint Range Extension (JRE), Time Slot Reallocation (TSR) and Joint Interface Control Officer (JICO) enhancements. The Army, Navy, Marine Corps, Air Force and Joint National Test Facility will provide support to Inter-Service integration, interoperability, identification and resolution of interface issues. Provide support to the JTAMD Process and its associated JTAMD Master Plan development, JTAMDO sponsored WIPTs, JTAMD Systems Architecture development, and the Systems Engineering and Integration (SE&I) process. Perform special studies as assigned and provide support to AQ Systems Interoperability and Integration (SI&I) efforts.

Total 53603

FY 2001 Planned Program:

- 10916 Theater Missile Defense System Exerciser (TMDSE): This task supports the development of the TMDSE, the primary Hardware-in-the-Loop (HWIL) test tool for the TMD Family of Systems (FoS). Effort includes: evolution of TMDSE via incremental software builds and the addition of system nodes, the transition of TMDSE into the JNTF, and support of HWIL testing.
- 1999 BM/C3I Integration –Army Upgrade and test with JDP AMDWS planning modules with subsequent versions of JDP; develop objectives US/GE ADA Bde/SAMOC interoperability capabilities; transition JRE to lead service program offices.
- 2803 BM/C3I Integration -Air Force: Demonstrate and test JRE UHF link to isolated units; develop and integrate Service-generated system data tables for new systems; complete final A2IPB prototype development (build 2); install A2IPB at CUBE or JNTF; certify evolutionary A2IPB software as DII COE segment; build prototype product solution in the Joint Planning Net.
- 1583 BM/C3I Integration- Navy & USMC: Transition JRE into lead Service Program offices; integrate JDP V 3.0 with GCCS-M.
- 400 BM/C3I Integration- Joint/Combined : Joint proposals for standard data elements; integration support for initiatives emerging information requirement for planned coalition interfaces; provide joint support for integration of multiple broadcast in theater include SEW and ITW/AA.
- 4863 Cooperative Engagement Capability (CEC) Demonstration/Impact '98: This ACTD program provides data to extend the evaluation of enhanced warfighting capabilities and provides engineering data to enable an assessment of the potential for PATRIOT, THAAD, and Cooperative Engagement Capability (CEC) contributions in: increasing Theatre Air and Missile Defense defended area, initiating a U.S. Army/U.S. Navy SIAP, and increasing contingency operation capability. FY01 efforts focus on THAAD/CEC data analysis and integration investigation.
- 435 BM/C3I Integration- JNTF: Assist other Service GCCS customers in their integration of TAMD applications.
- 2757 FoS Interoperability - This task contributes to vertical and horizontal integration of the JPN, JDN and JCTN in support of joint and coalition TAMD operations, such as: Joint Range Extension (JRE), Time Slot Reallocation (TSR) and Joint Interface Control Officer (JICO) enhancements. The Army, Navy, Marine Corps, Air Force and Joint National Test Facility will provide support to Inter-Service integration, interoperability, identification and resolution of interface issues. Provide support to the JTAMD Process and its associated JTAMD Master Plan development, JTAMDO sponsored WIPTs, JTAMD Systems Architecture development, and the Systems Engineering and Integration (SE&I) process. Perform special studies as assigned and provide support to AQ Systems Interoperability and Integration (SI&I) efforts.

Total 25756

B. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
PE 0603750D (OUSD AS&C)	2.000	4.192	2.192	.400	.400	0	0	TBD	TBD

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3261

C. Acquisition Strategy: The 3261 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy BM/C3I performance requirements. A significant portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Update TADIL-J message sets		X						
Test JTIDS integration to AOC		X						
Complete TCTA system certification testing in AOC and CIC		X						
Final development and fielding of JDP V 2.0 into GCCS V4.0			X					
Final development and fielding of JDP V 2.0 into TBMCS V2.0				X				
Initial version of JDP V 3.0			X					
Complete final A2IPB prototype development (Build 2)				X				
Certify evolutionary A2IPB software as DII COE segment				X				
Begin fielding A2IPB as a DII COE complaint GCCS segment					X			
Coordinate documentation, issues, suggested correction, and resolution plans concerning the JTAMDO/BMDO Family of Systems Architecture		X	X	X	X	X	X	
Install Area Limitation prototype at the CUBE or JNTF			X					
Complete final evolutionary prototype and certify Area Limitation software as DII COE segment				X				
Begin fielding Area Limitation as a DII COE compliant GCCS segment					X			
Support and incorporate WIPT analysis as results into the FoS management plan		X	X	X	X	X	X	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3261

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1. TMDSE - JNTF	Allotment	Multiple	0	13072	Oct 1999	10916	Oct 2000	Continue	Continue	
2. Army PEO-AMD	Allotment	Multiple	6413	5660	Oct 1999	1999	Oct 2000	Continue	Continue	
3. Air Force ESC	Allotment	Multiple	8005	8300	Oct 1999	2803	Oct 2000	Continue	Continue	
4. USMC Sys Com	Allotment	Multiple	3641	2283	Oct 1999	705	Oct 2000	Continue	Continue	
5. Navy PEO-TAD	Allotment	Multiple	7264	4610	Oct 1999	878	Oct 2000	Continue	Continue	
6. BMDO	Allotment	Multiple	535	2757	Oct 1999	400	Oct 2000	Continue	Continue	
7. CEC/Impact '98	Allotment	Multiple	1450	11250	Oct 1999	4863	Oct 2000	TBD	TBD	
8. JNTF	Allotment	Multiple	1021	342	Oct 1999	435	Oct 2000	Continue	Continue	
9. FoS Interoperability	Allotment	Multiple	4416	5329	Oct 1999	2757	Oct 2000	Continue	Continue	
Subtotal Product Development:			32745	53603		25756				

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1. Army PEO-AMD	Allotment	Multiple	989	0		0		Continue	Continue	
2. Air Force ESC	Allotment	Multiple	898	0		0		Continue	Continue	
3. USMC Sys Com	Allotment	Multiple	296	0		0		Continue	Continue	
4. Navy PEO-TAD	Allotment	Multiple	989	0		0		Continue	Continue	
5. BMDO	Allotment	Multiple	750	0		0		Continue	Continue	
6. JNTF	Allotment	Multiple	494	0		0		Continue	Continue	
Subtotal Support Costs:			4416							

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3261

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a				0		0		0		0
Subtotal Test and Evaluation:										0

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
A To be distributed				0		0		0		0
Subtotal Test and Evaluation:										0

Remark:

Project Total Cost:			37161	53603		25756			Continue	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3354

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3354 Targets	0	6317	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification The purpose of this effort is to provide for the acquisition of targets for SIT II and Impact 98 testing.

FY 1999 Accomplishments: No Funding

FY 2000 Planned Program:

- 6317 Develop and procure medium range ballistic missile for use during TMD Family of Systems Testing in System Integration Test II (SIT)..

Total 6317

FY 2001 Planned Program: No funding.

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	TBD	TBD
2260 THAAD, PE 0604861C		0	79462	549945	685168	789736	755134	591049	TBD	TBD
2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	TBD	TBD
1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	TBD	TBD
2263 NAVY AREA, 0604867C		241782	307274	274234	228596	85866	33293	29369	TBD	TBD
3354 TARGETS, PE 0603872C		17615	48056	0	0	0	0	0	TBD	TBD
3354 TARGETS, PE 0603874C		1936	2300	49135	36211	38081	40260	40882	CONT	CONT
3360 TEST RESOURCES, PE 0603874C		41005	66237	69555	64211	54314	54375	54975	CONT	CONT
3360 TEST RESOURCES, PE 0603872		45846	13734	0	0	0	0	0	CONT	CONT

C. Acquisition Strategy:

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603873C Family of System E & I**

SIT II						1Q				

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3354

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
b. Theater Target	FFP	BMDO		6317					6317	6317
Subtotal Product Development:				6317					6317	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
b.										
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
b.										
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
b.										
Subtotal Management Services:										

Remark:

Project Total Cost:				6317					6317	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3359

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3359 Test, Evaluation and Assessment	20297	23249	61299	34045	50090	37803	38868	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project contains BMDO's Commanders In Chiefs (CINCs') Assessment; (the long-term goal is to ensure the successful transition of interoperable Theater Air Missile Defense (TAMD) Family of Systems (FoS) to the warfighting customers); and FoS Assessment program. The CINCs' Assessment program is directed toward enabling the warfighters to employ TAMD systems as they are delivered. In addition, CINCs' Assessment supports the development of joint interoperability TAMD doctrine, Concepts of Operations (CONOPS), and Tactics, Techniques, and procedures (TTPs); and provides Joint/Coalition/Allied TAMD interoperability data from CINCs TAMD exercises. The FoS Assessment program validates progress in achieving Joint Interoperability. It uses data from the CINCs' TAMD exercises, Major Defense Acquisition Program (MDAP) interoperability tests, System Integration Tests (SITs), and Overlay tests along with joint interoperability Modeling and Simulation (M&S) via the Extended Air Defense Test Bed (EADTB), and Hardware-in-the-Loop tests (HWILT) (HWILTs use a tool called Theater Missile Defense System Exerciser) to support system engineering validate requirements. All of these programs support the TMD Capstone Requirements Document (CRD), TAMD Master Plan requirements and Capability Increments (CI) in the Draft Interoperability Program Plan (IPP). TAMD is based on a FoS concept where the Services air and ballistic missiles defense and command and control (C2) systems are integrated using various existing and developing communications capabilities and systems. As a resulting FoS provides the CINCs with 'plug and fight' C2 TAMD system capability that can be tailored for any theater of operations to address a wide variety of air and missile threats.

FY 1999 Accomplishments:

- 13495 Completed transition of TMDSE Build 3 to the JNTF. Funded JNTF for Tactical Communications Enviroment Segment (TCES) validation effort. Supported JDN gateway development to support HWITL 99a testing.
- 4919 Conducted execution and analysis of HWILT99a and planning for HWILT99b at the JNTF. Initial planning for SIT II scheduled for FY01 execution. Collected and analyzed interoperability data from all FoS events (HWILT99a, FE98, ASCIET00, JPOW4, SLUGGER, RS) to develop a FoS assessment for Consolidated Assessment Report (CAR) publication. September 1999.
- 1883 OTA's conducted operational assessments of FoS events including HWILT99a, ASCIET99 and RS99. Provided input into the Draft Captstone TMD TEMP.

Total 20297

FY 2000 Planned Program:

- 638 Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs.
- 3881 Support CINCs By developing TAMD exercise framework, and assist with developing CONOPs and TTPs
- 14727 Conduct planning and pretest risk reduction/analysis on SIT II (scheduled FY01). Conduct HWILT 99a execution and analysis and HWILT 00 planning, execution and analysis at the JNTF. Conduct EADTB analysis to support FoS assessment. Collect and analyze interoperability data from all FoS events (HWILT, Service, MDAP and CINC exercises) to develop a FoS assessment and publish in the CAR.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I
	PROJECT 3359

- 4003 OTA's conduct independent operational assessments of FoS using HWILT, service testing and Joint Exercises. Provide input to FoS T&E documentation

Total 23249

FY 2001 Planned Program:

- 842 Support CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs.
- 1213 Support CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTP.
- 2341 Support CINC USACOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTP.
- 742 Support CINC USFK by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTP.
- 1638 Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs.
- 4945 Support CINCs By developing TAMD exercise framework, and assist with developing CONOPs and TTPs
- 46175 Execute SIT II. Conduct HWILT 01 planning, execution and analysis at the JNTF. Conduct EADTB analysis to support FoS assessment. Collect and analyze interoperability data from all FoS events (HWILT, Service, MDAP and CINC exercises) to develop a FoS assessment and publish in the CAR.
- 3403 OTA's conduct independent operational assessments of FoS using HWILT, service testing and Joint Exercises. Provide input to FoS T&E documentation.

Total 61299

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
PE 0603872C Joint TMD, Project 3359, BMDO Tas 01			9099							

C. C. **Acquisition Strategy:** The FoS assessment strategy uses currently Program and OPFAC development and CINC exercises, coupled with an annual HWILT and periodic SIT tests for interoperability analysis and assessment. Event in-process reviews and test readiness reviews are conducted prior to execution. Documentation is reviewed as required. Yearly Consolidated Assessment Report is issued summarizing interoperability status using all test event results/conclusions.

D. Schedule Profile		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
SIT II				4Q				
Overlay						3Q		3Q
HWILT 00A		3Q	3Q	3Q	3Q	3Q	3Q	3Q

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603873C Family of System E & I**

HWILT 99B			1Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603873C Family of System E & I

PROJECT: 3359

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TMDSE B3	SubAllocation	TBE Huntsville, AL JNTF CO Springs, CO	13495						13495	
Subtotal Product Development			13495						13495	

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Test Plan/Exec	SubAllocation	SMDC	441		1Q00	463	1Q01	Continue	Continue	
b. Gov Proj Personnel/Spt	SubAllocation	AMD PEO		.337	1Q00	.346	1Q01	Continue	Continue	
Subtotal Support Costs:			441	337		809				

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Test Planning/Execution	Suballocation	NWAS/ Joint/ Combined	3525	14090	1Q00	45081	1Q01	Continue	Continue	
b. OT&E	Suballocation	Other Test Agencies	1883	4003	1Q00	3403	1Q01	Continue	Continue	
c. CINCs Experiments	Suballocation	Theater CINCs		4519	1Q00	11721	1Q01	Continue	Continue	
Subtotal Test and Evaluation:			5408	22612		60205				

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.	CPAF	SRS	953						953	
b.	CPAF	Vanguard		300	1Q00	285	1Q01	Continue	Continue	
Subtotal Management Services:			953	300		285				

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603873C Family of System E & I**

Project Total Cost:			20297	23249		61299			Continue	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I PROJECT 4000

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4000 Operational Support	0	0	72320	70282	67679	66265	68501	Continuing	Continuing

A. Mission Description and Budget Item Justification

Beginning with FY 01, this program element replaces the Joint TMD Dem/Val program element.

This project funds three basic areas: personnel and related facility support costs; statutory and fiscal requirements, and support service contracts.

Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, US Army PEO Missile Defense, US Navy PEO for Theater Defense, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.

Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

Finally, assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.

FY 1999 Accomplishments:

- 0 Efforts funded in the Joint Theater Missile Defense PE 060387C2

Total 0

FY 2000 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I / PROJECT: 4000

- 0 Efforts funded in the Joint Theater Missile Defense PE 060387C2

Total 0

FY 2001 Planned Program:

- 77214 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 77214

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	0	0	77214
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressional General Reductions			
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming			
e. Rescissions			
Adjustments to Budget Years Since FY 2000 PB			-4894
Current Budget Submit (FY 2001 / 2002 BES/PB)	0	0	72320

Change Summary Explanation: Starting in FY01, all Family of System efforts from the Joint Theater Missile Defense program element (060387C2) were transferred to this program in order to maintain adequate visibility into Theater Missile Defense efforts.

B. Other Program Funding Summary N/A	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603873C Family of System E & I**

C. Acquisition Strategy:
N/A

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
N/A										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	188317	214445	270718	248170	241011	249822	252898	Continuing	Continuing
1155 Discrimination	18507	24382	28269	20304	22153	16436	16413	Continuing	Continuing
3153 Systems Arch and Engineering	16054	15653	22316	22406	23350	22590	22899	Continuing	Continuing
3156 System Lethality	0	0	7950	11915	11906	19819	19800	Continuing	Continuing
3352 Modelling and Simulation	46226	39585	27920	29379	26241	26512	26788	Continuing	Continuing
3353 JNTF	57211	55632	54741	52672	53942	58619	59961	Continuing	Continuing
3354 Targets*	1936	2300	49135	36211	38081	40260	40882	Continuing	Continuing
3360 Test Resources*	41005	66237	69555	64211	54314	54375	54975	Continuing	Continuing
4000 Operational Support	7378	10656	10832	11072	11024	11211	11180	Continuing	Continuing

* Funding for this project for FY01-05 contributed by PE 0603872C.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense (BMD) Technical Operations Programs are comprised of the centrally managed functional capabilities required to assure the execution of Theater Missile Defense (TMD), Family of Systems Engineering and Integration (FOS E&I), National Missile Defense (NMD), and Technology programs. Functional areas include BMD systems architecting and engineering analysis, test resources and facilities, modeling and simulation, and phenomenology data collection and analysis. These highly specialized BMD-specific investments provide the threat representative data and derived requirements, modeling capabilities, and test facilities necessary to meet the aggressive development, test, and deployment schedules of the TMD and NMD systems. These centrally managed programs are executed in a manner integrated with BMDO's mission areas.

The catalyst for reorganization of BMDO PEs, including the creation of this PE, was the fundamental shift in the Department's management approach for both the NMD program and TMD "Family of Systems". Technical Operations Programs were formerly distributed and managed within the NMD, TMD, and Technology mission areas. This required OSD and Congress to look across multiple PEs to understand the scope of these investments. Under a single PE, Technical Operations programs will be more

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY **4 - Demonstration and Validation**	PE NUMBER AND TITLE **0603874C BMD Technical Operations**

identifiable and managed in a more streamlined manner. The Technical Operations Program Element establishment was accomplished and first reported in BMDO's FY99-03 Program Objective Memorandum submission.

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of each Program Element Summary.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)		184842	190650	160295
Congressional Adjustments			+25500	
Appropriated Value			216150	
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)			-1498	
b. OSD Reductions				
c. Emergency Supplemental				
d. Internal Reprogramming			-207	
Adjustments to Budget Years Since FY 2000 PB		+3475		+110423
Current Budget Submit (FY 2001 PB)		188317	214445	270718

Change Summary Explanation:

Significant changes in FY00, due to implementation of Congressional Direction including $15M increase for Pacific Missile Range Facility to provide upgrade for radars, command & control engagement, and the optical tracking system (PMA 3360).

In addition to implementation of OSD PBD Direction, significant FY01 changes include:

- $64M transferred from Joint (Other) TMD PE to Technical Operations to consolidate Test Resource (Project 3360) and Targets (Project 3354).
- $32M increase to fund Ground Test Facilities and Ranges utilized by MDAPs Programs (Project 3360).
- $8M to establish and consolidate overall BMDO Lethality Program activities (Project 3156)
- $8M to perform alternative baseline architecture analyses and critical independent systems engineering studies (Project 3153).

C. Acquisition Strategy: See Individual R2 summaries.

	DATE **February 2000**
BUDGET ACTIVITY **4 - Demonstration and Validation**	PE NUMBER AND TITLE **0603874C BMD Technical Operations**

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 1155

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1155 Discrimination	18507	24382	28269	20304	22153	16436	16413	Continuing	Continuing

A. Mission Description and Budget Item Justification

To prepare for critical future defense needs, technical operations will support MDAP programs by conducting a balanced program of high leverage technologies that yield improved capabilities across a selected range of boost, midcourse, and terminal phase missile defense interceptors, advanced target sensors, and innovative science. The objectives of these investments are subsystems with improved performance or reduced costs for acquisition programs, and technical solution options to mitigate advanced and near-term National and Theater Ballistic Missile threats.

This program provides the U.S. with the data and predictive tools to generate high confidence target signatures for Ballistic Missile Defenses (BMD). This is a critical adjunct to the evaluation of BMD system performance across the full spectrum of threats and engagement scenarios. This program provides data collection sensors and instruments for use on live-fire missions and provides analysis of the resulting test data. This program provides predictive models of target signatures in both Radar and Electro-Optical regimes. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection.

Data collection and exploitation of data is achieved by ground, air, and sea based assets for domestic and foreign tests. This includes collection by assets that are owned or operated by other agencies for use by BMDO.

Algorithms and Analysis work is divided into optical and radar regimes. Promising acquisition, discrimination, track, and aimpoint algorithms are coded and installed at the Lexington Discrimination System (LDS) for evaluation in a real-time operating mode using real and simulated data. Algorithms from acquisition programs are evaluated for effectiveness in a variety of targets and scenarios.

Models provide predictive signature codes ranging from high-fidelity single component models to integrated model architecture that combine several components into a composite modeling capability. Component models follow the subject discipline of hardbody targets, missile plumes, and backgrounds. Codes are validated and upgraded, as analysis of measured data becomes available and understood.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations
	PROJECT: 1155

FY 1999 Accomplishments:

•	8758	Algorithms and Analysis: Continued data analysis support for TMD systems in Dem/Val and EMD. Provided support for TMD radar/optical discrimination algorithms and architectures for advanced TMD threats and penaids. Developed real-time algorithms for battlefield learning using neural networks, field data, and simulations on LDS. Developed algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
•	300	Advanced planning for the Adaptive Algorithms Technology program to support adaptive programs for discrimination.
•	4890	Models: Delivered validated signature models for high priority engagement scenarios. Continued participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and signature phenomenology.
•	2207	IR Data Collection Upgrade: Initiated Award of Advanced Technology and Measurement System contract and conducted System Requirements Review (SRR) and Integrated Baseline Review (IBR).
•	50	Cobra Ball Upgrade: Stand-up program.
•	200	Sensor and system trade studies.
•	1800	Continue program operations.
•	302	International: Acquired removable data storage unit for Multifunction Electronically Scanned Adaptive Radar (MESAR) trials.
Total	18507	

FY 2000 Planned Program:

•	7015	Algorithms and Analysis: Provide data analysis support for TMD systems in Dev/Val and EMD. Provide support for NMD radar/optical discrimination algorithms and architectures for advanced NMD threats and penaids. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
•	5131	Models: Continue development and validation of high fidelity signature and environment codes.
•	10967	IR Data Collection Upgrade: Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR).
•	377	Cobra Ball Upgrade: Initiate sensor subsystem design trade studies.
•	745	Government Project Personnel Support: Civilian Salaries for BMDO Executing Agent (EA)
•	147	International: Continue MESAR efforts and support of the Scientific Cooperative Research Exchange (SCORE) exchange with the UK.
Total	24382	

FY 2001 Planned Program:

•	7188	Algorithms and Analysis: Data analysis support for TMD systems in Dev/Val and EMD. Provide support for NMD radar/optical discrimination algorithms and architectures for advanced NMD threats and penaids. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
•	4929	Models: Continue development and validation of high fidelity signature and environment codes.
•	13675	IR Data Collection Upgrade: Delivery of sensor system, and cupola. Flight Readiness Review (FRR) integrated platform testing and first flight operations.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 1155

- 248 Cobra Ball Upgrade: Sensor Procurement activities and design reviews.
- 541 Government Project Personnel Support: Civilian Salaries for BMDO EA
- 1688 International: Continuing ongoing efforts, including: MESAR radar measurements with UK; surface wave radar work with Canada; Down Under Early Warning Experiment (DUNDEE) missile detection and tracking experiments with Australia; TMD signature and phenomenology exchange with Israel; passive technology with the Czech Republic; and neural network and wide-field-of-view efforts with Hungary.

Total 28269

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
1155 NMD Program, PE 0603871C	0	400								400

C. Acquisition Strategy: This project funds its efforts through executing agents in the Air Force, Army, Navy and BMDO via existing contracts.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
RDA Resources on Non-X band system plan	1Q	1Q						
ODA Model and simulation support	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q				
Release SSGM 98	1Q							
Delivered SAMM 2.0	2Q							
SHARC code 4.1	2Q							
Support BMDO test flight programs		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q			
IR Sensor SRR			1Q					
IR Sensor PDR			2Q					
IR Sensor CDR			4Q					
IR Sensor Integration and Test				1Q-3Q				
IR Sensor First Flight				4Q				
IR Sensor O&M					1Q-4Q			

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 1155

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. IR Sensor Upgrade	C, CPFF	Aeromet, OK	2205	10679	1Q00	13675	1Q01	0	26559	
b. Cobra Ball Upgrade	C, TBD	Raytheon, TX	50	377	1Q00	248	1Q01	80000	80675	
			2000						2000	
Subtotal Product Development:			4255	11056		13923		80000	109234	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. OSC SW Maintenance	CPFF	TBE, Huntsvlle AL	547	400	1Q00	300	1Q01	Cont.	1247	
b. BES Development	Allot	SMDC, H'sville AL		961	1Q00	893	1Q01	Cont.	1854	
c. Bkgnds SW Dev	Allot	AFRL, MA	1020	1086	1Q00	1000	1Q01	Cont.	3106	
d. SSGM Software Dev	Allot	NRL, Wash DC	400	400		400	1Q01	Cont.	1200	
e. SSGM SW Dev	CPFF	PRA, Calif Other, VA	1504	1096		1161	1Q01	Cont.	3761	
f. Cont. Eng Supprt	C, CPFF	Other, VA	925	866	1Q00	883	1Q01	Cont.	2674	
Subtotal Support Costs:			4396	4809		4637			13842	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Mission Planning supt.	Other		503	278	1Q00	292	1Q01	0	1073	
b. MESAR Trials	MIPR	PEO-TAD, Wash	225	0		0		0	225	
Subtotal Test and Evaluation:			728	278		292			1298	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 1155

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Plumes Analysis	Allotment	AFRL, CA	1019	1086	1Q00	1001	1Q01	Cont.	3106	
b. Radar Analy / Supprt	MIPR	MIT/LL Lex, MA	4872	3769	1Q00	3350	1Q01	Cont.	11991	
c. Optical analy (ODA)	C, CPFF	NRC, H'sville AL	2761	2492	1Q00	2837	1Q01	Cont.	8090	
d. Prog Man Pers	Allotment	SMDC, H'sville AL		745	1Q00	541	1Q01	Cont.	1286	
e. Other Intnl prgms	Other		476	147	1Q00	1688	1Q01	Cont.	2311	
Subtotal Management Services:			9128	8239		9417			26784	

Remark:

Project Total Cost:			18507	24382		28269		80000	151158	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)			DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations		PROJECT 3153

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3153 Systems Arch and Engineering	16054	15653	22316	22406	23350	22590	22899	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project supports the Office of the Chief Architect/System Engineering to address Joint Systems Architecture/Engineering (JSAE) issues in a coordinated and synergistic manner across all National Missile Defense (NMD) and Theater Air and Missile Defense (TAMD) efforts. It provides the technical foundation for program acquisition decisions at the architectural level. This office reports directly and independently to the BMDO Director, serving as the Organization's senior technical advisor to the BMDAE for JSAE, integration and support; providing the necessary mission-area oversight of critical BMDO technical issues.

The Office of the Chief Architect/System Engineering provides the technical assessment of the expected effectiveness of major programs under development and requirements for supporting technology and are responsible to:

- Develop BMD mission area requirements;
- Conduct BMD System Engineering;
- Direct analysis of future joint mission area architectures;
- Direct system analysis capabilities;
- Develop an integrated joint systems architecture engineering management framework;
- Formulate and supervise systems architecture/engineering concepts to ensure BMD programs are feasible, survivable, testable, and easily upgradable;
- Investigate test and evaluation (T&E) processes and strategies, providing input to various T&E forums, integrating T&E within the systems engineering process;
- Oversee all aspects of the BMDO program impacting the formulation and execution of Battle Management Command, Control, and Communications (BM/C3) research, development, and acquisition to support national and theater missile defense.

Functional areas of policy determination, expertise, and execution include System Engineering and Architecture Analysis, Missile Defense Interoperability, Test and Evaluation, and System Planning.

System Engineering and Architecture Analysis activities facilitate the overall BMDO system engineering corporate decision-making process. These efforts lead the implementation of Joint Systems Architecture Engineering within BMDO. This activity provides the technical interface for BMDO with the Office of the Secretary of Defense (OSD) technical engineering offices and develops JSAE implementation processes and policies. This activity conducts the requirement analysis, functional analysis and allocation, physical systems/architecture analysis and synthesis of new systems and architectures, and systems architecture analysis and control necessary for NMD, TAMD, and Technology mission areas.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3153

Missile Defense Interoperability activities assure, through policy formulation and implementation, that DoD and BMD interoperability requirements support the services and coalition partners. Specific activities include: NATO BMC3 Analysis; US/GE planning and analysis; US/UK multi-sensor tracking and fusion; implementation of Joint Technical Architecture (JTA); BMC3 support related to allied capabilities and interfaces; data standardization activities; and development of DE/JTAMDO technical architectures.

Systems-level Test and Evaluation is responsible for overarching BMDO T&E activities that provide integrated/centralized T&E program execution guidelines and resources. Specifically this includes development of T&E policy, performing specialized studies, T&E resource and infrastructure reviews, T&E documentation reviews, service and OSD T&E liaison, MDAP T&E program insight and tracking, OT&E integration with BMDO T&E (BOTEC) and participation in the Joint Test and Evaluation (JT&E) program.

System Planning supports the BMD Master Planning process by providing the applied architectural engineering information needed to baseline currently defined systems and develop options for P3I upgrades and next generation missile defense systems. Emphasis is on analyses of post-2010 threats and excursions, identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative concepts, defining system needs for technology, and assisting in preparation of OSD required pre-milestone I documentation.

The primary thrust of the work is to analytically show the need for and expected performance of different defense systems under development to address current and projected threats. The systems-level architecture/engineering analysis supports efforts to determine the expected operational performance and effectiveness of missile defense systems under development. Models and simulations are used to investigate architecture and system level capability and to resolve critical technical issues related to the development of specific elements of the architecture. Tradeoffs in alternative elements, specific designs, inventory and integration of systems are conducted to determine the most cost-effective approach for a particular missile defense mission. Analysis is performed on a continuing basis in order to determine the impact of changing threats, mission requirements, and technological advances. Analysis priorities are determined by the Integrated Analysis Leadership Group (IALG), a group sponsored by the Chief Architect/Engineer with representatives from across BMDO. The remaining core JSAE efforts focus on integrating ongoing efforts across the TAMD and NMD mission areas and developing and implementing policies designed to enhance system and cost performance. These efforts reduce system and architectural risks, improve system interoperability, focus technology planning and prioritization, and integrate T&E and M&S efforts.

This project provides technical recommendations for missile defense acquisition and budget allocation decisions to the Director.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations PROJECT 3153

FY 1999 Accomplishments:

- 11577 Architecture/Engineering Analysis: Through the IALG, developed an overall analysis plan for the BMDO and oversaw the analysis process. Participated in engineering trade studies with the TAMD systems engineer. Performed commonality studies on the Upper Tier TMD systems. Continued systems analysis of architecture/system performance and related technical issues as directed by Congress, the Department of Defense, the BMDO Director, and the Chief Architect/Engineer. Directed the Joint Systems Engineering Team (JSET). Managed the systems technology implementation process and develop pre-planned program improvement requirements.
- 4477 Architecture/Engineering Core: Led BMDO JSAE efforts to develop strategies, policies, and processes. Provided BMDO system-level capability to address emerging system requirements and concerns in a synergistic manner across all NMD and TAMD development efforts and facilitate the translation of operational requirements to joint and combined interoperable systems. Led BMDO participation in the development and implementation of various BMDO, DoD, Allied, and other Government and commercial initiatives relating to BMDO NMD/TMD BM/C3 development. Conducted Joint Technical Architecture (JTA) compliance engineering; held T&E Steering Group (TESG) and BMD Operation T&E Council (BOTEC) meetings; oversaw High Level Architecture (HLA) compliance and migration; and produced the BMDO Open Systems Assessment and the Test and Experiment Activities Summary (TEAS).

Total 16054

FY 2000 Planned Program:

- 9403 System Engineering and Architecture Analysis: Support analyses for Current Systems/Architectures, development of advanced/future systems/architecture requirements, and develop and maintain engineering threat documentation. Conduct functional and physical analysis and related allocation in support of current and advanced/future systems/architectures. Perform risk analysis and mitigation/control activities, trade-off analysis, and conduct program reviews in support of architecture analysis and control function. Support BMDO corporate technical decision processes.
- 3800 Missile Defense Interoperability: Formulate policy and implement DoD and BMD interoperability requirements in support of the services and coalition partners. Conduct BMC3 activities, to address NATO, US/GE, and US/UK customer interoperability scenarios and issues. NATO analysis will include joint experiment planning and upgrade of Extended Air Defense Test Bed. US and United Kingdom interoperability efforts concentrate on multi-sensor tracking and fusion. An interoperability study will be conducted during FY00. BMC3 interoperability activities address DoD's mandated implementation of the Joint Technical Architecture. BMC3 Support includes technical analysis of allies capabilities and interfaces to TAMD, tracking and maintaining an allies capability inventory, support of BICAR and DISA, quick reaction suspense/document reviews, analysis of CINC interoperability shortfalls, and interoperability analysis of Service Systems/JPN/JDN/JCTN. Data Standardization support includes development of TMD/NMD information exchange requirements, support of common data definitions required for NMD/TMD, analysis of standardization of interfaces to external systems, support to NMD data process and Missile Defense Data groups, review of Service BMC3 documents, MD Data Element Crosswalk input development, Metadata analysis, and technical review of data packages from JTAMDO and NMD. BMC3 interoperability efforts also develop joint TMD Technical Architectures. Technical Architectures and related analysis will be developed for 2003 and 2010 timeframes.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3153

•	850	Test and Evaluation: This task conducts T&E activities required to support BMDO architecture and system engineering functions by ensuring T&E is used to reduce acquisition risk and provide early and continuing estimates of system performance. It insures test planning, testing and analysis of test results are integral parts of the systems engineering process to meet objectives. This includes reviewing SEMPs and other Systems Engineering (SE) documentation, to verify T&E programs and documentation (TEMPs) are traceable and support the SE requirements verification process. These T&E activities will also include assessing testability of current and future BMD architectures and MD Lethality Program test and experiment support.
•	1600	System Planning: Activities develop missile defense system concept alternatives, linked to the evolution of the currently defined BMD system, for inclusion in the BMD Master Planning process. Specific task activities include assistance in defense threat characterizations (post-2010), identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative defense concepts, system needs definition for advanced technology programs, leadership of Joint Technology Board process, and technical assistance in developing Pre Milestone I OSD required documentation.
Total	15653	

FY 2001 Planned Program:

•	13566	System Engineering and Architecture Analysis: Support analyses for Current Systems/Architectures, development of advanced/future systems/architecture requirements, and develop and maintain engineering threat documentation. Conduct functional and physical analysis and related allocation in support of current and advanced/future systems/architectures. Perform risk analysis and mitigation/control activities, trade-off analysis, and conduct program reviews in support of architecture analysis and control function. Support BMDO corporate technical decision processes.
•	4300	Missile Defense Interoperability: Formulate policy and implement DoD and BMD interoperability requirements in support of the services and coalition partners. Conduct BMC3 activities, to address NATO, US/GE, and US/UK customer interoperability scenarios and issues. NATO analysis will include joint experiment planning and upgrade of Extended Air Defense Test Bed. US and United Kingdom interoperability efforts concentrates on multi-sensor tracking and fusion. BMC3 interoperability activities address DoD's mandated implementation of the Joint Technical Architecture. BMC3 Support includes technical analysis of allies capabilities and interfaces to TAMD, tracking and maintaining an allies capability inventory, support of BICAR and DISA, quick reaction suspense/document reviews, analysis of CINC interoperability shortfalls, and interoperability analysis of Service Systems/JPN/JDN/JCTN. Data Standardization support includes development of TMD/NMD information exchange requirements, support of common data definitions required for NMD/TMD, analysis of standardization of interfaces to external systems, support to NMD data process and Missile Defense Data groups, review of Service BMC3 documents, MD Data Element Crosswalk input development, Metadata analysis, and technical review of data packages from JTAMDO and NMD. BMC3 interoperability efforts also develop joint TMD Technical Architectures (DE/JTAMDO). Technical Architectures and related analysis will be developed for 2003 and 2010 timeframes.
•	1200	Test and Evaluation: Conduct BMDO level T&E functions to include BMD T&E policy development, T&E requirements special studies, MDAP program insight, and external T&E community coordination activities. BMDO T&E policy includes ensuring implementation of centralized/integrated T&E practices and resources. Special studies includes determining/investigating T&E needs and requirements and providing inputs to various T&E forums. Insight includes tracking of MDAP issues, T&E program documentation review and participation in T&E IPTs.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
	PROJECT 3153

- 3250 System Planning: Activities develop missile defense system concept alternatives, linked to the evolution of the currently defined BMD system, for inclusion in the BMD Master Planning process. Specific task activities include assistance in defense threat characterizations (post-2010), identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative defense concepts, system needs definition for advanced technology programs, leadership of Joint Technology Board process, and technical assistance in developing Pre Milestone I OSD required documentation.

Total 22316

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3352 Modeling and Simulation Core Capability PE 0603874C		45059	39585	27920	29379	26241	26512	26788	Continuing	Continuing
3354 Targets Development Core Capability PE 0603874C		1936	2300	49135	36211	38081	40260	40882	Continuing	Continuing
3360 Test Resources Core Capability PE 0603874C		41005	66237	69555	64211	54314	54375	54975	Continuing	Continuing

C. Acquisition Strategy: Systems analysis work in this project is contracted. For other JSAE efforts, expertise of Government, Federally Funded Research & Development Center (FFRDC), System Engineering and Integration Contractor (SEIC), and Scientific, Engineering and Technical Assistance (SETA) personnel are leveraged in the execution of project activities, using existing contracts to the maximum extent possible. Specifically, U.S. Army Space and Missile Defense Command (USASMDC) and USAF/Electronic Systems Center (ESC) Government and contractor personnel lead Information Architecture and development efforts; SETA and SEIC contracts provide the core of technical expertise for a variety of JSAE activities; and FFRDC contract vehicles provide state-of-the-art technical expertise in Software Engineering and related technical areas. Additional contractor services will be procured if needed to meet emerging program requirements.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Prepare Report to Congress on Utility of Sea-Based Assets to NMD	3Q	4Q	2Q					
Navy NMD Concept Definition			3Q	2Q, 4Q	2Q, 4Q			
Support Report to Congress on Asia-Pacific Threat		2Q						
BMD System Architecture Study		3Q	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
BMDO Corporate Lethality Plan		1Q						
Prepare JTA Annual Report		1Q	1Q	1Q	1Q	1Q	1Q	1Q
ASCIET US/UK Final Report			3Q					

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3153

Integrated Analysis Leadership Group (IALG)			Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
"Quick-Reaction" Analysis			Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
NATO BMC3 Analysis Final Report			4Q					
US/GE Analysis Final Report			4Q					
BMDO Annual Interoperability and Cap. Report			4Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3153

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3153

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.	CPAF	SPARTA		4540		5346		8215		TBD	18101	
b.	CPAF	CSC		4500		5260		6650		TBD	16410	
c.	CPFF	SRS		1200		0		0		TBD	1200	
d.	CPAF	Vanguard Research		1000		1105		3263		TBD	5368	
e.	Various	POET		4814		2942		4188		TBD	11944	
f.	Various	ISEG				1000					1000	
Subtotal Management Services:				16054		15653		22316			54023	

Remark:

Project Total Cost:				16054		15653		22316			54023	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3156	
COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3156 System Lethality	0	0	7950	11915	11906	19819	19800	Continuing	Continuing

A. Mission Description and Budget Item Justification

The BMDO Corporate Lethality Program focuses on the mission-kill definition of lethality. The project consists of four areas of interest: target response, agent/debris source term characterization, atmospheric transport and dispersion, and ground effects. To this end, the program executes a rigorous process of experimentation and analysis to support development of models themselves supporting the acquisition and operational deployment of ballistic missile defense (BMD) systems. A part of the System Engineering Directorate's Threat and Lethality efforts, the Corporate Lethality Program supports system engineering and operational analyses by utilizing the lethality community in several ways. These ways include performing sensitivity assessments of the current pool of lethality knowledge for BMD purposes, furthering corporate BMDO knowledge on the behavior of weapons of mass destruction (WMD) following intercept by a BMD system, supporting test and evaluation programs with lethality data assessments and uncertainty bounds, and executing future program budget decision requirements. The Corporate Lethality program will also support acquisition of the BMD major defense acquisition programs by providing top-level assessments of the system-level Test and Evaluation Master Plans, looking for completeness from a lethality perspective, and providing support to those test events capable of rendering lethality data products. In addition, the Corporate Lethality Program will work in collaboration with Allied governments to cooperatively enhance our understanding of the behavior of WMD in the appropriate flight regimes. Ultimately, the Corporate Lethality Program's efforts will help us better understand end-state deposition on the ground following a BMD system intercept.

Target Response – Provide the ability to understand and predict the dynamics of target impact response, for target structures and payloads, resulting from intercepts by hit-to-kill (HTK), HTK alternatives, and directed energy weapons. Provide the ability to assess the success of the intercept, and type of warhead intercepted.

Agent/Debris Source Term Characterization – Provide the capability to characterize and predict the formation of target debris and agent release, as source terms for transport and dispersion resulting from the intercept of a target by HTK, HTK alternatives, or directed energy weapons.

Transport and Dispersion – Provide the capability to characterize and predict the transport and dispersion of intercept debris and agent released following the intercept of a target by HTK, HTK alternatives, or directed energy weapons. Also, characterize the environmental effects on the released agent and impact.

Intercept Effects and Consequences – Provide data to bound the effects of the intercept on operational capabilities, defended assets, and identify potential collateral consequences.

Note: This project, beginning in FY01, consolidates both the corporate BMDO lethality studies currently located in multiple Program Elements and post-engagement lethality work conducted by the BMDO MDAPs.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
	PROJECT 3156

FY 1999 Accomplishments:

Total 0 Program starts in FY2001

FY 2000 Planned Program:

Total 0 Program starts in FY2001

FY 2001 Planned Program:

- 2450 Target Response:
  Light gas gun (LGG) tests at high velocity with computational support, hydrocode benchmarking for high-speed impacts (and continuing PLATE-like activities), and analysis for Parametric Endo_ExoLethality Simulation (PEELS) validation and accreditation. Define criteria for hydrocode predictions of damage to thin-walled canisters and bomblets, laser tests to simulate aerothermal effects on submunitions, and Red-Team effort to prevent/reduce aerothermal demise of canisters and bomblets.
- 1490 Agent/Debris Source Term Characterization:
  Laboratory studies of high-strain-rate fluid expansion and breakup, measurements of agent EOS and stability against shock loading, and follow-on model development and computational support.
- 3570 Atmospheric Transport and Dispersion:
  Extend data for fluid breakup in rapid air streams, measure agent physical and thermodynamic properties and computational support, chemistry studies of agent stability at high altitudes, T&D sensitivity analyses with HPAC and/or VLSTRACK, and follow-on model development and computational support.
- 440 Ground Effects:
  Evaluate sensor requirements and capabilities to assess post-impact damage and warhead type, apply sensor technologies to ongoing tests, and develop and apply models for signature generation. Establish cooperative efforts between ground consequences community and provide necessary BMD-related source term information for incorporation to their predictive tools.

Total 7950

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
1266 Navy Theater Wide, PE 0603868C		4183	2188	6619						12990
2257 Patriot (PAC-3), PE 0604865C		3226								3226
2260 THAAD (Dem/Val), PE 0603861C		5198	6638							11836
2260 THAAD (EMD), PE 0604861C				10346						10346
2263 Navy Area, PE 0604867C		5822								5822
2410 NMD Test & Evaluation, PE 0603871C		6000	10893							16893`
3359 System Test and Evaluation, PE 0603871C										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603874C BMD Technical Operations						PROJECT 3156	
3359 System Test and Evaluation, PE 0603872C		3966	10816							14782
Note: Funding reflects lethality efforts only.										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3156

C. Acquisition Strategy:

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Begin Full Implementation of Program			1Q				
Corporate Lethality Plan Update			4Q	4Q	4Q	4Q	4Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3156

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Lethality Analysis	Various	Multiple				7950			7950	7950
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:						7950			7950	7950

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3156

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										

Remark:

Project Total Cost:						7950			7950	7950

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3352	
COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3352 Modelling and Simulation	46226	39585	27920	29379	26241	26512	26788	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project ensures timely availability of reliable, cooperative, and cost-effective BMDO and Service-provided Modeling Simulation, & Networks (MS&N) tools and capabilities responsive to BMDO requirements. This project provides for the program management, planning, coordination, and technical oversight of system level M&S for the Joint Theater Air and Missile Defense (JTAMD) and the National Missile Defense (NMD) Deployment Readiness Programs. This cost effective approach reduces the high cost of missile test programs and generates the information needed to make timely and informed operational, requirements, performance, design/cost/risk tradeoffs, mitigation and resource allocation decisions.

MS&N programs funded by this project include: Wargame 2000, M&S Support, M&S Acquisition Strategy/Investment Plan, Mission Oriented Information Technology Resources (ITR), the BMD Simulation Support Center (BMD SSC), and the infrastructure portion of the Advanced Research Center/Simulation Center (ARC/SC).

Wargame 2000 is being developed as a BMD simulation to run wargames and exercises at the JNTF for the next 10 years. The requirements are to: design the simulation using an object oriented paradigm, enable "plug and play" of TMD and NMD models, facilitate integrating (BMDO's JNTF) internal and external elements into a flexible real-time simulation suite, incorporate more realistic C2 displays, enhance wargaming productivity and responsiveness, and provide for multi-level security.

The BMD SSC will store M&S tools which are joint, global and possess multi-level fidelity. The BMD SSC seamlessly links existing and planned simulations of C4I networks, platforms and weapon systems. This activity also includes the operation and maintenance of centralized M&S catalogs of databases that identify current and developing BMDO simulation tools. BMD SSC has been designated as the BMDO Node for models, simulations, and data on the Defense Modeling and Simulation (DMSO) Resource Repository (MSRR).

This project also provides acquisition and support services for the design, development, modernization, and control of BMDO Mission Oriented ITR. The objective for this program is to provide responsive ITR support and services via a flexible, responsive architecture to satisfy validated current and projected user ITR requirements. Specific tasks include processing of Mission Oriented ITR-related service requests, conducting the Mission Oriented ITR Working Group and supporting BMDO Chief Information Officer (CIO) initiatives such as the drafting and implementation of the mission oriented portions of the BMDO Strategic Information Management Plan and BMDO Five Year Information Resources Management Plan (FYIRMP). This project is also responsible for the identification and support of High Performance Computing requirements.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3352

M&S activities also funded by this project include: development, enhancement, and maintenance of the theater test beds and conduct of wargames that provide the analysis, integration, demonstration, and performance verification for TMD systems. It ensures joint usage of simulation tool resources and supports allied and friendly international participation and cooperation in wargaming exercises. This project focuses M&S support in four primary areas: assessments, development/modification, computer architectures/networks, and program management for BMDO and Service M&S programs.

Design and develop a distributed HWIL Testbed linking the Ground Based Radar Simulation (GBRSIM) at the Advanced Research Center (ARC) with the AMCOM THAAD infrared HWIL facilities in Huntsville, AL. In a parallel effort, connect AMCOM AIT (optical) and SMDC ARC (radar) HWIL connectivity for real-time information fusion analysis and algorithm development and design a Next Generation Internet/Virtual Private Network (NGI/VPN)-based geographically distributed network for the Navy Theater Wide (NTW) program. This NGI/VPN capability will link the Raytheon Standard Missile Block III infrared HWIL/SIL facility in Tucson, AZ, with the AEGIS Combat System Engineering Development Site (CSEDS) in Moorestown, NJ. The NGI/VPN technology will support high bandwidth communications over NGI networks, such as Internet 2, while providing the quality of service and security features that allow use of public networks for sensitive applications.

This project is conducted in accordance with DoDD 5000.59, DoD Modeling and Simulation (M&S) Management.

FY 1999 Accomplishments:

- 14724 Provided high performance computing resources at the ARC/SC which operates a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation, the Theater High Altitude Area Defense System (THAAD) Test Bed, and the Integrated System Test Capability (ISTC). The ARC also supports development of the Ground–Based Radar (GBR), ISTC, and NMD Joint Program Office. Major areas of support included maintenance, modification, and enhancement of/to: Computational Fluid Dynamics (CFD) analysis; COEA of TMD systems; technical base analysis; concept studies; and alternative trade-off analysis.
- 2860 Provided Army project personnel and support funding for the ARC/SC.
- 3270 Provided BMDO M&S support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. This area included funding for Service M&S activities. Top priorities included: the BMDO M&S Strategic Plan; Wargame 2000; BMD SSC; Modeling and Simulation Working Group (MSWG) management; execution of MSWG action plans; and model assessments/evaluations.
- 780 Continued to support BMDO's Mission Oriented ITR. Priorities included: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations; implementation of new technology to support multimedia applications; and replacement of obsolete computational resources.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3352

•	12674	Provided JNTF Project funding to support continued development of Wargame 2000 and BMD SSC. The Wargame 2000 program continued to design and develop a "world-class" simulation tool for use in support of CinC wargames and exercises. Wargame 2000 tests operational concepts involving Theater Air and National Missile Defense. Funding supported an NMD Initial Operational Capability (IOC), Block 10 Demo, integration with BMC3, initial TMD capability development, and an NMD C2SIM 99 with Block 20. The BMD SSC continued to support TMD and NMD in the following areas: assisted in software development process improvement for M&S, developed processes for testing and improving models and algorithms; incorporated new web technologies into the BMD SSC, and updated the TMD, NMD and Building Block M&S catalogs/repositories. Provided on-line query capabilities using BMDO Core M&S and interconnected with Defense Modeling and Simulation Office (DMSO) Modeling and Simulation Resource Repository (MSRR) as an official DoD Node.
•	11918	Provided funding to the BMDO Data Centers Program to archive, manage, develop data products, distribute and provide remote access to all relevant BMD data. Specific priorities included: Advanced Missile Signature Center (AMSC) – provided NMD Family of Systems (FoS), Cruise Missile Defense, Boost Phase Interceptor, and Midcourse Space Experiment (MSX) programs data management support, and developed and implemented Virtual Data Center (VDC): Backgrounds Center of Expertise (BCoE) –interoperability and integration, program data management support; the BCoE also provided primary development effort for the VDC. Missile Defense Data Center (MDDC) – provided Theater Air and Missile Defense (TAMD) and NMD FoS, NMD Ground Based Interceptor (GBI), Ground Based Sensors (GBS) and other data management support, developed and implemented VDC; BMD SSC – provided Optic Cobra, Theatre Missile Defense System Exerciser (TMDSE), System Integrated Test (SIT) –98, SIT-99 Wargame 2000, Extended Air Defense Test Bed (EADTB), NMD Data Management support, and developed and implemented the VDC network.
Total	46226	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3352

FY 2000 Planned Program:

- 13360 Provide high performance computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation, and the Integrated System Test Capability (ISTC). The ARC also supports development of the Ground –Based Radar (GBR), ISTC, and NMD Joint Program Office Support. Major areas of support include maintenance, modification, and enhancements of/to: Computational Fluid Dynamics (CFD) analysis; COEA of TMD systems; concept studies; and alternative trade-off analysis.
- 2622 Provide funding for Army salaries in support of the ARC/SC.
- 5235 Provide BMDO M&S support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. This area also includes funding for Service M&S activities. Top priorities include: the BMDO M & S Acquisition Strategy and Investment Plan; Wargame 2000; BMD SSC; Modeling and Simulation Working Group (MSWG) management; execution of MSWG action plans; and model assessments/evaluations.
- 1728 Continue to support BMDO's Mission Oriented ITR. Priorities include: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations and computationally intensive analyses; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs; and support the drafting and execution of BMDO Strategic Information Management Plan and FYIRMP.
- 9378 Provide JNTF Project funding to support continued development of Wargame 2000. The Wargame 2000 program will continue to design and develop a "world-class" simulation tool for use in support of CINC wargames and exercises testing operational concepts involving Theater Air and National Missile Defense. Funding will involve development to support a Wargame 2000 Theater Air and Missile Defense (TAMD) demonstration exercise and a NMD Follow-on capability (FOC). Continue to incorporate new web technology into the BMD SSC, as well as continue the population and refinement of M&S catalogs/repositories. Continue to refine and update on-line query capabilities of both unclassified and classified information. Assist and improve DoD support to the DMSO MSRR.
- 7262 Design and develop a distributed HWIL Testbed linking the Ground Based Radar Simulation (GBRSIM) at the Advanced Research Center (ARC) with the AMCOM THAAD infrared HWIL facilities in Huntsville, AL. In parallel effort, connect AMCOM AIT (optical) and SMDC ARC (radar) HWIL connectivity for real-time information fusion analysis and algorithm development and design a Next Generation Internet/Virtual Private Network (NGI/VPN)-based geographically distributed network for the Navy Theater Wide (NTW) program. This NGI/VPN capability will link the Raytheon Standard Missile Block III infrared HWIL/SIL facility in Tucson, AZ, with the Moorestown, NJ, NJ AEGIS Combat System Engineering Development Site (CSEDS). The NGI/VPN technology will support high bandwidth communications over NGI networks, such as Internet 2, while providing the quality of service and security features that allow use of public networks for sensitive applications.

Total 39585

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3352

FY 2001 Planned Program:

- 11926 Provide high performance computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation, and the Integrated System Test Capability (ISTC). The ARC also supports development of the Ground –Based Radar (GBR), ISTC, and NMD Joint Program Office Support. Major areas of support include maintenance, modification, and enhancements of/to: Computational Fluid Dynamics (CFD) analysis; COEA of TMD systems; concept studies; and alternative trade-off analysis.
- 1532 Provide funding for Army salaries in support of the ARC/SC.
- 3705 Provide BMDO M&S support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. This area also includes funding for Service M&S activities. Top priorities include: the BMDO M&S Investment Plan; Wargame 2000; BMD SSC; MSWG management; execution of MSWG action plans; and model assessments/evaluations.
- 3523 Continue to support BMDO's Mission Oriented ITR. Priorities include: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations and computationally intensive analyses; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs; and updates to and execution of the FYIRMP.
- 7234 Provide JNTF Project funding to support continued development of Wargame 2000. The Wargame 2000 program will continue to design and develop a "world-class" simulation tool for use in support of CINC wargames and exercises testing operational concepts involving Theater Air and National Missile Defense. Continue to incorporate new WEB technology into the BMD SSC, as well as continue the population and refinement of M&S catalogs/repositories. Continue to refine and update on-line query capabilities of both unclassified and classified information. Assist and improve DoD support to the DMSO MSRR.

Total 27920

B. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2400, Modeling and Simulation, PE 0603871C	700	0	0	0	0	0	0	CONT.	CONT.
3352, Modeling and Simulation, PE 0603872C	16539	0	0	0	0	0	0	CONT.	CONT.

C. Acquisition Strategy:

The work in this project is sourced through full and open competition. Primary M&S support is performed at the JNTF, ARC/SC, MDDC, AMSC, BCE, BMD SSC and other test bed facilities. The ARC/SC contractor operates under a Cost Plus Fixed Fee (CPFF) contract first awarded in June of 1989.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3352

D. Schedule Profile	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
BMDSSC Version Release (Unclassified)	1Q – 4Q	1Q – 4Q	1Q – 4Q	1Q – 4Q	1Q – 4Q	1Q – 4Q
Wargame 2000 Integration with BMC3	1Q					
M-O FYIRMP	4Q	4Q	4Q			
BMD SSC Version Release (Classified)	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q
99A C2SIM with Wargame 2000	1Q					
Wargame 2000 TAMD IOC	3Q					
Wargame 2000 TAMD FOC		4Q				
M & S Acquisition Strategy	1Q					
M & S Investment Plan	2Q	2Q	2Q	2Q	2Q	2Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3352

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ARC Infrastructure	SS/CPFF	Colsa Corporation (HSV)	9037	9831		8943		TBD	27811	
b. Simulation Center Infrastructure	C/CPFF	Madison Research (HSV)	4520	3528		2983		TBD	11031	
c. WG2K Software Dvlpmt, Rqmt Analysis, System Engineering and design test	C/CPAF	TRW (JNTF)	12674	9378		7234		TBD	29286	
d. Services M&S			0	462		0		TBD	462	
e. BMDO Data Centers			11918						11918	
f. Mission Oriented ITR			780	1728		3523			6031	
g. Bandwidth Infrastructure				7261					7261	
Subtotal Product Development:			38929	32188		22683			93800	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Support Costs:										

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3352

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army Salaries		Huntsville	2860	2624		1532		TBD	7016	
b. BMDO M&S Management			3270	4773		3705		TBD	11748	
c.										
d.										
e.										
f.										
Subtotal Management Services:			6130	7397		5237			18764	

Remark:

Project Total Cost:			45059	39585		27920			112564	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3353

COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3353 JNTF	57211	55632	54741	52672	53942	58619	59961	Continuing	Continuing

* The funding in this project for FY99-03 was transferred from PEs 0603871C and 0603872C. See those R2s for FY96-98 funding.

A. Mission Description and Budget Item Justification

This project provides core funding for the Joint National Test Facility (JNTF) for the Ballistic Missile Defense Organization's (BMDO) joint missile defense modeling, simulation, and test center of excellence whose focus is the joint inter-service, interoperability, and integration aspects of missile defense system acquisition. It is staffed by all of the Services. The JNTF is the BMDO's level playing field for the resolution of missile defense issues which cut across Service interfaces. The JNTF conducts human-in-the-loop missile defense wargaming for concept of operations (CONOPS) exploration and development. The JNTF also provides simulation, communication connectivity and other assets in support of BMDO- and CINC-sponsored theater missile defense exercises. The JNTF is the site at which increments of the National Missile Defense (NMD) Battle Management/Command, Control, and Communications (BMC3) capability are hosted. Test planning, implementation and analysis for both NMD and Theater Missile Defense (TMD) are conducted at the JNTF. The JNTF performs interoperability tests among the major TMD components. Ballistic Missile Defense (BMD) system-level analysis of missile defense issues are conducted here. The JNTF also performs studies and analysis in support of joint missile defense and provides inter-service computational capabilities and wide area network communication networks with Service facilities. The JNTF provides the missile defense community a data center to support their work and manages the BMDO Data Centers program.

FY 1999 Accomplishments:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations
	PROJECT: 3353

•	57211	The JNTF conducted a TMD interoperability test and subsequent analysis in the second quarter. This test gave clear indications of interoperability problems that needed to be addressed by the various systems involved. Preparations were made and dry runs conducted for an expanded test that was to occur in the first quarter of FY00. A BMDO data center was established at the JNTF. The JNTF developed and delivered the first version of a new wargaming model, *Wargame 2000*, that will provide increased capability to NMD Command & Control (C2) simulations and TMD wargames. It incorporated an object oriented parallel discrete event simulation architecture which will allow distributive processing giving more throughput with smaller less expensive computers. It supplies near realtime access to the wargame database which provides more game realism. This model will be the only tool to provide support to the NMD Deployment Readiness Review in the summer of CY00. The JNTF supported 25 CINC exercises with missile defense inputs through the Missile Defense and Space Tool. They also conducted Y2K testing for BMDO HQ and JNTF computer systems. Conducted a JTAMD table-top demonstration for the warfighter community. Began planning for a joint US/Russian Federation wargame to take place in FY00. Conducted Passive Defense Early Warning Analysis for the Joint Theater and Air Missile Defense (JTAMD) Organization Technical Director in support of their Joint Mission Area Assessment. Employed the JNTF's capability to compare and contrast various approaches to fusing data for NMD and TAMD functions which contributed to the Joint Composite Tracking Network algorithm benchmarking effort. Began conducting a verification and validation of the TMDSE TADIL J Communication Emulation Segment. Conducted a successful V&V of the Upgraded Early Warning Radar representation for NMD tests IGT-3, IGT-4 and IGT-5. The JNTF became one of only 15 high-performance computing distributing centers in the U.S. This provides high-end computational resources for the entire DoD community. This capability allowed the acceleration of the *Wargame 2000* development. Obsolete servers and workstations support the analysis mission area were upgraded. Began implementation of an off-line network testing capability to support technology insertion, proof of concept validation, training, and disaster recovery.
Total	57211	

FY 2000 Planned Program:

•	24314	Provide a core capability of technical expertise that makes the JNTF the center of excellence in missile defense acquisition support and allows for fast response on new tasking. Conduct two major TMD Hardware-in-the-Loop interoperability tests with analysis reports, and accomplish all preparations for a third test that will be conducted in 1QFY01. Continue to update the Theater Missile Defense System Exerciser (TMDSE) that provides a test platform for BMDO-sponsored Hardware in the Loop Tests (HWILTs). Provide analysis expertise to address BMD issues across the entire development and operational spectrum. Provide command and control simulations for TMD and NMD for joint CONOPS development, and missile defense system simulations to CINC exercises. Utilize *Wargame 2000* to accomplish a major TMD simulation to test CONOPS. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide BMDO Data Centers to store, archive, manage, develop and distribute data products, and provide remote access to all relevant BMD science and technical data/information from experiments, tests, demonstrations, wargames, simulations, model executions, joint effectiveness analyses, and evaluations.
•	2023	Modernize and upgrade information resource technology base to maintain the JNTF as a state-of-the-art facility to support joint modeling and simulation, and distributed testing. Begin Wide Area Network (WAN) upgrade to support distributed testing without expensive dedicated communication lines. Provide software process improvement for modeling and simulation, develop processes for testing and improving models and algorithms. Implement facility modernization to support the technology base.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3353

•	29295	Provide operations support of network, computer hardware, software, and communication procurement, installation, and maintenance, leased communication lines, systems engineering, security (both personnel and equipment), facility maintenance, government civilian pay, advisory and assistance service to the government, and contractor management services essential to missile defense acquisition. (Note: This area also supports $23M of mission work from other BMDO PMAs.)
Total	55632	

FY 2001 Planned Program:

•	23273	Provide a core capability of technical expertise that makes the JNTF the center of excellence in missile defense acquisition support and allows for fast response on new tasking. Conduct two major TMD Hardware-in-the-Loop interoperability tests with analysis reports, and accomplish all preparations for a third test that will be conducted in 1QFY02. Continue to update the Theater Missile Defense System Exerciser (TMDSE) that provides a test platform for BMDO-sponsored Hardware in the Loop Tests (HWILT).Provide analysis expertise to address BMD issues across the entire development and operational spectrum. Provide command and control simulations for TMD and NMD for joint CONOPS development, and missile defense system simulations to CINC exercises. In addition to large C2 simulations, conduct 2-3 smaller simulations to support BMC3 procedure development. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide BMDO Data Centers to store, archive, manage, develop and distribute data products, and provide remote access to all relevant BMD science and technical data/information from experiments, tests, demonstrations, wargames, simulations, model executions, joint effectiveness analyses, and evaluations.
•	1576	Modernize and upgrade information resource technology base to maintain the JNTF as a state-of-the-art facility to support joint modeling and simulation, and distributed testing. Complete WAN upgrade. Provide software process improvement for modeling and simulation, develop processes for testing and improving models and algorithms. Implement facility modernization to support the technology base.
•	29892	Provide operations support of network, computer hardware, software, and communication procurement, installation, and maintenance, leased communication lines, systems engineering, security (both personnel and equipment), facility maintenance, government civilian pay, advisory and assistance service to the government, and contractor management services essential to missile defense acquisition. (Note: This operations support also supports mission work from other BMDO PMAs.)
Total	54741	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3353

B. Other Program Funding Summary*	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3352 Modeling & Simulation, PE 0603174C	15742	8274	8061	6666	4672	4765	4857		
2259 Israeli Cooperative Projs, 0603875C	405	178							
2404 BMC3, 0603871C	3820	4879							
2407 Systems Engineering, 0603871C	2089	4700							
3153 Systems Arch & Engineering, 0603874C	449								
3155 Sys Eng & Integration, 0603873C	95	47							
3261 TMD BM/C3I, 0603873C	2009	732	823	2530	867	1193	692		
3270 Threat And CM Program, 0603876C	3443	1974	2544	2527	2518	2557	2698		
3359 Test, Eval & Assessment, 0603873C	1307	2493	2683	2681	2679	27775	2871		
3360 Test Resources, 0603874C	276								
*Note: These dollars do not represent total project funding, but rather only related portion of budget funding									

C. Acquisition Strategy: The tasks in this project are met through full and open competition. The JNTF support contracts were awarded to Lockheed Martin, (Operations & Maintenance) and TRW (Research & Development), both contracts are Cost Plus Award Fee. In February 1999, the OMC and RDC was combined and referred to as the CRDC (Combined Research & Development Contract) with TRW being the prime contractor and Lockheed-Martin a subcontractor to TRW; cost reporting for FY99 was consolidated as CRDC. This contract will be re-competed in FY01 through full and open competition. Formal source selection procedures are envisioned with an estimated award date of 15 October 2001. Contracted Advisory & Assistance Services are provided by Vanguard Research as Cost Plus Award Fee. This contract will be re-competed as a technical and administrative assistance contract for the JNTF Government staff in FY00. Formal source selection procedures are envisioned with an estimated award date of 15 October 2000.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
TAMD/CINC Exercises	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
TAMD Wargame		4Q	2Q	3Q	3Q	3Q	3Q
BMD Workshop	3Q	2Q	2Q	2Q	2Q	2Q	2Q
Workstation Upgrade	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
C2 Simulation (NMD)	1Q	1&3Q	1&3Q	1&3Q	1&3Q	1&3Q	1&3Q
Interoperability Tests	2Q	1&2Q	1&2Q	1&2Q	1&2Q	1&2Q	1&2Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3353

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
b.										
c.										
d.										
e.										
f.										
Subtotal Product Development:										

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost FY99-01	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1. TRW	C/CPAF	JNTF	47919	41519		40762		Cont.	130200	
2. Vanguard Research	C/CPAF	JNTF	3855	3674		3278	1Q01	Cont.	10807	
3. JNTF	Government	JNTF	3971	4007	N/A	3924	N/A	Cont.	11902	
4. USN NRL	Government	JNTF	866	809	N/A	800	N/A	Cont.	2475	
5. LLNL	FFRDC	JNTF	600	300		300			1200	
6. SMDC	Government	SMDC, Huntsville Al		2365		2511	N/A	Cont.	4876	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3353

7. AEDC &AFRL	Government	AEDC, Arnold AFB TN; AFRL Hanscom AFB MA		1933		2106	N/A	Cont.	4039	
8. MITRE	FFRDC	JNTF		1025	N/A	1060	N/A	Cont.	2085	
Subtotal Support Costs:			57211	55632		54741			167584	

Remark:

The JNTF provides missile defense-related analysis, system level engineering, integration, and test and evaluation; supports the development of joint and combined missile defense doctrine, requirements, and CONOPS; and supports warfighting CINCs by conducting joint and combined simulations and wargames and participating in exercises. It accomplishes this mission by hosting BMDO projects, and non-BMDO customers who have synergy with missile defense, with space occupancy (facility O&M, security, utilities, transportation and handling, etc.), computers (O&M, networking, supplies and materials, customer service, licensing, installation, etc.), communications, modernization of computer equipment and software, facility modifications and enhancements, and product engineering support.

The JNTF focus is on interoperability testing. This involves conducting C2 simulations to develop and test CONOPS for missile defense, and conducting tests with all TMD missile defense systems connected to test their ability to work together in a theater defensive posture.

.

On 1 Feb 99 JNTF consolidated the Lockheed Martin O&M contract and the TRW R&D contract into a TRW Consolidated R&D Contract.

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										

Remark:

Project Total Cost:			57211	55632		54741			167584	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3354	
COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3354 Targets*	1936	2300	49135	36211	38081	40260	40882	Continuing	Continuing

* Funding for this project for FY01-05 contributed by PE 0603872C.

A. Mission Description and Budget Item Justification

This project maintains the Strategic Target System (STARS) motors, components and launch equipment and mission planning support for possible future use as a Theater Missile Defense (TMD) long range target or National Missile Defense (NMD) target.

Starting in FY01, this project will include core funding for targets and target related services needed to support the testing and evaluation of all TMD programs to include: Theater High –Altitude Area Defense (THAAD); PATRIOT Advanced Capability – 3 (PAC-3); Navy Area Defense (NAD); Navy Theater Wide (NTW) and the US Air Force Airborne Laser (ABL) programs. This project is a segment of the BMDO Consolidated Targets Program (CTP). The CTP mission is to provide threat representative ballistic missile target system support to interceptor and sensor development acquisition programs. Each target is tailored and configured to meet unique mission requirements for each test. This project will fund the development and demonstration of U.S.-built target systems and Foreign Military Acquisition targets to support TMD test and evaluation.

The THAAD program intends to use the Hera target system with planned launches at White Sands Missile Range (WSMR) including FT. Wingate Launch complex in New Mexico and from Wake Island into the Kwajalein Missile Range (KMR) impact area. The PAC-3 program will use Storm and Hera targets launched from WSMR and Wake Island. The Navy Area and Theater Defense programs will use Hera and other ground targets at WSMR and the Pacific Missile Range Facility (PMRF) (Barking Sands, Kauai, HI). This project is developing a short range (200-600 Km) air launch ballistic target and a long range (1000-3000 Km) air-launch target to satisfy the collective target requirements of PAC-3, THAAD, both Navy programs, and TMD Family of Systems (FoS) tests for multiple simultaneous engagements, multi-axis scenarios, and short range and long-range threat target presentations. THAAD and PAC-3 will use air-launched targets at KMR and the Navy will use air-launched targets at PMRF. The project is also developing threat representative reentry vehicles to simulate a set of baseline threats.

FY 1999 Accomplishments:

- 1936 Funds supported STARS target program.

Total 1936

FY 2000 Planned Program:

- 2300 Funds will be used to continue support of STARS target program.

Total 2300

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations
	PROJECT: 3354

FY 2001 Planned Program:

- 95 Provide maintenance for acquired Foreign Material Acquisition (FMA) targets.
- 2628 Provide government project personnel support.
- 16754 Provide booster hardware refurbishment, aging surveillance and static firings of booster assets.
- 8809 Continue development of Long Range Air Launched Target (LRALT) and Low Fidelity Test Target (LFTT).
- 11741 Provide technical support for target program operations.
- 6584 Continue Range and launch support.
- 2524 Provide verification and validation of TBD targets and sensor characterization of target payloads.

Total 49135

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	CONT	CONT
2260 THAAD, PE 0604861C		0	79462	549945	685168	789736	755134	591049	CONT	CONT
2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	CONT	CONT
1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	CONT	CONT
2263 NAVY AREA, PE 0604867C		241782	307274	274234	228596	85866	33293	29369	CONT	CONT
3354 TARGETS, PE 0603872C		17615	48056	0	0	0	0	0	CONT	CONT
3360 TEST RESOURCES, PE 0603872C		45846	13734	0	0	0	0	0	CONT	CONT
3360 TEST RESOURCES, PE 0603874C		41005	66237	69555	64211	54314	54375	54975	CONT	CONT

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3354

C. Acquisition Strategy:

The Hera and Storm target systems are being developed by the executing agent: U.S. Army Space and Missile Defense Command (USASMDC), Theater Targets Products Office (SMDC-TJ-TT) in Huntsville, AL. The Hera target system, developed by Coleman Aerospace Corporation (CAC) Orlando, FL is being procured with a contract for a quantity of 25 targets. Orbital Sciences Corporation (OSC) has delivered four Storm Maneuvering Tactical Target Vehicles (MTTV). Additional targets include the Lance target system and Foreign Material Acquisition. The development and demonstration of the air launch ballistic target system is being managed by USASMDC/TT&E office with the Air Force Space and Missile Command as the contracting agency. The Consolidated Theater Target Systems (CTTS) contract was awarded 27 February 1998 to CAC, OSC and Lockheed Martin Missile Systems (LMMS) to produce future theater targets. This contract provides increased flexibility to meet MDAP schedules and requirements. USASMDC will maintain STARS at a sustainment level to keep the knowledge base and components necessary to launch a STARS target in the future.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Navy Area			1-4Q	1&3Q	1Q		
Navy Theater			2-4Q	2Q	1-4Q		
THAAD							3-4Q
PAC-3			2Q				
ABL				4Q	3-4Q	2Q	
Others (Technology Programs)			2Q				

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3354

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
		USABMDC				46507	N/A		46507	
Subtotal Product Development:						46507			46507	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Support Costs:										

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Maintenance of System	Allot	USASMDC, Huntsville, AL	1936	2300	10/01/99	2628	10/01/99	TBD	6864	N/A
Subtotal Management Services:			1936	2300		2628	10/01/99		6864	

Remark:

Project Total Cost:			1936	2300		49135			53371	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3360

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
3360 Test Resources*	41005	66237	69555	64211	54314	54375	54975	Continuing	Continuing

* Funding for this project for FY01-05 contributed by PE 0603872C (Joint TMD).

A. Mission Description and Budget Item Justification

This project provides for BMDO planning, oversight and coordination of integrated test and evaluation facilities. The project includes inter-element as well as inter-service test and evaluation efforts, and provides for common ground test facilities, ranges and instrumentation. Project 3360 funds those test resources mutually supporting BMDO's National Missile Defense (NMD), Theater Missile Defense (TMD) and Technology programs. Individual BMDO programs pay only the direct costs associated with their specific testing efforts at these mission critical facilities.

The Technical Operations ground test facilities include:

Kinetic Kill Vehicle Hardware in the Loop Simulator (KHILS) at Eglin AFB in Fort Walton Beach, FL
AEDC Hypervelocity Wind Tunnel Number 9 (Tunnel 9) at White Oak, MD
Infrared and Blackbody Standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD.
Hypervelocity Ballistic Range G Light Gas Gun Von Karman Facilities (VKF) at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN
7V and 10V Space Chambers at AEDC, Tullahoma, TN
Portable Optical Sensor Testbed (POST) at Anaheim, CA
National Hover Test Facility (NHTF) at Edwards AFB, CA (Deleted "located" from this line)
(Last Line (APRF) Deleted)

The Technical Operations test range facilities include national ranges such as:

White Sands Missile Range (WSMR) in Las Cruces, NM including Ft. Wingate Launch Complex near Gallup, NM
Kwajalein Missile Range (KMR) in the central Pacific Ocean
Pacific Missile Range Facility (PMRF) and Kauai Test Facility (KTF) at Kauai, HI

The range instrumentation special test equipment, data collection assets, and range instrumentation include:

Airborne Surveillance Testbed (AST) IR data collection sensor and platform (previously managed within project 1155).
Mobile Range Safety System and Kwajalein Range Safety Control Center Upgrades
NP-3 Aircraft upgrade for remote area safety support.
Sea-Lite Beam Director (SLBD), based at White Sands Missile Range, Las Cruces, NM
Miscellaneous improvements to BMDO infrastructure and support systems

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
	PROJECT 3360

These ground test, range and instrumentation assets provide valuable risk reduction and test implementation capability in support of TMD and NMD test and evaluation. The ground test facilities provide a cost-effective method of testing and evaluating applicable component, sub-system and system level technologies. The common range facilities provide a cost-effective method of flight testing missile and target components applicable to the BMD program and TMD Family of Systems (FoS), BMC^3 and interoperability testing. The range instrumentation provides a cost-effective capability to collect missile characteristics, phenomenology data, and target/interceptor diagnostics on flight tests. It also provides for the living quarters for personnel supporting test programs at USAKA. These facilities and capabilities support systems design, verification and validation of target realism, and the evaluation of test results.

Starting in FY00, this program element and project also provides environmental program guidance, environmental impact analyses and documentation, real property facility siting, acquisition, and facility operational support for the Ballistic Missile Defense Organization (BMDO) Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. This project plans, programs, budgets, and oversees facility acquisition through the Military Construction (MILCON) and RDT&E construction programs. This project provides guidance and supports BMDO TMD, NMD, and Advanced Technology Environmental Safety and Health (ESH) Programs, including the Environmental Assessment and Environmental Impact Statement process, environmental compliance, pollution prevention, and other environmental efforts. (For FY99, these environmental, siting and facility support activities are funded in this project under PE 0603872C, Joint TMD - DEM/VAL. For FY98 and prior, these activities were managed through project 3157 within the Joint TMD PE.)

FY 1999 Accomplishments:

•	7090	Provided ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 to support NMD, TMD and AIT; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G; upgrades at KHILS to support TMD, AIT and NMD interceptor kill vehicle testing, and primary IR standards, black body and optical materials, calibrations at the NIST to support other BMDO facilities. Supported THAAD flight test anomaly investigation and objective window testing at Tunnel 9.
•	11106	Provided for operation and maintenance at Meck Island, core support of the Kwajelein Missile Range Safety System (KMRSS), improvement and modernization of Range Control Safety System (RCSS), technical support at Wake Island, and collection & analysis of data by MIT/LL, as well as PMRF general support and test planning.
•	5152	Provided for upgrades to NP-3 aircraft, maintenance of launch facilities at White Sands Missile Range (WSMR), as well as other general range support.
•	15829	Provided AST core-operating costs to collect optical data of BMDO development flights, target development flights and flight test intercepts.
•	1828	Provided technical support for Resource activities by the Executing Agent and at BMDO.
Total	41005	

FY 2000 Planned Program:

•	13462	Provide ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 and AOEC; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G/VKF; primary IR standards, black body and optical materials, calibrations at the NIST; Integrated kill vehicle testing at NHTF; capability for sled track maintenance and upkeep at HHSTT; upgrades at KHILS to support TMD, AIT and NMD interceptor kill vehicle testing; and IR testing at the POST facility.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360

•	1997	Provide test range planning and range instrumentation support, maintenance and upgrades. Includes all efforts associated with integrating the Ballistic Target Program with National Range activities, MDAP customers, BMDO, and National Laboratories. Includes all efforts associated with direct target launch mission support, efforts associated with target launch logistics support, development and coordination of all required Universal Documentation System inputs, and efforts associated with target launch site development at the various National Ranges.
•	19195	Support continuing Navy Area and Theater-Wide Programs TBMD risk reduction at-sea testing and infrastructure improvements at PMRF. Provides support to SLBD, an infrared optical data collection, data recording/reduction, and data analysis and reporting system. Provides maintenance of the physical plant, the technical systems and the compliance posture of the Kauai Test Facility. Supports risk reduction activities for Navy Area Defense (NAD) and Navy Theater Wide (NTW) testing, by implementing additional upgrades and improvements to the radar instrumentation, range data display system, telemetry instrumentation, a scenario planning tool, and advanced electro-optical sensor technology at PMRF.
•	1920	Provide for White Sands Missile Range (WSMR) general support to BMDO and provides for the maintenance and care of launch facilities which support BMD testing. Contracts with land owners for the use of their land. Provides White Sands technical support to BMDO to conduct studies as needed, to respond to tasking as requested, and to provide manpower support to BMDO in the Washington, D.C. area.
•	9608	Provide range services, upgrades, and repairs in support of BMD testing at Kwajalein Missile Range. Provides caretaker activities to maintain Meck Island facilities and a composite mobile range safety system, configured on a mobile sea platform/ship, to manage overall flight safety (USS Worthy/Kwajalein Mobile Range Safety System). Provides the KMR Wake Island maintenance, development and integration of core technical support capabilities. Continues a multiyear effort to upgrade the Range Safety Control Center for Multiple Simultaneous Engagements and to replace the underground communications cable on the islands of Kwajalein, Roi Namur and Meck.
•	16230	Provide O&M core funding to keep the AST Program team intact and the system operational in order to support customer-funded TMD and NMD live fire tests at various ballistic missile test ranges, worldwide. Perform collection and analysis of requirements for external (non-range) sensor platforms to support MDAP test and evaluation data collection needs.
•	1040	Integrate ESH considerations into BMDO weapon systems acquisition life cycle; to reduce overall risk and costs, while enhancing the human environment and systems' performance. ESH analyses are accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas are: 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials management, and 5) pollution prevention. Work continues on environmental analyses for National Missile Defense (NMD), Medium Extended Air Defense System (MEADS), and Advanced Interceptor Technology (AIT). Work also continues on new BMDO requirements as well as on Space Based Laser (SBL), Navy Area, Navy Theater Wide, THAAD and PAC-3 systems.
•	1494	Ensure the FY99-01 MILCON, Minor MILCON, and RDT&E design and construction activities are executed in time to support BMD programs' facility requirements and ensures compliance with all applicable laws and regulations. The design emphasis will be on completing design for the National Missile Defense (NMD) facility requirements in preparation for the Deployment Readiness Review and design for TMD systems. Provides for TMD and NMD test and evaluation facilities improvements to support increasingly complex test scenarios.
•	1291	Provide technical support for Resource activities by the Executing Agent and at BMDO.
Total	66237	

FY 2001 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360

•	18830	Provide ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 and AOEC; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G/VKF; and primary IR standards, black body and optical materials, calibrations at the NIST. Provide ground test facility infrastructure and upgrades for BMDO testing at KHILS to support endgame HWIL testing at integrated IR sensors systems including THAAD, AIT, NMD, and Navy Theater Wide TBMD.
•	3150	Provide test range planning and range instrumentation support, maintenance and upgrades; includes all efforts associated with integrating the Ballistic Target Program with National Range activities, MDAP customers, BMDO, and National Laboratories. Includes all efforts associated with direct target launch mission support, efforts associated with target launch logistics support, development and coordination of all required Universal Documentation System inputs, and efforts associated with target launch site development at the various National Ranges.
•	4590	Support continuing Navy Area and Theater-Wide Programs TBMD risk reduction at-sea testing. Provides support to SLBD, an infrared optical data collection, data recording/reduction, and data analysis and reporting system. Provides maintenance of the physical plant, the technical systems and the compliance posture of the Kauai Test Facility.
•	1976	Provides for White Sands Missile Range (WSMR) general support to BMDO and provides for the maintenance and care of launch facilities which support BMD testing. Contracts with land owners for the use of their land. Provides White Sands technical support to BMDO to conduct studies as needed, to respond to tasking as requested, and to provide manpower support to BMDO in the Washington, D.C. area.
•	6200	Provide for the caretaker activities to maintain Wake Island facilities for BMD target launch operations. Provides lease of Defense Information Systems Agency provided relay satellite bandwidth and the receiver earth station at Hickam AFB, Hawaii. Provides for the payment of shipments to and from Wake Island via air and sea. Provides fuel purchases. Provides environmental compliance for Wake Island.
•	9830	Provide range services, upgrades, and repairs in support of BMD testing at Kwajalein Missile Range. Provides caretaker activities to maintain Meck Island facilities and a composite mobile range safety system, configured on a mobile sea platform/ship, to manage overall flight safety. Provides the KMR Wake Island maintenance, development and integration of core technical support capabilities. Continues a multiyear effort to replace the underground communications cable on the islands of Kwajalein, Roi Namur and Meck.
•	16269	Provide O&M core funding to keep the AST Program team intact and the system operational in order to support customer-funded TMD and NMD live fire tests at various ballistic missile test ranges, worldwide. Perform collection and analysis of requirements for external (non-range) sensor platforms to support MDAP test and evaluation data collection needs.
•	5000	Provide core funding to perform all activities required to maintain a mission-ready optical data collection test asset (HALO/IRIS) to support TMD/NMD data collection missions required/requested by BMDO, MDAPs, and other Programs/Projects.
•	1024	Integrate ESH considerations into BMDO weapon systems acquisition life cycle; to reduce overall risk and costs, while enhancing the human environment and systems' performance. ESH analyses are accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas are 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials, and 5) pollution prevention. Work continues on new BMDO requirements as well as on NMD, Space Based Laser (SBL), Navy Area, Navy Theater Wide, MEADS, THAAD and PAC-3 systems to meet their requirements.
•	1515	Ensure the FY01-03 MILCON, Minor MILCON, and RDT&E design and construction activities are executed in time to support BMD programs' facility requirements and ensures compliance with all applicable laws and regulations. Support NMD design and construction requirements. Support the design and construction of facilities to test and field ballistic missile defense systems such as Space Based Laser (SBL), THAAD, PAC-3, Navy Area, and Navy Theater Wide.

- 1171 Provide technical support for Resource activities by the Executing Agent and at BMDO.

Total 69555

B. Other Program Funding Summary		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2257 PATRIOT, PE 0604865C		237345	179139	81016	0	0	0	0	Cont.	Cont.
2260 THAAD, PE 0604861C		0	79462	549945	685168	789736	755134	591049	Cont.	Cont.
2260 THAAD, PE 0603861C		429266	523525	0	0	0	0	0	Cont.	Cont.
1266 NAVY THEATER WIDE, PE 0603868C		364284	375764	382671	287274	214301	246657	429674	Cont.	Cont.
2263 NAVY AREA, 0604867C		241782	307274	274234	228596	85866	33293	29369	Cont.	Cont.
3354 TARGETS, PE 0603874C		1936	2300	49135	36211	38081	40260	40882	Cont.	Cont.
3354 TARGETS, PE 0603872C		17615	48056	0	0	0	0	0	TBD	TBD
3360 TEST RESOURCES, PE 0603871C		1680	494	474	470	466	476	486	Cont.	Cont.
3360 TEST RESOURCES, PE 0603872C		45846	13734	0	0	0	0	0	TBD	TBD
3360 MILCON Planning & Design, PE 0603872C		331	0	0	0	0	0	0	TBD	TBD
3360 Minor MILCON, PE 0603874C		0	1248	1694	2609	2709	2755	2778	Cont.	Cont.
3360 MILCON Planning & Design, PE 0603874C		0	124	229	240	241	850	850	Cont.	Cont.
2400 NMD MILCON Planning & Design, PE 0603871C		9669	15000	14500	0	0	0	0	TBD	TBD
2400 NMD Minor MILCON, PE 0603871C		0	0	2000	2000	2000	2000	2000	Cont.	Cont.
2400 NMD MILCON, PE 0603871C		0	0	85095	189940	124450	36350	15300	Cont.	Cont.
2400 NMD, PE 0603871C		1638798	934859	1798626	998667	875916	680107	649009	Cont.	Cont.

C. Acquisition Strategy:

BMDO tasks the Services through Program Management Agreements to perform the required tasks in support of the BMD program and performs quarterly reviews to verify and validate completed tasks.

In providing range and test facilities support to the MDAP Program managers, as well as, technical assistance concerning facilities construction, siting, and environmental activities, BMDO implements a Reliance Process which:

- Maintains perspective of national technical test capabilities relative to all BMD developmental programs,
- Responds to MDAP program requirements,
- Makes maximum use of existing test resources where possible,
- Requires full coordination prior to development of new resources,

- Consolidates management of existing resources where possible and practical.

This process is executed through a variety of acquisition methods. Executing Agent Project Managers for the elements and tasks under this project include the three military services and the BMDO. Service Project Manager organizations specifically include the:

- U.S. Army Space and Missile Defense Command (USASMDC)
- U.S. Air Force Materiel Command
- U.S. Navy Office of Naval Research
- Navy Program Executive Officer (Theater Air Defense)
- U.S. Air Force Research Laboratory
- U.S. Army Corps of Engineers,
- and the U.S. Army Program Executive Officer-Missile Defense.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
KHILS – DITP (Quantum Well, Integration Tests)		1-4Q	1-4Q				
KHILS – DTRA (Nuclear Requirements)		1-4Q	1-4Q	1-4Q			
KHILS – BPI (System Studies)		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	
KHILS – Target VV&A		1-2Q					
7V/10V – GBI: BNA		1-4Q					
7V/10V – GBI: Raytheon		1-4Q					
Tunnel 9 – THAAD Support			1-4Q	1-4Q			
Tunnel 9 – Arrow Support		1-4Q	1-4Q	1-4Q			
Tunnel 9 – NMD		1-4Q	1-4Q				
Tunnel 9 – Phenomenolgy Support		1-4Q					
Tunnel 9 – Navy Lower Tier Support		1-4Q	1-4Q	1-4Q			
Range G – NMD		2-4Q		1-4Q			
Range G – Navy Theater TBMD		1-4Q	1-4Q				
Range G – Phenomenology Impact		1-2Q					
Range G – THAAD		2-4Q					
RCSS Operational Capability		3Q					
NIST – 7V/10V, EKV SM-3, SBIRS (Blackbody Calibration)		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
NIST – SM-2, THAAD, EKV, NraD (Emissisivity)				1-4Q	1-4Q	1-4Q	1-4Q
KMR TCMP Launch			2Q				

		DATE
		February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603874C BMD Technical Operations**

WSMR Navy SM2-Blk IV Testing		4Q	1Q				
AST		1-4Q	1-4Q				
Environmental Support for BMDO Programs		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Facility Acquisition Support for BMDO Programs		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3360

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army TMD Facility/ Environmental Programs Development	Allot	Army PEO, Huntsville	0	99	10/1/99	102	10/01/01	Cont.	201	N/A
b. Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TAD, Arlington VA	0	99	10/1/99	101	10/01/01	Cont.	200	N/A
c. Air Force TMD Facility/Environmental Programs Development	Allot	AF SMC, Los Angeles CA	0	15	10/1/99	15	10/01/01	Cont.	30	N/A
d. Army SMDC Fac/Envir Prog Development	Allot	Army SMDC, Huntsville, AL	0	245	10/1/99	250	10/01/01	Cont.	495	N/A
e. PMRF Upgrades	Allot	NAVY, PMRF		10000	TBD				10000	
f. Optical Sensor Upgrade	Allot	Navy, PMRF		5000	TBD				5000	
Subtotal Product Development:				15458		468			15926	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. HALO & AST Support	Allot	SMDC, Huntsville, AL		16230	10/01/99	21269	10/01/00	Cont.	37499	
b. Wake Island Support	Allot	SMDC, Wake Island		0		6200	10/01/00	Cont.	6200	
c. KTF	Allot	Navy, Kauai Test Facility		3526	10/01/99	3540	10/01/00	Cont.	7066	
d. Facility Acquisition Life-Cycle Management	MIPR	U.S. Army Corps of Engineers, Huntsville AL		50	1/2/00	106	10/1/00	Cont.	156	N/A
e. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc. – Bethesda, MD		2010	6/99	1950	6/00	Cont.	3960	N/A

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3360

f. Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington DC		16	1/1/00	15	1/1/01	Cont.	31	N/A
g. Sea Light Beam Dir	MIPR	SPAWAR		874	10/1/99	830	10/01/00	Cont.	1704	N/A
h. Kwaj. Missile Range Spt	CPAF	USASMDC		9290	10/1/99	9830	10/01/00	Cont.	19120	N/A
i. White Sands Missile Range Spt	Allot	WSMR, White Sands, NM		1920	10/1/99	1976	10/01/00	Cont.	3896	N/A
Subtotal Support Costs				33916		45716			79632	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:										

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Core Infrastructure Planning Support	Allot	USASMDC	27994	2949	10/1/99	4093	10/1/00	Cont.	35036	N/A
b. Core Infrastructure Planning Support	Allot	USAF	6731	10410	10/1/99	15843	10/1/00	Cont.	32984	N/A
c. Core Infrastructure Planning Support	Allot	JNTF	294	0	10/1/99	0	10/1/00	Cont.	294	N/A
d. Core infrastructure Planning Support	Allot	USN	1161	190	10/1/99	220	10/1/00	Cont.	1571	N/A
e. Core Infrastructure Planning Support	MIPR	Various	2519	2023	TBD	2044	TBD	Cont.	6586	N/A
f. T&E Technical Support	CPFF	SRS Technologies, Arlington, VA	1189	0	N/A	0	N/A	TBD	1189	
g. T&E Technical Support	CPAF	Vanguard Research, Fairfax, VA	559	814	6/99	698	6/00	Cont.	2071	
h. Gov Project Personnel Support	Allot	USASMDC, Huntsville, AL	558	477	10/01/99	473	10/01/00	Cont.	1508	

BMDO RDT&E COST ANALYSIS (R-3)									DATE: February 2000	
BUDGET ACTIVITY: 4 - Demonstration and Validation			PE NUMBER AND TITLE: 0603874C BMD Technical Operations							PROJECT: 3360

Subtotal Management Services:			41005	16863		23371			81239	

Remark:

Project Total Cost:			41005	66237		69555			176797	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)			DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations		PROJECT 4000

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
4000 Operational Support	7378	10656	10832	11072	11024	11211	11180	Continuing	Continuing

A. Mission Description and Budget Item Justification:

This project funds three basic areas: personnel and related facility support costs; statutory and fiscal requirements, and support service contracts.

Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, US Army PEO Missile Defense, US Navy PEO for Theater Defense, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.

Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

Finally, assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.

FY 1999 Accomplishments:

- 7378 Provided management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 7378 0

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
PROJECT 4000	

FY 2000 Planned Program:

- 10656 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 10656

FY 2001 Planned Program:

- 10832 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 10832

B. ==DELETE== Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	7014	10656	10944
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressional General Reductions			
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming			
e. Rescissions			
Adjustments to Budget Years Since FY 2000 PB	364	-30	-112
Current Budget Submit (FY 2001 / 2002 BES/PB)	7378	10656	10832

Change Summary Explanation: Internal readjustment to management account.

B. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

C. Acquisition Strategy:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 4000

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	59126	81560	116992	142041	82394	69423	54512	Continuing	Continuing
1161 Advanced Sensor Technology*	12905	0	35778	93342	76394	63423	48512	Continuing	Continuing
1462 Other US - Russian Cooperative Programs	0	0	0	6000	6000	6000	6000	Continuing	Continuing
2259 Israeli Cooperative Project	46221	81560	81214	42699	0	0	0	Continuing	Continuing

*Will require reprogramming.

A. Mission Description and Budget Item Justification

This program is in budget activity 4 –Demonstration and Validation, Research Category 6.3B. This Program Element was created in accordance with H.R. 1119, SEC.223, which called for establishment of a PE referred to as the "cooperative Ballistic Missile Defense Program." This PE finances cooperative efforts with Israel and with the Russian Federation. Cooperation with Israel centers around the Development of an initial capability for the Arrow Missile Defense system that is interoperable with US missile defense forces. The PE also funds work with the Russian Federation on advanced satellite early warning, and other cooperative research with the Russian Federation.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	0	58903	36650	36719
Congressional Adjustments			+45000	
Appropriated Value			81650	
Adjustments to Appropriated Value				
a. Congressional General Reductions			-1466	
b. OSD Reductions				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming			1376	
e. Rescissions				
Adjustments to Budget Years Since FY 2000 PB		223	0	80273
Current Budget Submit (FY 2001 PB)		59126	81560	116992

Change Summary Explanation:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1161

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1161 Advanced Sensor Technology*	12905	0	35778	93342	76394	63423	48512	Continuing	Continuing

*Will require reprogramming.

A. Mission Description and Budget Item Justification

To prepare for critical future active defense needs, BMDO will conduct a balanced international cooperative program of high leverage technologies that yield improved capabilities across a selected range of advanced sensors, as well as advances in innovative science. The objectives of these investments are subsystems with improved performance and reduced costs for acquisition programs.

Russian American Cooperative Programs:

- The Russian American Observation Satellites (RAMOS) program is an innovative American-Russian space-based remote sensor research and development program addressing ballistic missile defense and national security. This program engaged Russian early warning satellite developers in the joint definition and execution of aircraft and space experiments. Near-term experiments have focused on planning and executing nearly simultaneous observations of Earth features using U.S. and Russian satellites. The final phase of the near-term experiments included the development of U.S. and Russian instruments for proof-of-concept measurements from the Flying Infrared Signatures Technology Aircraft (FISTA). The program will ultimately design, build, launch, and operate two satellites that will provide stereoscopic observations of the earth's atmosphere and ballistic missile launches in the short wavelength and mid-to-long wavelength infrared bands.

FY 1999 Accomplishments:

- 11585 During FY98 and FY99 BMDO conducted a major technology planning review, as well as a full review of the RAMOS program. The results of these reviews confirmed that there were technology benefits to the planned experiments under RAMOS. However, the associated technology objectives were assessed to be lower in priority than other critical technologies needed at that time to address future ballistic missile threats. A subsequent review of U.S.-Russian cooperation determined that continuing a program leading to space-based testing would significantly benefit U.S.-Russian relations. As a consequence, plans for a two satellite program were reviewed and revised to better adapt the program to defense needs.
- 925 The Russian and U.S. scientists analyzed data collected from specialized infrared sensors during prior years. These sensors were developed by the U.S. and Russia and flown aboard the U.S. Flying Infrared Signature Technology Aircraft (FISTA) operated by the Air Force Research Laboratory. Modeling and simulation of high altitude cloud sun glint and cloud background scene structure in the mid-to-longwave infrared band continued.
- 395 FY99 efforts supported Russian research into their own future early warning satellites by having the Russians begin Mid/Long Wavelength Infrared (M/LWIR) space sensor and satellite designs using non-U.S. component technologies. The FY 1999 effort continued research into mitigation of Short Wavelength Infrared (SWIR) solar glint effects by developing a prototype design of a space hyperspectral polarimeter for future flight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603875C International Cooperative Programs
	PROJECT: 1161

Total 12905

FY 2000 Planned Program:

- 0 Collect and analyze data from specialized infrared sensors developed by the U.S. and Russia and flown aboard the U.S. Flying Infrared Signature Technology Aircraft (FISTA). Continue efforts focused on the modeling and simulation of high altitude cloud sun glint and cloud background scene structure in the mid-to-longwave infrared band. Finalizes prototype design of a space hyperspectral polarimeter for future flight tests.

  Begins the preliminary design process for the satellite experiment. Confirms application of chosen bandwidths toward meeting program objectives, Reviews system and subsystem requirements, identifies risk items and recommends mitigation. Defines work package split between the U.S. and Russia concerning launch vehicles, integration planning, mission operations concept, and data analysis capabilities. Begins preliminary design process for the platform and instruments.

Total 0

FY 2001 Planned Program:

- 35278 Completes the preliminary design process for the satellite experiment and begins the final design efforts. Defines work package split between the U.S. and Russia concerning launch vehicles, integration planning, mission operations concept, and data analysis capabilities. Completes the preliminary design process for the platform and instruments and begins the final satellite design efforts.
- 500 Establishes system engineering and configuration control processes. Provides technical review of exported data.
-

Total 35778

B. Other Program Funding Summary NA	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

C. Acquisition Strategy:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1161

The current U.S. prime contractor for RAMOS is the Space Dynamics Laboratory of Utah State University, a designated University Affiliated Research Center for space sensors. SDL has a prime/subcontractor relationship with the Russians. The Russian lead is Rosvoorouzhenie, a State Company, with technical execution done by NPO Cometa and Astrophysica.

RAMOS is a cooperative experiment program designed to engage the Russians in early warning and theater missile defense related technologies.

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Joint U.S./Russian Obs. (MSX/MSTI/RESURS-1)	1Q, 3Q								
Phase I (Program Definition) Contract Signed	3Q								
Proof of Concept Sensors - FISTA	3Q, 4Q								
Polarization Measurements - FISTA	3Q, 4Q	3Q, 4Q							
Russian Federation Presidential Approval		2Q							
Concept Design Review		2Q							
Proof of Concept Demonstrations		3Q, 4Q							
Data Analysis of Previous Experiments			3Q, 4Q	1Q,2Q					
Additional FISTA Measurements				1Q					
Prototype Design of Space Hyperspectral Polarimeter				1Q					
Phase II (Design and Operations) Contract				3Q					
Initiate Development of Preliminary Satellite Design				3Q					
Preliminary Design Review					2Q				
Critical Design Review / Begin Fabrication						2Q			
Satellite Fabrication and Testing Complete								1Q	
Launch								2Q	
On Orbit Operations Begin								2Q	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1161

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Hardware Development	SS/CPFF	USU/SDL, Logan, UT	26375	15150		35278		TBD	76803	TBD
Subtotal Product Development:			26375	15150		35278			76803	TBD

Remark: Prior to FY 1999, the RAMOS program was in BA3 - Advanced Technology Development, PE 0603173C, Support Technologies – ATD

The FY-2000 funding will continue data analysis and concept design efforts in support of the preliminary design process for the satellite experiment; define the work package split between the U.S. and Russia concerning launch vehicles, integration planning, mission operations concept, and data analysis capabilities; and begin the preliminary design process for the platform and instruments.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Development Support	Allot	AFRL, Hanscom AFB	1425	500		0		TBD	1925	2300
Subtotal Support Costs:			1425	500					1925	2300

Remark: Prior to FY 1999, the RAMOS program was in BA3 - Advanced Technology Development, PE 0603173C, Support Technologies – ATD

The FY-2000 funding will provide for conducting FISTA aircraft measurements using U.S. instruments and the Russian 6.3-micron imaging radiometer collect, compile and analyze the data and provide support to modeling and simulation efforts.

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Test and Evaluation:										

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1161

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Program Management Support	C/CPFF	NRC, Arlington, VA	745	350		500		TBD	1595	4700
Subtotal Management Services:			745	350		500			1595	4700

Project Total Cost:			28545	16000		35778			80323	TBD

Remark: Prior to FY 1999, the RAMOS program was in BA3 - Advanced Technology Development, PE 0603173C, Support Technologies – ATD

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1462

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
1462 Other US - Russian Cooperative Programs	0	0	0	6000	6000	6000	6000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program provides additional cooperative research and development work with the Russian Federation in the area of technologies supporting missile defense programs. The project will allow the United States and Russia to take full advantage of Russia's unique technical capabilities that complement U.S. missile defense technologies.

FY 1999 Accomplishments:

- 0

Total 0

FY 2000 Planned Program:

- 0

Total 0

FY 2001 Planned Program:

- 0

Total 0

B. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
N/A									

C. Acquisition Strategy:

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603875C International Cooperative Programs / PROJECT: 2259

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
2259 Israeli Cooperative Project	46221	81560	81214	42699	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project includes the Arrow Deployability Program (ADP), Arrow interoperability, the Israeli Test Bed (ITB), and the Israeli System Architecture and Integration (ISA&I) Project. The U.S. derives considerable benefits from its participation in these projects. The primary benefits are in U.S. gains in technology and technical data that will reduce risks in U.S. TMD developmental programs. The U.S. also benefits from the eventual presence of an anti-ballistic missile defense system in Israel, which provides deterrence of future theater ballistic missile (TBM) conflicts in that region. This defensive system also contributes to a more robust defensive response should deterrence fail.

The Arrow Deployability Program consists of efforts to integrate and test the elements making up a ballistic missile defense system for Israel. It includes the U.S.-Israel cooperative initiative to integrate the jointly developed Arrow II anti-theater ballistic missile (ATBM) interceptor and launcher with the Israeli developed Arrow components, e.g., fire control radar (Green Pine), fire control/battle management center (Citron tree) and launcher control center (Hazelnut Tree). The cooperative Arrow program is in its third phase. Phase I consisted of the Arrow Experiments project that cooperatively developed the pre-prototype Arrow I interceptor. It was followed by the Arrow Continuation Experiments (ACES) project (Phase II) which was a continuation of Phase I, and consisted of critical lethality and flight tests using the upgraded Arrow II interceptor. Arrow II interceptor development, now complete, provided the basis for an informed Government of Israel engineering and manufacturing decision for an integrated ATBM defense capability. The phase II program was highly successful and satisfied the Israeli requirement for a ballistic missile interceptor for defense of Israeli critical assets and population centers. The phase II program contributed to the U.S. technology base for new advanced anti-tactical ballistic missile technologies that were incorporated into the U.S. theater missile defense (TMD) systems, and also provided risk reduction technologies in the event that U.S. ATBM technical efforts failed to meet expectations.

The third phase is the ongoing ADP, which began in Fiscal Year 1996. This phase of the program pursues the research and development of technologies associated with the demonstration and deployment of the integrated Arrow Weapon System (AWS) to permit the Government of Israeli (GOI) to make a decision regarding its deployment (without financial participation by the U.S. beyond the R&D stage). This effort includes integrated system-level flight tests of the total AWS. The first such integrated intercept flight test was successfully conducted in Israel on November 1, 1999. The Green Pine radar detected a Scud-class ballistic target and the Citron Tree battle management center commanded the launch of the Arrow II interceptor and communicated with it in-flight to successfully destroy the incoming missile. An interface has now been developed and delivered in Israel for AWS interoperability with U.S. TMD systems based on a common JTIDS/Link-16 communications architecture and message protocol. It is now planned to use the BMDO-developed Theater Missile Defense System Exerciser (TMDSE) to conduct interactive simulation exercises to test, assess, and validate the JTIDS-based interoperability between the AWS and U.S. TMD systems. Once the TMDSE experiments are completed in FY01, the AWS will be certified as fully interoperable with any deployed U.S. TMD systems. Lethality, kill assessment and producibility will continue to be assessed. Subsequent U.S.-Israeli cooperative R&D on other ballistic missile defense concepts or enhancements to the AWS may occur in the future. The International Agreement (IA) between the U.S. and Israel for the ADP is being amended to formalize the U.S. addition of $45M RDT&E from

Congressional plus-up in FY00. As directed by FY00 Congressional language, this increased the U.S. cost share in the ADP agreement, which permits the GOI to withdraw an equal amount from the ADP in order to continue Israeli procurement of additional AWS third battery components. The budget includes an additional $45M in FY2001 for a similar adjustment.

Since program initiation in 1988, Israel successfully improved the performance of its pre-prototype Arrow I interceptor to the point that it achieved a successful intercept and target destruction in June 1994. Arrow II design and component testing progressed to the successful demonstration of the new warhead, electro-optical seeker, radar fuse, first stage booster, sustainer booster, launcher canister, and launcher. The ADP IA was signed in March 1996 and Presidential certification was completed in May 1996. Under the ADP agreement, the first flight test of the integrated AWS, a fly-out non-intercept test, was successfully completed on September 14, 1998. This was a combined ACES/ADP flight test and its success marked the conclusion of the ACES Program. This flight test was the first in which the other elements of the AWS rather than test range assets were used to control and communicate in-flight with the Arrow missile. This test demonstrated the technical maturity of the AWS and was followed by a successful integrated system intercept test against a ballistic missile target on November 1, 1999. The success of this intercept is leading the Israeli Air Force to declare the AWS operational in early CY 2000.

The ITB Program is a medium-to-high fidelity theater missile defense simulation that provides the capability to evaluate potential Israeli missile defenses, aids the Israeli Ministry of Defense (IMoD) in the decision of which defense systems to field, provides insights into command and control in TMD and the role of human-in-the-loop, and trains Israeli Air Force personnel to function in a TMD environment. A structured set of joint U.S./Israeli experiments is being executed to evaluate the role of missile defenses in both mature and contingency Middle East theater operations. This funding also provides for a portion of the operation and maintenance of the ITB and for planned enhancements. Completed experiments identified additional enhancements needed to improve the ITB as an analysis tool. The enhancements incorporated in the ITB to date include radar and weapons models and a Boost Phase Intercept (BPI) simulation capability. The BPI enhancement benefited the Israeli BPI study completed in January 1996. The Adaptive Battle Management Center (ABMC) enhancement benefits the U.S. by enabling the ITB to simulate a wide variety of command and control, human-in-the-loop (HIL), and interoperability issues. The implementation of the Distributed Interactive Simulation (DIS) and high level architecture (HLA) technologies enables joint exercise experiments to be conducted both in Israel and across the water between U.S. TMD and Israeli TMD systems using a combination of such modeling and simulation tools as the Extended Air Defense Simulation (EADSIM), Extended Air Defense Test Bed (EADTB), and the ITB.

ITB experiments are used to validate the performance of the prospective near-term Israel Theater Missile Defense System and provides valuable insight into the potential role of Human-In-The-Loop (HIL) for a TMD system. The ITB is being used as a tool to assist with the development of Combined Standard Operating Procedures (CSOP) between the U.S. European Command (USEUCOM) and Israel for potential combined TMD operations. Early warfighter activities in developing the CSOP at the ITB were invaluable during U.S. contingency operations in late FY 98. Further ITB experiments involving the Israeli Air Force and USEUCOM are planned in FY00 to finalize combined operating procedures and to begin the integration of the AWS in EUCOM's CSOP and OPLAN.

The ISA&I tasks provide ongoing analysis and assessment of the baseline, evolutionary, and responsive threats to support the definition and evaluation of an initial Israeli Reference Missile Architecture (IRMA), a baseline missile configuration from which to assess and evaluate architectural effectiveness. Evolutionary growth paths to enhance the IRMA robustness against future threats will be identified. Critical TMD system architecture issues and technologies will be analyzed, and the conformance to established requirements of various ATBM programs, including the Arrow Deployability Program (ADP), Boost Phase Intercept concepts, and the ITB will be conducted. Finally, previously developed simulations and models will be used selectively to address significant TMD issues. Collectively, the tasks

conducted under this cooperatively sponsored ISA&I project will provide critical insights and technical data to both the U.S. and Israeli governments for improving near-term and evolutionary defenses against ballistic missile threats.

The ISA&I Project activities demonstrated that defense of the State of Israel from TBM attacks is necessary, feasible and cost-effective. The ISA&I effort analyzed and addressed numerous TMD system issues including HIL, resource allocation, and threat analysis. The U.S. benefited from the architecture analysis work, including identification and progress toward resolution of critical TMD system issues such as kill assessment and the lethality study of a novel interceptor warhead. The ISA&I is playing a critical role in identifying possible AWS upgrades to preserve system effectiveness as more robust regional ballistic missile threats continue to evolve.

FY 1999 Planned Program:

- 41352 Arrow Deployability Program. Commenced AWS integrated flight test. Evaluated U.S. and Arrow components for electro-magnetic interference. Transferred the results of the AWS tests to U.S. TMD interceptor developers. Continued interoperability, lethality, kill assessment and producibility studies leading to an initial Israeli operational capability.
- 1520 Interoperability. Continued interoperability activities to include Arrow Link-16 Upgrade Converter (ALUC) Proof of Concept II (APOC II). Developed and began testing of U.S./Israeli technical interoperability capability. Began efforts to develop scenarios and test plans for conducting TMDSE experiments.
- 1900 ITB. Continued ITB experiments on near-term improvements to the Israeli TMD system and on deployability. Provided improved threat model and Arrow II enhancements. Continued supporting U.S. EUCOM/IAF CSOP requirements and the potential for ITB II experiments.
- 1449 ISA&I. Analyzed results of ITB Interoperability experiments. Continued evaluations of the performance of the near-term TMD system based on ADP system flight tests. Continued analysis of TMD refinements for future threats such as the evolving Iranian MRBM threat.
- 0 Government Personnel and Support

Total 46221

FY 2000 Planned Program:

- 78498 Arrow Deployability Program. Continue AWS to migrate the system toward an initial operational capability and validate activities via integrated flight tests. Transfer the results of the AWS tests to U.S. TMD interceptor developers. Continue lethality, kill assessment and producibility studies leading to an Israeli operational capability. Funding includes $45M Congressional plus-up to offset Israel's continued requirement for procurement of components for a third Arrow battery.
- 1751 ITB. Continue ITB experiments on near-term improvements to the Arrow TMD system deployability. Provide improved threat model and Arrow II update enhancements. Conduct distributed interactive simulation over-the-water experiments. Support U.S. EUCOM/IAF CSOP and CINC EUCOM exercise requirements utilizing the ITB.
- 1173 ISA&I. Analyze results of ITB Interoperability experiments. Continue evaluations of the performance of the near- and far-term TMD system based on ADP system flight tests and evolving regional threats. Continue analysis of TMD system refinements necessary to defeat future threats such as the evolving Iranian MRBM threats.
- 138 Government Personnel and Support

Total 81560

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs
PROJECT 2259	

FY 2001 Planned Program:

- 77849 Arrow Deployability Program. Continue to transfer system development and flight test results to U.S. TMD interceptor developers. Continue activities for achieving interoperability, lethality, and high confidence kill assessment. Funding includes $45M which allows GOI to reduce ADP funding and continue procurement of components for the third Arrow battery.
- 1820 ITB. Continue ITB experiments related to the operational Arrow TMD system deployability. Provide improved threat model and Arrow II update enhancements. Support U.S. EUCOM/IAF CSOP development and CINC EUCOM exercise requirements if feasible within budget.
- 1409 ISA&I. Analyze results of ITB Interoperability experiments. Continue evaluations of the performance of the AWS. Continue analysis of TMD refinements for future emerging threats
- 136 Government Personnel and Support

Total 81214

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
3359 – Test Evaluation & Assess, PE 0603872C		3966	21363							25329
3359 – Test Evaluation & Assess, PE 0603873C		20297	23249	61299	34045	50090	37803	38868		265651

C. **C. Acquisition Strategy:** This is an ongoing cooperative U.S./GOI development program. By completing the Arrow Deployability Program, U.S. TMD programs will be afforded state-of-the-art technical data for program risk reduction and the GOI will have developed a robust AWS to defend against regional ballistic missile threats. Through the ADP, Link-16-based interoperability between the AWS and U.S. TMD systems will be achieved. The planned ISA&I and ITB efforts will continue to refine the operational tactics and techniques of the fielded near-term TMD system. The U.S. and the GOI, under the umbrella of the various Memoranda of Agreements, share project costs. The U.S. share of total funding is based upon the maturity of the development. Each contract associated with the individual projects is a firm-fixed price (FFP) contract. The GOI will likely continue to fund the Arrow Program through CY05 without any U.S. funding support U.S. obligations for ADP will be fulfilled in FY02.

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Initiate Interoperability Requirements	1 Q								
Complete ITB Enhancements	2 Q	3 Q	1 Q						
U.S./Israel ADP First Amendment Signed		2 Q							
Initiate Interoperability Tests (APOC I)		2 Q							

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603875C International Cooperative Programs**

U.S./Israel ADP Second Amendment Signed		3 Q							
Complete Arrow II ACES Flight Test		4 Q							
Arrow Weapon System Flight Tests		4 Q		1Q & 3Q	1Q & 3Q	1Q			
Conduct APOC II			2 Q						
U.S. Benefits Review				1 Q					
Conduct TPOC				2 Q					
Initiate Interoperability Tests w/ U.S. TMDSE				2 Q					
ADP Third Battery Cost Share Adjustment						2 Q			
Complete ADP, ITB, and ISA&I						2 Q			

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 2259

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ADP Development and Third Arrow Battery	International Agreement with Israel	Israel Ministry of Defense, Israel	39637	75641		74945			190223	
b. ISA&I	FFP with Cost Share	Wales, Ltd., Israel	1449	1173		1409			4031	
c. ITB	FFP	USA/SMDC Huntsville, AL	1900	1751		1820			5471	
d. Gov Personnel & Spt	Direct Funding	USA/SMDC Huntsville, AL	0	138		136			274	
Subtotal Product Development:			42986	78703		78310			199999	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ADP Arrow Project Office	Direct Funding	PEO/AMD	3235	2857	N/A	2904	N/A		8996	
Subtotal Support Costs:			3235	2857		2904			8996	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Test and Evaluation:										

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 2259

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A										
Subtotal Management Services:										

Remark:

Project Total Cost:			46221	81560		81214			208995	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603876C Threat and Countermeasures

PROJECT: 3270

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3270 Threat and Countermeasures Program	23258	19343	22621	22379	20670	21087	21507	Continuing	Continuing

A. Mission Description and Budget Item Justification

Intelligence Directorate. The BMDO Directorate of Intelligence defines potential adversary military force missile threats. To accomplish this mission, BMDO has a threat definition program, which is based on intelligence community projections and is traceable to quantifiable analysis. This project produces capstone threat and countermeasure documentation to ensure consistent technical threat definitions across all the Services. It does not duplicate Service-unique activities. The program consists of three primary component tasks: Intelligence Threat, Threat Systems Engineering, and Threat Applications; and a secondary task providing funds for an Executing Agent at USASMDC to support the Intelligence Threat task.

Intelligence Threat Task. The purpose of this task is to provide an Intelligence Community-Validated TMD and NMD threat description. The threat is divided into four major categories under this task: Operational Threat Environment, Targets, System Specific Threats (SST), and Reactive Threats. The Operational Threat Environment includes assessments of the operational and technological environments and projects the effects of developments and trends on TMD and NMD mission capability. The Targets category includes a projection of foreign missile systems and countermeasures that enhance their performance. This includes force structure, performance characteristics, and sample signatures. SST addresses threats to NMD and the TMD "family of systems" including reconnaissance, surveillance, and target acquisition; lethal and non-lethal threats; and regional integrated SST assessments. The Reactive Threats category includes those that an adversary may develop as a result of deployment of NMD and the TMD "family of systems."

Threat Applications Task. The accurate specification and characterization of ballistic missiles and the appropriate development and integration of scenarios using these characterizations are critical to the analysis of alternative ballistic missile architectures, the performance assessments of potential technology applications, and the operational performance evaluations of candidate designs. This task provides baseline and excursion scenario descriptions in documentary and digital form for use in analysis of BMD architectures and operational effectiveness. These descriptions are the only approved threat employment portrayals authorized for acceptable BMDO analysis. This task:

Identifies user needs for threat scenario descriptions.
Identifies analyses needed to fully specify and characterize the threat missile systems, penetration aids, tactics, etc., and ensures the analyses are accomplished.
Provides the analysis results to all interested agencies for review and comment.
Addresses critical threat issues, which arise during the analysis process.
Ensures all supporting agencies' views on threat issues are fully aired.
Reviews, approves, produces, and distributes all threat scenario descriptions.
Produces threat computer digital media (threat tapes) and supporting documentation for use by the development and acquisition communities.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603876C Threat and Countermeasures — PROJECT: 3270

Threat Systems Engineering Task. The BMDO Threat Systems Engineering Program assists TMD and NMD acquisition program offices in developing ballistic missile defense systems that are robust to potential countermeasures and are practical and within the means of anticipated adversaries. Included in this mission are Countermeasures Integration Program (CMIP) support to the TMD and NMD threat development process and advance warning to BMDO system designers. The BMDO CMIP reviews TMD and NMD systems for susceptibilities and identifies potential countermeasures, determines credibility through analyses and tests, characterizes credible countermeasures by providing designs and performance parameters, informs intelligence and system threat developers of potential countermeasures, informs TMD and NMD system designers with advance warning of potential countermeasures, and assists TMD and NMD system designers in developing counter-countermeasures. Providing vulnerability and susceptibility information, or “threat risk assessments”, to the system designers early enables them to build robustness into their designs during the early stages of the system development process, a cost-effective means for providing a flexible high-performance design. The program takes a "rest-of-world" perspective in developing credible, potential countermeasures.

FY 1999 Accomplishments:

- 11318 Over 50 intelligence studies tasked to Intelligence Community agencies by BMDO were completed during 1999. These studies included The National Missile Defense and Theater Missile Defense System Threat Assessment Reports (STARs) that form the basic threat documentation for BMDO programs. In addition, numerous intelligence databases including the Missile Design Database (MDDB) and the Ballistic Missile Reference Document (BMRD), and threat system models describing missile operations were updated with new intelligence data to respond to BMDO program analytical needs for detailed parametric specifications.

- 1635 Three major campaign scenarios were under production during FY99. These scenarios are detailed descriptions of future protracted conflicts in which Red missile and air forces are employed against Blue missile defenses. This provides a context for analysis and evaluation of defense force capabilities, architectures and systems. The 2003 Arabian Gulf Campaign Scenario (AGCS) and the 2010 AGCS were complete and distributed to BMDO program elements. Work was started on the 2010 Northeast Asia Campaign Scenario that will be completed in FY00. In addition, numerous scenario vignettes, engineering trajectories and engagement scenarios were produced to support NMD Integrated Ground Tests (IGTs), JTAMDO System Integration (SI) analysis, directed energy weapons (DEW) engineering studies, and System Requirements Documentation (SRDs).

- 10305
  Threat Systems Engineering Task:
  Two major Threat Risk Assessments were completed in FY99. These two assessments, against SBIRs and the United Kingdom's projected missile defense systems identified potential threats and countermeasures, their probability of being produced, and their impact on the defense systems. Two major documents were produced: the Countermeasures Taxonomy and the Countermeasures Compendium. These documents serve as reference documents to track and describe countermeasures of interest to BMDO. A number of CHOP Skunkworks missions were closed out or initiated during the year along with a hardware fabrication effort for the Atmospheric Interceptor Technology (AIT) program. The Missile Feasibility Assessment was also completed.

Total 23258

FY 2000 Planned Program:

•	6718	FY2000 will see the production of the Theater Air and Missile Defense and National Missile Defense STARs along with 22 intelligence studies/analyses/assessments. These studies will document threat system specifications, characterizations, signatures, operations, and employment tactics and strategies. Threat data bases will updated and numerous models will be modified to better evaluate threat system engagements.
•	1852	Threat Applications Task: Production work will continue on the 2010 Northeast Asia Campaign Scenario and work will begin on a new campaign scenario selected from the Defense Planning Guidance document. Threat scenario modeling tools will be upgraded to keep pace with new threat system descriptions and the needs of the modeling and simulation community. Scenario and intelligence support will be provided to BMDO wargaming and exercise efforts at he Joint National Test Facility.
•	7740	Threat Systems Engineering Task: Establish and maintain common engineering threat definition across the BMD architecture. Create and maintain a Ballistic Missile Defense (BMD) "Design-to-Threat". Revitalize and operate a Red Engineering Team that takes the role of an enemy striving for an effective ballistic missile attack on targets defended by US BMD systems. Provide Threat Systems Engineering Support to BMD architecture development and evolution. Conduct studies and analyses of proposed BMD architecture(s), system(s), and component designs from an adversary's point of view. Expand and/or develop countermeasure designs to an engineering detail level sufficient to support scenario development, modeling, simulation, and analysis. Conduct hardware development, experiments, and/or ground-tests to quantify the level of difficulty in creating countermeasures, quantify countermeasure performance, and provide test data to support systems analyses.
•	3033	Comprehensive Advanced Radar Task: A multiple project effort to address advanced threats and develop mitigation techniques through the development of algorithms, operational procedures and hardware.
Total	19343	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603876C Threat and Countermeasures	3270

FY 2001 Planned Program:

- 7440 Intelligence Threat Task: Provide Capstone STAR, specialty threats, targets analysis, operational threat environment intelligence assessments, management, and planning support
- 2218 Threat Applications Task: Continue development of threat system characterizations and scenario descriptions in response to the analysis needs of the system/element developers. Upgrade the threat modeling capability and produce digital media and supporting documentation through the JNTF. Develop scenarios depicting threat systems employed in theater/strategic environments.
- 12911 Threat Systems Engineering Task: Perform TMD/NMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD/NMD CM technical experiments and evaluations, and threat risk assessments. Support Countermeasures Hands-On Program (CHOP) "Skunkworks" teams in conducting CM concept, design, fabrication, and tests. Conduct non-technical analysis, oversight, and database management.
- 52 Executing Agent for Intelligence Threat task.

Total 22621

Acquisition Strategy: Funding is provided to executing agents who accomplish tasks under existing contracts via Military Interdepartmental Purchase Requests (MIPR); Scientific, Engineering, and Technical Assistance (SETA) contracts; and Federally Funded Research and Development Centers (FFRDCs) contracts.

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	23263	16497	22763
Congressional Adujustment		3000	
Appropriated Value		19497	
a. OSD Inflation Adjustment	-203	-154	
b. Internal Reprogramming	198		
Adjustments to Budget Years Since FY 2000 PB			-142
Current Budget Submit (FY 2001)	23258	19343	22621

Change Summary Explanation:

Funding: Funding adjustments made to support revisions in TMD core program schedules and requirements.

Schedule: None

Technical: None

C. Other Program Funding Summary ($In Thousands)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2407 NMD Program, PE 0603871C	3000								
Missile Feasibility Assessment (MFA) 0603871C	2421								
1155 Technology- Research&Engr, PE 0603874C	200								

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
4 - Demonstration and Validation	**0603876C Threat and Countermeasures**

D. Schedule Profile

	FY 1999				FY 2000				FY 2001				FY 2002			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Skunkworks Mission #12								X								
Skunkworks Mission #14								X								
Skunkworks Mission #15										X						
NMD STAR				X			X				X				X	
TMD Capstone STAR			X				X				X				X	
Threat Risk Assessment								X				X				X
NEA III Scenario							X									
AGCS 2010 Scenario					X						X					

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 6 - Management and Support

PE NUMBER AND TITLE: 0901585C Pentagon Maintenance Reserve

PROJECT: 6002

COST (*In Thousands*)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
6002 Pentagon Maintenance Reservation	0	0	4772	3771	5157	4061	4156	Continue	Continue

A. Mission Description and Budget Item Justification

This is a new DoD-directed Program Element to separately identify costs for the Pentagon Reservation Maintenance Revolving Fund (PMRF). The PMRF finances the following: real property operation and maintenance costs of the Pentagon and Federal Office Building #2; the renovation of the Pentagon; the Remote Delivery Facility; and the Metro Entrance Facility projects. The fund is reimbursed by charging tenant organizations for costs incurred. The PMRF also finances the operation, maintenance, and repair of 33 federally owned and leased facilities in the National Capital Region. DoD tenants are also charged and the fund reimbursed.

FY 1999 Accomplishments:

- This project has no funding in this fiscal year under this PE. FY99 funding was previously included in Program Element 0908612 Project 6001.

Total 0

FY 2000 Planned Program:

- This project has no funding in this fiscal year under this PE. FY00 funding was previously included in Program Element 0908612 Project 6001.

Total 0

FY 2001 Planned Program:

- Continue program as described in block A.

Total 4772

B. Program Change Summary	FY 1999	FY 2000	FY 2001

DATE
February 2000

BUDGET ACTIVITY
6 - Management and Support

PE NUMBER AND TITLE
0901585C Pentagon Maintenance Reserve

Previous President's Budget (FY 2000 PB)			
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressional General Reductions			
b. SBIR / STTR			
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming			
e. Rescissions			
Adjustments to Budget Years Since FY 2000 PB			
Current Budget Submit (FY 2001 / 2002 BES/PB)	0	0	4772

Change Summary Explanation:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604861C THAAD System - EMD

PROJECT: 2260

COST *(In Thousands)*	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense (THAAD)	0	79462	549945	685168	789736	755134	591049	TBD	TBD

A. **Mission Description and Budget Item Justification**

The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBMs) at long ranges and high altitudes. Its long-range intercept capability will make possible the protection of broad areas, dispersed assets, and population centers against TBM attacks. The THAAD System includes missiles, Palletized Loading System (PLS) launchers, Battle Management/Command and Control (BM/C2) units, THAAD Radars, and support equipment. The THAAD Radar provides threat early warning, threat type classification, interceptor fire control, external sensor cueing, and launch and impact point estimates for the THAAD System and other theater systems. The THAAD Radar is based on state-of-the-art, solid-state, X-band radar technology. THAAD will be interoperable with both existing and future air defense systems. This netted and distributed BM/C2 architecture will provide robust protection against the TBM threat spectrum.

The Theater High Altitude Area Defense (THAAD) System Engineering and Manufacturing Development (EMD) phase will refine and mature the Demonstration/Validation (Dem/Val) system design to ensure component and system performance, producibility, and supportability.

The Department of Defense just completed (December 1999) an extensive review of the THAAD and Navy Theater Wide (NTW) programs. The Department focused on an alternative acquisition approach that provides a phased introduction of capability. Prior to this review, the THAAD program was pursuing a standard acquisition approach to field an objective capability, i.e., define requirements, design and fabricate hardware, conduct ground and flight testing and eventually field a capability that meets threshold operational requirements. In order to better balance requirements, pace the threat, and obtain early capability with reduced risk, an evolutionary approach was proposed. This results in a FUE for an initial configuration (termed C1) in fiscal year 2007. C1 will include the capability to defeat all expected upper tier threats in that timeframe, and will meet the key performance parameters outlined in the Operational Requirements Document (ORD). Sophisticated counter measures and battalion operational software is deferred to the next configuration (termed C2) planned for fielding in the 2010/2011- timeframe.

FY 1999 Accomplishments:

-

Total 0

FY 2000 Planned Program:

- Award EMD Contract.
  Conduct Launcher PDR
- 64372 Begin objective system design leading to System PDR & CDR.
- 6690 Initiate material purchases for hardware.
- 8400 Begin software development.

Total 79462

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - Engineering and Manufacturing Development	0604861C THAAD System - EMD	2260

FY 2001 Planned Program:

- 428042 Continue EMD radar, BM/C2, and launcher hardware and software development. readiness. Continue design and development of early EMD missiles. Continue lethality studies and algorithm development. Continue integration of THAAD BM/C2 with PM AMDCCS. Prepare the system integration lab (SIL) for system testing, Conduct BMC2 PDR, Conduct segment CDRs (Launcher, BMC2, Radar).
- 106412 Maintain program management/in-house support
- 15491 Establish targets, lethality, and OT&E support. Begin preparation for early EMD flights, to include KMR readiness.

Total 549945

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	0	83755	556178
Congressional Adjustments		-38000	
Appropriated Value		45755	
a. Congressional Reductions (FFRDC, Inflation, etc)		-183	
b. OSD Reductions			
c. Emergency Supplemental		+38000	
d. Internal Reprogramming		-4110	
Adjustments to Budget Years Since FY 2000 PB			-6233
Current Presidents Budget (FY 2001 PB)	0	79462	549945

Change Summary Explanation: FY00 (+38000) Congressional Adjustment allocated from FY 99 Emergency Supplemental
FY00 (-183) Undistributed Reduction
FY01 (-6233) Project funding realigned

C. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
THAAD Dem/Val – 0603861C	429266	523525	0	0	0	0	0	0	4229753

D. Acquisition Strategy: The Acquisition Strategy for the THAAD EMD phase has been approved. This will be an evolutionary acquisition approach for the THAAD program. The EMD phase contract (missile, launcher, BM/C2, and Radar) will be a sole source award to the Dem/Val contractor team (as approved September 15, 1995 by USD (A,T&L) utilizing the DoD Acquisition Streamlining approach.) The contractor team for the EMD phase will become the contractor team for the Low Rate Initial Production (LRIP) and Full Rate Production (FRP) phases. A single prime contractor will have total system performance responsibility for the EMD, LRIP, and FRP phases.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604861C THAAD System - EMD

PROJECT: 2260

E. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Milestone II		3Q					
EMD Contract Award		3Q					
EMD MILESTONES:							
Radar CDR			2Q				
Launcher CDR			3Q				
BMC3I CDR			4Q				
System PDR				2Q			
Missile CDR					4Q		
System CDR						1Q	
Configuration 2 PDR						2Q	
EMD Radar 1 I&T Complete						4Q	
Developmental Tests –Begin							2Q
Award 14 Missile Option							3Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604861C THAAD System - EMD

PROJECT: 2260

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. THAAD System EMD	CPAF/IF	LMMS		79462	May 00	428042		TBD	TBD	TBD
Subtotal Product Development:				79462		428042		TBD	TBD	TBD

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA	CPAF			0		26732		TBD	TBD	TBD
b. Other Spt Cont	Various			0		26500		TBD	TBD	TBD
c. OGAs	MIPR			0		31460		TBD	TBD	TBD
d. Program Mgmt	Various			0		21720		TBD	TBD	TBD
Subtotal Support Costs:				0		106412		TBD	TBD	TBD

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	TBD
a. KMR Range Support	MIPR			0		1100		TBD	TBD	TBD
b. OT&E				0		1324		TBD	TBD	TBD
c. TARGETS				0		2657		TBD	TBD	TBD
d. LETHALITY				0		10410		TBD	TBD	TBD
Subtotal Test and Evaluation:				0		15491		TBD	TBD	TBD

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										

	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE
5 - Engineering and Manufacturing Development	**0604861C THAAD System - EMD**

b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										

Remark:

Project Total Cost:				79462		549945		TBD	TBD	TBD

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE: 0604865C PAC3 - EMD
	PROJECT: 2257

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
2257 Patriot	237345	179139	81016	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

PATRIOT is a long range, mobile, field Army and Corps air defense system, using guided missiles to simultaneously engage and destroy multiple targets at varying ranges. The PATRIOT Advanced Capability Level 3 (PAC-3) Upgrade Program is the latest evolution of the phased materiel change improvement program to PATRIOT. The materiel changes will provide improved performance across the spectrum for system and threat intercept performance. In addition to modernization of the ground support equipment, funding provides for a new missile design that provides a high velocity, hit to kill, surface to air missile with the range, accuracy, and lethality necessary to effectively intercept and destroy tactical missiles with Nuclear Biological Chemical/High Explosive (NBC/HE) warheads and air breathing threats. The full capability will provide defense against TBM's, CM's, UAVs and other air breathing threats as part of a multilayered defense system. PATRIOT is pursuing integration of PATRIOT Battle Management Command, Control, Communications and Intelligence (BMC3I) with the Project Manager, Air Defense Command and Control Systems to take advantage of previous Army developments that can be incorporated into the PATRIOT program.

FY 1999 Accomplishments:

•	206162	Continued PAC-3 missile Engineering and Manufacturing Development (EMD) program, including the first intercept during Seeker Characterization Flight (SCF).
•	14024	Continued PAC-3 EMD target and test support.
•	12491	Continued operational test and evaluation and lethality efforts.
•	4668	Air Directed Surface to Air Missile (ADSAM) Testing (Cooperative Engagement Capability)
Total	237345	

FY 2000 Planned Program:

•	161389	Continue PAC-3 missile Engineering and Manufacturing Development (EMD) program.
•	9712	Continue PAC-3 Target and Test Support.
•	8038	Continued operational test and evaluation efforts.
Total	179139	

FY 2001 Planned Program:

•	65960	Complete PAC-3 missile Engineering and Manufacturing Development (EMD) program.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE: 0604865C PAC3 - EMD
	PROJECT: 2257

- 9632 Continue PAC-3 Target and Test Support
- 5424 Continue Operational Test Support

Total 81016

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000/2001 PB)	320842	29141	39119
Congressional Adjustments		75000	
Appropriated Value	182265	104141	
Adjustments to Appropriated Value		-2	
a. Congressional Reductions (FFRDC, Inflation, etc)	-1409		
b. OSD Reductions	-3511		
c. Congressional Reprogramming	60000		
d. FY 99 Emergency Supplemental		75000	
Adjustments to Budget Years Since FY 2000 PB			41897
President's Budget (FY 2001 PB)	237345	179139	81016

Change Summary Explanation:

Funding: FY 1999 (+55080): Project decremented (-1409) for undistributed Congressional reductions.
Project decremented (-3511) for undistributed Defense-Wide reductions.
Project increased (+60000) via Congressional Reprogramming to meet program funding requirements and cost growth.

FY 2000 (+149998): Congressional increase of (+75000) to meet program funding requirements.
Project decremented (-2) for undistributed reductions.
Congressional adjustment of (+75000) allocated from FY99 Emergency Supplemental.

FY 2001 (+41897): Project increased (+44000) to meet program funding requirements and cost growth.
Project decremented (-2103) undistributed reductions.

Schedule: PAC-3 Missile flight test program extended into FY 01. FUE delayed to FY02.

C. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
2257, PAC3 Procurement, PE 0208865C	184527	343773	365457	337674	346258	406358	307643	2382000	4990600

D. Acquisition Strategy: The design objective of the PATRIOT system is to provide a system capable of being modified to cope with the evolving threat. This strategy minimizes technological risks and provides a means of enhancing system capability through planned upgrades of deployed systems. The PATRIOT program consists of two interrelated acquisition programs – the PATRIOT Growth Program and the PAC-3 Missile Program. Growth Program modifications are grouped into configurations which are scheduled to be fielded in the same time frame. Configuration groupings are a convenience for managing block changes and are not a performance related grouping.

However, incremental increases in performance is determined for each configuration in order to provide benchmarks for configuration testing and for the development of user doctrine and tactics.

E. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Guidance Test Flight 1	2rd Qtr						
PAC-3 Missile Low Rate Initial Production (LRIP)		1st Qtr					
Configuration 3 CDT&E	3rd Qtr						
Configuration 3 Initial Operational Test & Evaluation (IOT&E)			3-4rd Qtr				
PDB-5 Software Release		3rd Qtr					
PAC-3 FUE			4th Qtr				
Milestone III				1st Qtr			

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604865C PAC3 - EMD

PROJECT: 2257

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. PAC-3 Missile EMD	SS-CPIF	LMVS/TX	844018	78000	Dec 99	18578	Oct 00	0	940596	940596
b. PAC-3 Missile Integration	SS-CPIF	Raytheon/MA	135933	24000	Dec 99	13000	Nov 00	0	172933	172933
c. RDEC	MIPR	MRDEC/AL	57875	9728	Dec 99	6376	Nov 00	0	73979	73979
Subtotal Product Development:			1037826	111728		37954		0	1187508	1187508

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA	C-CPAF	CAS/AL	33200	10140	Oct 99	4779	Oct 00	0	48119	48119
b. OGA/In-House	PO		56572	14200	Nov 99	4641	Nov 00	0	75413	75413
c. Engineering Support	SS-CPIF	Raytheon/MA	62939	11151		5685		0	79775	79775
Subtotal Support Costs:			152711	35491		15105		0	203307	203307

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. White Sands Missile Range	MIPR	WSMR/NM	71007	14170	Oct 99	12901	Oct 00	0	98078	98078
b. ADSAM			4668					0	4668	4668
c. Operational Test Support	MIPR		21951	8038		5424	Nov 00	0	35413	35413
d. Targets	MIPR	SMDC/AL	80956	9712		9632	Nov 00	0	100300	100300
e. Lethality	MIPR	SMDC/AL	37628					0	37628	37628
Subtotal Test and Evaluation:			216210	31920		27957		0	276087	276087

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604865C PAC3 - EMD

PROJECT: 2257

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.										
b.										
c.										
d.										
e.										
f.										
Subtotal Management Services:										

Remark:

Project Total Cost:			1406747	179139		81016		0	1666902	1666902

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604867C Navy Area - EMD

PROJECT: 2263

COST (*In Thousands*)	FY1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
2263 Navy Area	241883	307274	274234	228596	85866	33293	29369	TBD	TBD

A. Mission Description and Budget Item Justification

The Navy Area Theater Ballistic Missile Defense (TBMD) project builds on the national investment in AEGIS ships, AEGIS Weapon Systems (AWS), and Navy Standard Missile II (SM-2) Block IV missiles. Two classes of ships continue to be deployed with the AEGIS combat system: the CG-47 Ticonderoga-class cruisers and the DDG-51 Burke-class destroyers. Navy TBMD will take advantage of the attributes of naval forces including overseas presence, mobility, flexibility, and sustainability in order to provide lower tier protection to debarkation ports, coastal airfields, amphibious objective areas, Allied forces ashore, and other high value sites. Navy assets will provide an option for initial TBMD allowing the insertion of additional land-based TBMD assets and other expeditionary forces in an opposed environment.

FY 1999 Accomplishments:

•	203996	Continued Engineering/Manufacturing Development (EMD) of the missile. Continued fabrication and delivery of Inert Operational Missile (IOM) /Engineering Design Model (EDM) test rounds. Continued fabrication of White Sands Missile Range (WSMR) flight test and LINEBACKER missiles. Continued completion of exit criteria to support Long Lead Material (LLM) Decision for Low Rate Initial Production (LRIP). Continued AWS Baseline 6 Phase III full capability (tactical) computer program development, conducted Critical Design Review (CDR), and continued coding of the computer program. Continued follow-on AWS Baseline 7 Phase I computer program development. Initiated implementation of modifications to Navy Command and Control systems to maintain consistency with the Joint Planning Network (JPN), Joint Data Network (JDN), and Joint Composite Tracking Network (JCTN). Continued implementation of Joint Maritime Command Information System (JMCIS) TBMD segments and TBMD messages in Command and Control Processor (C2P).
•	5822	Continued Live Fire Test & Evaluation (LFT&E) testing and completed Phase I of LFT&E Arena and Warhead Sled Test Program. Continued required lethality analyses and lethality model refinements.
•	26565	Continued building and delivery of targets to support Navy TBMD flight tests and maintained infrastructure to support TMD targets.
•	5500	Participated in characterization testing in support of Iranian Missile Protection Act of 1998 (IMPACT 98) demonstration.
Total	241883	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE: 0604867C Navy Area - EMD / PROJECT: 2263

FY 2000 Planned Program:

•	269668	Continue EMD of the missile. Continue fabrication and delivery of WSMR flight test and LINEBACKER missiles. Begin missile Developmental Testing/Operational Assessment (DT/OA) at WSMR. Complete exit criteria to support and conduct review for LRIP LLM decision. Continue fabrication and delivery of IOM/EDM test rounds. Continue AWS Baseline 6 Phase III full capability (tactical) computer program development and initiate computer program testing of combat systems interface at Combat Systems Engineering Development Site (CSEDS). Continue follow-on AWS Baseline 7 Phase I computer program development. Continue implementation of modifications to Navy Command and Control systems to maintain consistency with the JPN, JDN, and JCTN.
•	4700	Complete LFT&E ground test program activities. Continue required lethality analyses and lethality model refinements.
•	32226	Continue building and delivery of targets to support Navy TBMD flight tests and maintain infrastructure to support TMD targets.
•	680	Provide testing support for IMPACT 98.
Total	307274	

FY 2001 Planned Program:

•	220560	Complete WSMR missile flight testing. Conduct review for missile LRIP decision and begin LRIP missile fabrication. Continue procurement of long lead components to support missile LRIP. Continue fabrication and delivery of IOM/EDM test rounds. Integrate IOM/EDM round into AEGIS LINEBACKER initial capability computer program. Conduct LINEBACKER DT at sea to provide an early deployment capability of Navy TBMD. Complete AWS Baseline 6 Phase III full capability (tactical) computer program coding and computer program testing at CSEDS. Begin preparations for delivery of AWS tactical computer program to Developmental Testing/Operational Testing (DT/OT) ship. Continue follow-on AWS Baseline 7 Phase I computer program development. Continue implementation of modifications to Navy Command and Control systems to maintain consistency with the JPN, JDN, and JCTN.
•	2501	Continue required lethality analyses and lethality model refinements.
•	50159	Continue building and delivery of targets to support Navy TBMD flight tests.
•	1014	Provide testing support for IMPACT 98 demonstration.
Total	274234	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604867C Navy Area - EMD

PROJECT: 2263

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000 PB)	242597	268389	226772
Congressional Adjustments		40000	
Appropriated Value		308389	
Adjustments to Appropriated Value	+1483		
a. Congressional Reductions (FFRDC, Inflation, etc)	-250	-3002	-1704
b. OSD Reductions	-565		
c. Emergency Supplemental			
d. Internal Reprogramming		1887	
Adjustments to Budget Years Since FY 2000 PB			+49166
Current Budget Submit (FY 2001 PB)	241883	307274	274234

Change Summary Explanation:

Funding: FY 99 decrease of $.815M was due to Congressional general reductions and OSD reductions. The FY00 Appropriation Act added $40M in support of the program rebaseline and a reduction of $1.115M was due to OSD reductions. The FY01 funding increase of $49.166M is also in support of the program rebaselining and reduction of $1.704M is an inflation adjustment.

Schedule: With the rebaselined program, the start of missile development testing phase at WSMR has been adjusted and the testing phase has been expanded to reduce schedule and technical risk following an initial assessment of program risk and recommendations from independent review group. This expanded WSMR schedule resulted in adjustments to the LRIP LLM and the LRIP decisions as well as the LINEBACKER at sea testing.

Technical: The new program baseline provides for higher confidence in the schedule, lowers technical risk, adds ground test assets, restructures flight test configurations, provides additional land based testing, and allows for more robust preparation prior to OT.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604867C Navy Area - EMD

PROJECT: 2263

C. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
Navy Area TBMD – AEGIS TBM Upgrades	14859	28971	7918	0	6983	56892	70437	73843	418305	677941
Navy Area TBMD – SM-2 Blk IVA Procurement		13700	10225	0	0	0	80445	102678	904573	1111621
WPN BLI: 223400 Standard Missile SM-2 BLK IVA	0	29000	92597	68538	107887	175831	219155	265037	1413164	2371209
WPN 2290 Other Missile Support Mk 21 Mod 1 VLS Canisters for SM-2 BLK IVA	0	0	2114	2342	4495	9455	14514	18991	120085	171996

D. Acquisition Strategy:

This strategy consists of a Navy Area TBMD Program evolving to a Theater-Wide Defense TBMD program. The Navy Area Program will build on existing force structure by modifying the SM-2 Block IV missile and AEGIS Combat System to achieve TBMD capability.

E. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
AEGIS Linebacker Preliminary Design Review	3Q									
SM-2 Block IVA Preliminary Design Review	4Q									
Acquisition Milestone II		2Q								
AEGIS Linebacker Critical Design Review		2Q								
AEGIS 6 Phase III Preliminary Design Review			1Q							
AEGIS Linebacker Engineering Assessment			4Q							
AEGIS 6 Phase III In Process Review			4Q							
AEGIS 6 Phase III Critical Design Review				1Q						
White Sands Missile Range Developmental Testing/Operational Assessment – Start					2Q					
Low Rate Initial Production Decision						3Q				
AEGIS Linebacker DT At-Sea Tests Complete						4Q				
Low Rate Initial Production Delivery							3Q			
Tactical DT/OT Flight Tests – Start							3Q			
Tactical First Unit Equipped								1Q		
Acquisition Milestone III								3Q		

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604867C Navy Area - EMD

PROJECT: 2263

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SM-2 Blk IVA Missile	CPAF	RAYTHEON	376326	107498	Cont	79346	Cont	TBD	563170	TBD
b. SM-2 Blk IVA Missile	WR	CHINA LAKE	4000	2000	Cont	2500	Cont	TBD	8500	TBD
c. SM-2 Blk IVA Missile	WR	NSWC PHD	0	595	Cont	1200	Cont	TBD	1795	TBD
d. AWS/BMC41	CPAF	LOCKHEED MARTIN	107250	74409	Cont	53590	Cont	TBD	235249	TBD
e. AWS/BMC4I/SM-2	WR	NSWC/DD	21390	9257	Cont	9466	Cont	TBD	40113	TBD
f. AWS/BMC4I/SM-2	CPFF	JHU/APL	22915	10592	Cont	9250	Cont	TBD	42757	TBD
g. AEGIS Weapon System	WR	(Sites)	0	7600	Cont	4040	Cont	TBD	11640	TBD
h. AEGIS Weapon System	MIPR	MIT/LL	2200	3000	Cont	1500	Cont	TBD	6700	TBD
i. AWS/BMC41	CPFF	TSC	1500	2350	Cont	1500	Cont	TBD	5350	TBD
j. AWS/SM-2	WR	NWAS	1924	2200	Cont	1800	Cont	TBD	5924	TBD
k. AWS/BMC41	WR	ATRC	0	1143	Cont	2225	Cont	TBD	3368	TBD
l. Vertical Launch System	CPAF	UNITED DEFENSE	5198	2509	Cont	474	Cont	TBD	8181	TBD
m. BMC4I	RCP	SPAWAR	11033	3966	Cont	4211	Cont	TBD	19210	TBD
n. SM-2/AWS/VLS	WR	VARIOUS	29489	3613	Cont	2908	Cont	TBD	36010	TBD
Subtotal Product Development:			583225	230732	Cont	174010	Cont		987967	TBD

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Architecture	CPFF	JHU/APL	927	1380	Cont	1379	Cont	TBD	TBD	TBD
b. VLS/Sys Architecture	WR	NSWC/DD	341	2125	Cont	2079	Cont	TBD	TBD	TBD
c. VLS/Sys Arch/BMC4I	VARIOUS	VARIOUS	5662	5524	Cont.	4433	Cont	TBD	TBD	TBD
Subtotal Support Costs:			6930	9029	Cont	7891	Cont	TBD	TBD	TBD

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 2000

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604867C Navy Area - EMD

PROJECT: 2263

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Test & Evaluation	CPFF	JHU/APL	2800	2128	Cont	1763	Cont	TBD	TBD	TBD
b. Test & Evaluation	WR	WSMR	3797	4994	Cont	11433	Cont	TBD	TBD	TBD
c. Test & Evaluation	WR	PMRF	355	895	Cont	4476	Cont	TBD	TBD	TBD
d. T&E/IMPACT/Lethality	WR	NSWC/DD	27169	5380	Cont	3515	Cont	TBD	TBD	TBD
e. VLS/T&E	WR	NSWC/PHD	4615	1835	Cont	1011	Cont	TBD	TBD	TBD
f. Targets		SMDC Army	35260	32226	Cont	50159	Cont	TBD	TBD	TBD
g. T&E/VLS/BMC4I	Various	Various	3874	9268	Cont	9733	Cont	TBD	TBD	TBD
Subtotal Test and Evaluation:			77870	56726	Cont	82090	Cont	TBD	TBD	TBD

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SM-2 Blk IVA Missile	CPAF	LOGICON	1550	1200	Cont	1200	Cont	TBD	TBD	TBD
b. AEGIS Weapon System	CPFF	PCI	375	1175	Cont	1175	Cont	TBD	TBD	TBD
c. Systems Architecture	PD	NAVSEA	7000	2000	Cont	2100	Cont	TBD	TBD	TBD
d. T&E/Sys Architecture	CPFF	Techmatics/SPA	2600	3819	Cont	3819	Cont	TBD	TBD	TBD
e. SM/BMC4I/SysArch/VLS	Various	Various	2638	2593	Cont	1949	Cont	TBD	TBD	TBD
Subtotal Management Services:			14163	10787	Cont	10243	Cont	TBD	TBD	TBD

Remark:

Project Total Cost:			682188	307274	Cont	274234	Cont	TBD	TBD	TBD

Remark: