Ballistic Missile Defense Organization
FY 2000/2001 RDT&E PROGRAM EXHIBIT R-1

APPROPRIATION: 0400D Research Development Test & Eval, Defwide Date: FEB 1999

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 1998	FY 1999	FY 2000	FY 2001	S E C
8	0602173C	Support Technologies - Applied Research	2	109,888	97,436	65,328	52,992	U
	Applied Research			**109,888**	**97,436**	**65,328**	**52,992**	
29	0603173C	Support Technologies - Advanced Technology Development	3	298,207	272,820	173,704	180,826	U
	Advanced Technology Development			**298,207**	**272,820**	**173,704**	**180,826**	
71	0603861C	Theater High-Altitude Area Defense System - TMD - Dem/Val	4	387,260	433,922	34,133	3,519	U
72	0603868C	Navy Theater Wide Missile Defense System	4	437,896	364,284	329,768	369,049	U
73	0603869C	Meads Concepts - Dem/Val	4	49,728	9,915	48,597	63,568	U
74	0603870C	Boost Phase Intercept Theater Missile Defense Acquisition - Dem/ Val	4	13,994	6,426			U
75	0603871C	National Missile Defense - Dem/Val	4	935,737	1,533,532	836,555	866,680	U
76	0603872C	Joint Theater Missile Defense - Dem/Val	4	684,181	200,133	195,722	218,608	U
77	0603873C	Family-of Systems Engineering and Integration (FoS E&I)	4		95,721	141,821	128,551	U
78	0603874C	BMD Technical Operations	4		184,842	190,650	160,295	U
79	0603875C	International Cooperative Programs	4		58,903	36,650	36,719	U
80	0603876C	Threat and Countermeasures	4		23,263	16,497	22,763	U
	Demonstration and Validation			**2,508,796**	**2,910,941**	**1,830,393**	**1,869,752**	
92	0604861C	Theater High-Altitude Area Defense System - TMD - EMD	5			577,493	556,178	U
93	0604865C	Patriot PAC-3 Theater Missile Defense Acquisition - EMD	5	242,690	320,842	29,141	39,119	U

Ballistic Missile Defense Organization
FY 2000/2001 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 0400D Research Development Test & Eval, Defwide

Date: FEB 1999

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 1998	FY 1999	FY 2000	FY 2001	S E C
94	0604867C	Navy Area Theater Missile Defense - EMD	5	292,063	242,597	268,389	226,772	U
	Engineering and Manufacturing Development			**534,753**	**563,439**	**875,023**	**822,069**	
122	0908612C	Acquisition Program Stability Reserve	6				9,821	U
	RDT&E Management Support						**9,821**	
	Total Ballistic Missile Defense Organization			**3,451,644**	**3,844,636**	**2,944,448**	**2,935,460**	

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

DATE: February 1999

BUDGET ACTIVITY: 2 - Applied Research

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

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	109888	97436	65328	52992	43925	39384	38262	31675	TBD	TBD
1180 Surveillance Technology	0	1780	0	0	0	0	0	0	TBD	TBD
1280 Interceptor Technology	0	963	0	0	0	0	0	0	TBD	TBD
1461 BMC4I	0	5203	0	0	0	0	0	0	TBD	TBD
1651 Innovative Science and Technology (IST)	52817	22975	7858	7911	7894	7875	7871	7862	Continuing	Continuing
1660 Statutory and Mandated Programs	57071	66515	57470	45081	36031	31509	30391	23813	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element includes the only applied research projects in the Department of Defense which focus specifically on future BMDO technical requirements.

To prepare to meet critical future active defense needs, the Innovative Science and Technology (IST) project invests in an aggressive program of high leverage technologies that yield markedly improved capabilities across a selected range of boost phase and terminal defense interceptors, advanced target sensors, and innovative science. The objectives of these investments are to provide: (1) component technologies that offer improved performance or reduced costs for BMDO acquisition programs; (2) a better understanding of the material characteristics and physics for processes that form the basis of technologies that support these acquisition programs; and (3) technical solution options to mitigate 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. The technologies pursued include: next generation sensors, power, information processing, optics, advanced materials, propulsion, and communication. This project causes and exploits breakthroughs in science that will keep BMD at the foremost edge of what is possible. A primary project goal is to conduct proof-of-concept demonstrations of some of these breakthroughs that will aid in transitioning the technology to development programs. Demonstration programs have been transferred to projects 1180, 1280, and 1461 in FY99.

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

The Technology Applications (TA) Program, established in 1986, makes technology from all parts of BMDO available to federal agencies, state and local governments, and U.S. business and research interests. The program objective is to develop and support the transfer of BMD derived technology to other Department of Defense applications as well as other federal, state and local government agencies, federal laboratories, universities and the domestic, commercial and private sector.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

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 applications in BMDO systems.

The Historically Black Colleges and Universities/Minority Institutions (HBCU/MI) program is managed in project 1660 under this program element (starting in FY99). 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 business contracts, 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 available due to the wise investment in innovative technologies some 10 years ago. Examples include: indium antimonide (InSb) and mercury cadmium telluride (HgCdTe) 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 sophisticated guidance and control; and solid-state gallium arsenide (GaAs) transmitter/receivers for BMDO radars.

Acquisition Strategy: The IST R&D program receives proposals in response to an annual Broad Agency Announcement (BAA) of research opportunities. Proposals received are competitively judged according to BMD relevance, cost, and capabilities of the offeror. The HBCU/MI program also receives proposals in response to an annual BAA. For the SBIR and STTR programs, strong emphasis is placed on the dual-use 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.

FY 1998 Accomplishments:

•	52817	IST BM/C3: Invested in neural networks for image recognition, optical image processing, and multi-sensor tracking. Invested in ultra-stable laser diodes for optical communication; terahertz communication sources; advanced computer architectures; and spread-spectrum CDMA communications modem. Began preparation for proof-of-principal tests of Virtual Distributed Hardware-in-the-Loop Testbed (VDHTB). VDHTB Program to transition to PMA 1461 in FY99. Materials: Invested in wide band-gap semiconductors and finalized prototype design of gallium nitride (GaN)-based high microwave power amplifier operated at 300 degrees Centigrade. Sensors: Demonstrated Fast Frame Seeker capability against simulated infrared cruise missile targets with a gimbaled airborne platform. Invested in high-impulse solid propellants; electric propulsion thrusters; and propellant manufacturability. Propulsion: Conducted Express/T-160 Hall effect thruster flight test critical design review (CDR). Invested in advanced switching for radar; high-efficiency solar cells and concentrators; and miniature interceptor guidance technology. Power: Initiated development of an advanced thermal battery for interceptors.
•	57071	SBIR/STTR : 190 Phase 1 SBIR Awards to 155 firms and 75 Phase II SBIR awards to 70 firms
Total	109888	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

FY 1999 Planned Program:

•	22975	IS&T: BMC3: Invest in ultra-stable laser diodes for optical communication; terahertz communication sources; advanced computer architectures; and spread-spectrum CDMA communications modem. Materials: Continue to invest in wide band-gap semiconductors; polymer-based electronics and digital superconducting electronics, based on technical progress and system technology needs. Conduct a critical design review for the Dual Mode Bow Shock Interaction experiment. Continue to invest in high-impulse solid propellants; electric propulsion thrusters; and propellant manufacturability, based on technical progress and system technology needs. Conduct Express/T-160 Hall effect thruster flight test. Power: Continue to invest in high-efficiency solar arrays, based on technical progress and system technology needs.
	1000	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 assitance 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.
•	64166	SBIR/STTR : Estimated 220 Phase 1 SBIR Awards to 180 firms and 85 Phase II SBIR awards to 80 firms
•	1349	HBCU/MI : Will incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.
•	7946	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 but to be excuted under Projects 1180, 1280, and 1461 in FY1999.
Total	97436	

FY 2000 Planned Program:

•	7858	Continue to investigate various BMC3, materials, sensors, propulsion, and power technologies, based on technical progress and system technology needs. Conduct the Dual Mode Bow Shock Interaction experiment
•	1000	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 assitance 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.
•	55164	SBIR/STTR : Estimated 195 Phase 1 SBIR Awards to 160 firms and 75 Phase II SBIR awards to 70 firms
•	1306	HBCU/MI : Will incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.
Total	65328	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research

FY 2001 Planned Program:

- 7911 Continue to investigate various BMC3, materials, sensors, propulsion, and power technologies, based on technical progress and system technology needs.
- 1000 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 assitance 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.
- 42779 SBIR/STTR : Estimated 175 Phase 1 SBIR Awards to 145 firms and 70 Phase II SBIR awards to 65 firms
- 1302 HBCU/MI : Will incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.

Total 52992

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	109628	86866	79370	75295
Congressional Adjustments		11000		
Appropriated Value		97866		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-430		
b. OSD Reductions				
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	109888	97436	65328	52992

Change Summary Explanation:

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

DATE: February 1999

BUDGET ACTIVITY: 3 - Advanced Technology Development

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

	COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	298207	272820	173704	180826	185315	187888	179225	179529	TBD	TBD
1155	Discrimination	33653	0	0	0	0	0	0	0	TBD	TBD
1161	Advanced Sensor Technology	28920	0	0	0	0	0	0	0	TBD	TBD
1180	Surveillance Technologies	0	31299	23639	26195	26247	27770	20816	21000	Continuing	Continuing
1264	Atmospheric Interceptor Technology	31606	0	0	0	0	0	0	0	0	0
1270	Adv Interceptor Materials and Systems Tech	42510	0	0	0	0	0	0	0	0	0
1280	Interceptor Technologies	0	73735	38508	38535	44308	43196	42870	41343	Continuing	Continuing
1360	Space Based Laser	118323	124963	75000	75000	75000	75000	75000	75000	Continuing	Continuing
1461	BMC4I	0	9642	5339	7814	7556	8370	7870	7401	Continuing	Continuing
1651	Innovative Science and Technology (IST)	4671	0	0	0	0	0	0	0	TBD	TBD
1660	Statutory and Mandated Programs	4008	0	2930	2943	2955	2972	3019	3066	TBD	TBD
3352	Modeling and Simulations	5015	0	0	0	0	0	0	0	TBD	TBD
3360	Test Resources	0	2532	0	0	0	0	0	0	TBD	TBD
4000	Operational Support	29501	30649	28288	30339	29249	30580	29650	31719	Continuing	Continuing

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 sensors, as well as advances in innovative science. The objectives of these investments are subsystems with improved performance and reduced costs for acquisition programs.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

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 (post-2000) BMD threats. This includes target object map generation on board interceptors, the detection and tracking of low observable targets, high leverage sensor technologies and the engineering analysis required to determine, leverage, and integrate BMDO and service sponsored technologies into BMDO systems to address the evolving threat (Project 1180).
- Development and Integration of the critical technologies for performing hypervelocity hit-to-kill intercepts of TBM's within and outside the atmosphere. Development and demonstration of advanced interceptor sensor processing and power components; multifunctional material and structures; low cost interceptor composite manufacturing processes; and including performing low cost flight test demonstrations. (Project 1280).
- Development of advanced chemical laser systems technologies to demonstrate their integration with a high power laser beam and large optics. (Project 1360)
- Development and demonstration of advanced technologies for BMD Battle Management Command, Control, Communication, Computer and Intelligence (BMC4I) to enhance kill assessment capabilities, increase situation awareness, and improve evaluation tools required to assess BMC4I system performance. (Project 1461)
- Manpower authorizations and the associated costs specifically identified and measured to 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.

The Air Force share of SBL follows:	FY99	FY00	FY01	FY02	FY03	FY04	FY05
	34884	63840	63779	63674	63565	64244	64938
	(FY99 will be 33753 after SBIR Reduction)						

FY 1998 Accomplishments:

- 33653 Discrimination: Provided analysis for Midcourse Space Experiment (MSX) cryogen phase data in support of Spaced Based Infrared System (SBIRS) and NMD/GBI. Supported operations of the MSX relevant to BMDO's mission. Provided Technical Analysis to BMDO with the specialized support required to resolve advanced technology development and technical operations issues, including trade studies of the cost, schedule, and technical risks of alternative program investment strategies. Supported the collection of signature data for technology needs by planning data collection and analyzing future signature and collection issues.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

- 28920 Russian American Observational Satellites (RAMOS): Specialized infrared sensors developed by the U.S. and Russia were flown aboard the U.S. Flying Infrared Signature Technology Aircraft (FISTA) with data collected and analyzed. Additional efforts were focused on the modeling and simulation of high altitude cloud sun glint reflection and cloud and background scene structure in the mid-to-longwave infrared band. Completed CDR and various program execution approaches were examined. Active Plasma Experiment (APEX): Began experimental planning, finalized experiment objectives and criteria. Specified experiment design, electrical, mechanical, and environmental interfaces between US and Russian components and systems. Began fabrication of components to be used for flight tests. Advanced Sensor Technology Program (ASTP): Performed laboratory, ground, and chamber demonstrations of integrated sensor components and transitioned to Discriminating Interceptor Technology Program (DITP) under Project 1270. DITP was combined with materials and structures to form Project 1282 (EIT).
- 31606 Atmospheric Interceptor Technology (AIT): Completed preparations for Jet Interaction, Strapdown Infrared Seeker (SIS), and Solid Divert Attitude Control System (SDACS) testing, awarded Integrated Test Bed (ITB) contract, defined Multi-Function Generator (MFG) effort and developed Rocket System Launch Program (RSLP) payload.
- 42510 Advanced Interceptor Materials and Systems Technology: Continued development of DITP sensors, fusion processor, and fusion algorithms. Initiated DITP integrated sensor demonstration project. Delivered Space Technology Research Vehicle (STRV)-2 Experiment Module. Conducted Critical Design Reviews (CDRs) and initiated fabrication of STRV-1d flight experiments. Delivered Solar Concentrator Array with Refractive Linear Element Technology (SCARLET) advanced concentrator solar array for flight testing. Continued development of thermal battery, lightweight composite structures and propulsion system components for interceptors. This activity was combined with DITP to form Project 1282, Exoatmospheric Interceptor Technology (EIT).
- 118323 Performed integrated laser, beam control and large optics system testing with an uncooled deformable mirror in high power beam train. Performed laser optimization testing, advanced nozzle testing, and advanced nozzle ring fabrication. Completed passive and active Acquisition, Tracking and Pointing (ATP) laboratory tests. Continued uncooled resonator fabrication. Conducted Concept Definition Studies. Developed Demonstration Objectives Document (DOD).
- 5015 Funded modernization and upgrades to Mission Oriented Information Technology Resources (ITR) in BMDO and BMDO-funded missile defense development programs in order to satisfy validated requirements of the ITR user community (Project 3352). Provided funding for the BMDO Data Centers Program to archive, manage, develop data products, distribute and provide remote access to all relevant BMD data. Specific priorities include: Advanced Missile Signature Center (AMSC) - supported Virtual Data Centers (VDC) design, development, testing, implementation and Initial Operational Capability (IOC), and MSX data management; Background Center of Expertise (BCoE) - supported VDC design, development, testing, implementation and IOC, transition to backgrounds data center of expertise; Missile Defense Data Center (MDDC) - supported VDC design, development, testing, implementation and IOC; BMD Simulation Support Center (SSC) - supported VDC design, development, testing, implementation and IOC, and established initial functions and capabilities as back-up data archive (Project 3352).
- 4671 IST (1651) - Provided research and development support for a pilot production line for Photoconductor on Active Pixel (POAP) detectors, for both visible and x-ray imaging applications.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

•	2627	TA (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 publications, brochures, target articles for journals and newspapers, quarterly newsletters, conference exhibits, ads and reports on BMDO technology, etc. 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 and commercialization. . Initiated new activities to include technology transfer demonstration projects.
•	1381	HBCU/MI (1660) - HBCU/MI program incrementally funded 8 contracts.
•	29501	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	298207	

FY 1999 Planned Program:

•	31299	Surveillance Technology: Continue satellite operation and data analysis for the Midcourse Space Experiment (MSX). Deliver Space Technology Research Vehicle-1d (STRV-1d) flight experiments. Launch STRV-1d and STRV-2 flight experiments. Complete performance analysis of SCARLET flight experiment data. Complete design of SCARLET Plasma Electric Discharge Experiment (SPEDE) flight experiment. Provide for low level planning and development of Advanced Radar Technology enhancements of transmitter/receiver technologies and signal processing architectures. Continue development of advanced technologies for space surveillance systems. Investigate sensors systems for low observable target. Perform overarching and integrated technology engineering analysis. This includes: development and update of BMDO Technology Master Plan to serve as guidance for BMDO and multi-service technology programs; detailed systems and architecture engineering analysis based on technology development needs; support of technology conference activities required to assure government and industry technology interface; and engineering-based Program Planning, Budgeting System Analyses.
•	73735	Interceptor Technology: Complete AIT Integrated Test Bed technology trade study. Conduct initial testing of Jet Interaction, SIS, and SDACS. Continue DITP Laser Radar, Passive Sensor, and Fusion Processor/Algorithm component development. Deliver DITP Government Furnished Equipment (GFE) Subsystem and conduct seeker integration and demonstration System Requirements Review and PDR. Conduct ground and laboratory testing of intermediate GFE subsystems. Conduct PDR and CDR for Master Frequency Generator (MFG) and RSLP launch. Complete development of interceptor thermal battery. Continue development of lightweight high performance multi-functional structures for interceptors. Continue development of advanced technology components for future interceptor systems. Leverage /fund Service technology development areas of value to UAV BPI.
•	9642	BMC4I Advanced Technology: Provide planning, development, and research for NMD and TMD Kill Assessment algorithm development and modeling. Leverage communications infrastructure to extend range and bandwidth of missile defense nodes. Develop advanced metric tracking and discrimination, correlation, fusion processing and networking technology to improve Situation Awareness and Engagement. Demonstrate real-time, geographically distributed computing technologies to support BMC4I using BMDO simulation and Hardware-in-the-Loop (HWIL) capabilities. Support Active Plasma Experiment, a U.S./Russian effort to study high-speed artificial plasma jets interaction with the atmosphere.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

•	124963	SBL: Complete Alpha laser high power optimization for power extraction and mode filling. Continue high power testing to improve brassboard integrated system performance, and data correlation; begin high power auto alignment tests. Perform conceptual design of Beta laser and beam expander for flight configured integrated ground experiment. Continue uncooled resonator and gain generator ring fabrication for the Beta laser. Complete ATP ground tests at WSMR against full scale boosting targets and perform balloon checkout flight. Initiate large, lightweight, deployable optics concept study known as Advanced Mirror System Development (AMSD). Conduct architecture and affordability study for directed energy concepts with space components.
•	30649	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.
•	2532	Operations and Maintenance: Provide 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.
Total	272820	

FY 2000 Planned Program:

•	23639	Surveillance Technology: Continue analysis of Midcourse Space Experiment (MSX) data in support of Space Based Infrared System (SBIRS) and NMD/GBI. 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. Complete data analysis of STRV-2 and STRV-1d flight experiments. Deliver SPEDE flight experiment to Space Test Program. Continue development of advanced technologies for space surveillance systems. Perform overarching and integrated technology engineering analysis. This includes: development and update of BMDO Technology Master Plan to serve as guidance for BMDO and multi-service technology programs; detailed systems and architecture engineering analysis based on technology development needs; support of technology conference activities required to assure government and industry technology interface; and engineering-based Program Planning, Budgeting System Analyses.
•	38508	Interceptor Technology: Conduct AIT ITB PDR. Complete initial Jet Interaction model validation, SIS prototype design, SDACS prototype design. Deliver MFG to PAC-3. Deliver and test DITP sensor subsystem. Begin integration of DITP sensor subsystem. Ground test DITP fused-sensor system and conduct integration/demonsstration CDR. Develop DITP Flight Test 1 GFE. Fabricate and ground test multi-functional structure. Continue development of advanced technology components for future interceptor systems.
•	5339	BMC4I Advanced Technology: 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. Develop advanced metric tracking and discrimination, correlation, fusion processing and networking technology to improve Situation Awareness and Engagement. Develop modeling and simulation tools and HWIL test-beds to evaluate BMC4I technologies integrated with representations of the actual sensors and weapons systems under development. Demonstrate real-time, geographically distributed computing technologies to support BMC4I using BMDO simulation and HWIL capabilities.
•	75000	SBL: Conduct System Conceptual Design Review (CoDR) for flight configured integrated ground experiment. Complete fabrication of Beta laser gain generator and uncooled resonator. Perform ATP flight tests against TBM representative targets. Continue design validation and risk reduction for the integrated ground experiment. Complete and select concept(s) to pursue from the large, lightweight, deployable optics study.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev

- 28288 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.
- 2930 Government civilian salaries.

Total 173704

FY 2001 Planned Program:

- 26195 Surveillance Technology: 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 SPEDE flight experiment. Continue development of advanced technologies for space surveillance systems. Perform overarching and integrated technology engineering analysis. This includes: development and update of BMDO Technology Master Plan to serve as guidance for BMDO and multi-service technology programs; detailed systems and architecture engineering analysis based on technology development needs; support of technology conference activities required to assure government and industry technology interface; and engineering-based Program Planning, Budgeting System Analyses.
- 38535 Interceptor Technology: Conduct AIT ITB CDR and perform ITB ground tests. Complete Jet Interaction model validation. Deliver prototypes for SIS and SDACS. Conduct DITP Flight Test 1. Deliver GFE and fused-sensor system for DITP Flight Test-2. Flight test advanced multi-functional interceptor structure. Continue development of advanced technology components for future interceptor systems.
- 7814 BMC4I Advanced Technology: Continue development and research for NMD and TMD Kill Assessment modeling and simulation. Develop advanced interoperability messaging and translation protocols to improve communications. Initialize development of pre-planning and adaptive battle management tools to account for probability of kill and available inventory. Develop advanced metric tracking and discrimination, correlation, fusion processing and networking technology to improve Situation Awareness and Engagement. Develop modeling and simulation tools and HWIL test-to evaluate BMC4I technologies integrated with representations of the actual sensors and weapons systems under development. Demonstrate utility of virtual distributed HWIL test-bed to illustrate increased communication bandwidth.
- 75000 SBL: Continue design activities leading to a system PDR in FY02 for a flight configured integrated ground experiment. Install and initiate testing of Beta laser. Modify brassboard beam control and large optics hardware for ground experiment design validation and risk reduction. Begin advanced ATP risk reduction and design validation activities. Begin fabrication of large, lightweight, deployable optics demonstration hardware.
- 30339 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.
- 2943 Government civilian salaries.

Total 180826

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

DATE: February 1999

BUDGET ACTIVITY: 3 - Advanced Technology Development

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

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	299788	166676	165431	163514
Congressional Adjustments		111000		
Appropriated Value		277676		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-4356		
b. OSD Reductions		-500		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	298207	272820	173704	180826

Change Summary Explanation:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2260

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense (THAAD)	387260	433922	527871	3519	0	0	0	0	0	1352572

Note: FY00 THAAD EMD and Dem/Val controls do not match OSD/OMB funding controls due to a requested transfer of THAAD EMD ($493,738) to THAAD Dem/Val not being processed prior to the funding controls database lock. These exhibits reflect the correct allocation of funds and the database realignment will be addressed at the Congressional level prior to funding appropriation.

A. Mission Description and Budget Item Justification

The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBM) 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, Control, Communications, Intelligence (BM/C3I) units, THAAD Radars, and support equipment. The THAAD Radar (formerly known as Ground Based 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/C3I architecture will provide robust protection against the TBM threat spectrum. THAAD is pursuing integration of THAAD BM/C3I with the Project Manager (PM), Air and Missile Defense Command and Control Systems (AMDCCS) to take advantage of previous Army developments that can be incorporated into the THAAD program.

The Demonstration/Validation (Dem/Val) program will develop the requirements for the objective THAAD system and demonstrate the capabilities of the system in a series of 13 flight tests. The Dem/Val development continues to incorporate the User Operational Evaluation System (UOES) program which is focused on obtaining early soldier involvement in the design of the objective system. As a part of this program, 2 THAAD radars, 4 launchers, and 2 BM/C4I units have been acquired. This hardware has been delivered and is being employed to support the Dem/Val flight test program and soldier training. The Dem/Val contract option for acquisition of UOES missiles will not exercised and has been replaced with a Risk Reduction/contingency (RR/c) program. The RR/c program is focused on reducing risk in the development of the objective system missile and making needed design improvements for testability, reliability, and producibility. Twenty RR/c missiles will be acquired to support ground testing and RR/c flight testing planned in early EMD. The THAAD system design will be developed in and tested in the Engineering and Manufacturing Development (EMD) phase leading to low rate initial production and subsequent fielding in FY07.

During FY95 - FY99 the Dem/Val flight test program is being conducted at White Sands Missile Range (WSMR), New Mexico. The flight test schedule consists of flight and system tests which began on April 21, 1995 with a successful first flight of the THAAD missile. To date, eight flight tests have been conducted with the ninth flight planned for 2Q99. The targets for the flight test program are being developed under the Tactical Missile Defense Targets contract (Project 3354).

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL; PROJECT: 2260

The THAAD Program continued Dem/Val hardware and software design, development and delivery in support of integration and acceptance testing for flight testing at WSMR. The THAAD Dem/Val radar was delivered to WSMR in July 1995, and has participated in flights 3 through 6. The Dem/Val Radar performed in the shadow mode to the test range radar and was the primary sensor on flight 6. Once UOES Radar #1 became available, the Dem/Val Radar was delivered to the national missile defense program for use in their test program. UOES Radar #1 was delivered to WSMR in May 1996, and completed range integration and test in September 1996. It performed nominally in the first Radar System Test in October 1996 and was used for flight testing in flights #7 and #8. UOES Radar #1 will be used for the remainder of the Dem/Val flight tests. The UOES Radar #2 went through range integration and test from September to November 1996, and was used in the second Radar System Test in March 1997. It is currently being used for requirements verification and to check out the block upgrade software to be used on flights #10 - #13. The first flight which was a non-intercept flight was successfully conducted at WSMR on April 21, 1995, proving the THAAD missile propulsion system booster/kill vehicle separation, seeker shroud cover deployment, seeker data, uplink/downlink communications from the Radar Interface Unit (RIU) to the missile, and pre-planned command destruct. The second flight was conducted on July 31, 1995, as a planned non-intercept, guidance and control test. The missile successfully performed the THAAD Energy Management Steering (TEMS) maneuver which resulted in nominal velocities and accelerations. The kill vehicle successfully maneuvered in response to planned In-Flight Target Updates (IFTUs). The third flight was a non-intercept fly-by test against a Storm target on October 13, 1995. The missile collected critical seeker data and the BM/C3I generated the fire control solution and sent the launch command to the interim launcher. During Flight 4, on December 13, 1995, much success was demonstrated even though a planned intercept was not accomplished. The flight test demonstrated seeker close-loop track, kill vehicle homing guidance, and THAAD Radar generation of uplink messages. Detailed analysis of the failed intercept verified that a software error in avionics processing caused the missile to perform an errant maneuver during flyout that consumed fuel required for interceptor divert and control for end game. Flight 5 was conducted March 22, 1996. The flight test successfully demonstrated the first launch from the tactical Palletized Loading System launcher. However, during kill vehicle/booster separation, a power interrupt to the integrated avionics processor caused the missile computer to reset to a prelaunch condition, which predestined the missile on a ballistic flight path and prevented target intercept. During flights 4, 5, and 6, the THAAD Radar successfully tracked both the THAAD interceptor and the target. During flights 4 and 6, it properly maintained track on the interceptor and seeker shrouds during shroud separation. All radar mission events, times, and durations, went as predicted in pre-mission analysis. Flight 6 was conducted July 15, 1996. The THAAD missile did not intercept the target due to the seeker not providing the proper imagery to the onboard computer. Analysis and testing determined the most likely cause of failure was dewar contamination. Although an intercept was not achieved, critical data was obtained on how the seeker viewed the target. Flight 7 conducted March 6, 1997, failed to achieve an intercept due to the inability to provide in-flight course correction from the missile Divert and Attitude Control Systems (DACS). Post flight analysis concluded that the THAAD radar, launcher, and BM/C3I segments performed nominally, and that the failure mode resided in the missile kill vehicle in the electronics connection between the kill vehicle battery and the Divert and Attitude Control System. Flight 8 conducted May 12, 1998 failed to achieve an intercept due to an electrical short in the thrust vector control in the booster. Post flight analysis indicated that the THAAD radar, launcher, and the BM/C3I segments performed nominally.

FY 1998 Accomplishments:

- 244668 Major Contracts: Conducted pre-EMD risk mitigation activity and continued system flight test program and support.
- 64731 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL; PROJECT: 2260

•	48503	Government Furnished Equipment (GFE)/Other: Continued integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C3I, 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/C3I with PM, AMDCCS to take advantage of previous Army developments of force operations software.
•	17317	In-house support: Maintained government salaries and benefits, travel, training, etc.
•	8279	Targets: Continued development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintained infrastructure to support TMD targets.
•	2258	Lethality Analysis: Continued lethality simulation code validation.
•	1504	Operational Test and Evaluation (OT&E): Conducted independent assessment of the THAAD System.
Total	387260	

FY 1999 Planned Program:

•	302591	Major Contracts: Continue system flight test program and support. Begin RR/C missile design and development work. Conduct Missile Requirement Review and System Software Review. Continue pre-EMD risk mitigation activities, conduct Radar Prelimary Design Review, and prepare for the MSII DAB.
•	47949	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. Continue integration and support THAAD flight testing.
•	47762	Government Furnished Equipment (GFE)/Other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C3I, 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 flight tests to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C3I with PM, AMDCCS to take advantage of previous Army developments of force operations software.
•	6	Undistributed Reductions.
•	19127	In-house support: Maintain government salaries and benefits, travel, training, etc.
•	9937	Targets: Continue development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintain infrastructure to support TMD targets.
•	5198	Lethality Analysis: Continue lethality simulation code validation.
•	1352	Operational Test and Evaluation (OT&E): Conduct independent assessment of the THAAD System.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603861C THAAD System - DEM/VAL; PROJECT: 2260

Total 433922

FY 2000 Planned Program:

- 389224 Major Contracts: Complete system flight test program and support. Initiate procurement, fabrication, and integration of RR/c missiles. Complete pre-EMD risk mitigation activities; conduct missile and BM/C3I PDRs; and finalize preparations for the MSII DAB.
- 62976 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. Continue integration and support THAAD flight testing.
- 38600 Government Furnished Equipment (GFE)/Other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C3I, 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 flight tests to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C3I with PM, AMDCCS to take advantage of previous Army developments of force operations software.
- 21400 In-house support: Maintain government salaries and benefits, travel, training, etc.
- 7264 Targets: Continue development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintain infrastructure to support TMD targets.
- 7086 Lethality Analysis: Continue lethality simulation code validation.
- 1321 Operational Test and Evaluation (OT&E): Continue independent assessment of the THAAD System.

Total 527871

FY 2001 Planned Program:

- 3519 Complete Dem/Val phase flight test data reduction and analysis.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	390785	497752	37000	5400
Congressional Adjustments		-52500		
Appropriated Value		445252		
Adjustments to Appropriated Value				

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2260

a. Congressional Reductions (FFRDC, Inflation, etc)		-8648		
b. OSD Reductions		-2682		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	387260	433922	527871	3519

Change Summary Explanation for FY98 Below Threshold Reprogramming:

(-1,200) FY98: Funds were reprogrammed for PAC 3 Spare Target Hardware.
(- 508) FY98: Funds were adjusted between FY99 President's Budget and the FY00 President's Budget
(-1,817) FY98: Funds were reprogrammed.
(-3,525) FY98 Total

Change Summary Explanation for FY00 Adjustment to Budget: Due to program schedule slip, EMD dollars transferred to Dem/Val (+493,738) along with some reductions/recissions (-2,867).

Change Summary Explanation for FY01 Adjustment to Budget: Due to undistributed reductions/recissions (-1,881).

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 Theater Wide – 0603868C	437896	364284	329768	369049					TBD	TBD
THAAD MILCON – 0604861C	0	0	0	0	0	4689	17200	0	0	21,889
THAAD EMD– 0604861C	0	0	83755*	556178	417530	289197	188652	0	0	1,535312
UPPER TIER – 0604218C	0	0	0	0	514318	471852	517902	634550	Cont	Cont
THAAD Procurement – 0208861C						91729	182628	603924	5186000	6064281

*FY00 THAAD EMD and Dem/Val controls do not match OSD/OMB funding controls due to a requested transfer of THAAD EMD ($493,738) to THAAD Dem/Val not being processed prior to the funding controls database lock. These exhibits reflect the correct allocation of funds and the database realignment will be addressed at the Congressional level prior to funding appropriation.

D. Acquisition Strategy: The THAAD Acquisition Strategy approved for the Dem/Val phase specified full and open competition for THAAD system integration, missiles, launchers, and BM/C3I. The TMD Ground Based Radar (GBR) Acquisition Strategy also specified full and open competition for Dem/Val. 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 Dem/Val program will develop a design for the THAAD System. The THAAD Radar (formerly known as TMD-GBR) Dem/Val contract was competitively awarded to Raytheon Company in September 1992. The Dem/Val phase includes the development and test of one Dem/Val radar and two UOES radars.

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2260

E. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Dem/Val Radar Integration and Test	1Q									
System Design Review	3Q									
UOES Radar 1 I&T Complete	4Q									
Radar System Test #1		1Q								
UOES Radar 2 I&T Complete		2Q								
Radar System Test #2			2Q							
Software Specification Review				3Q						
Risk Reduction Award				3Q						
Integrated System Tests Complete					1Q					
Milestone II					3Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. LMMS	CPFF/CPAF		1841818	279091		369224		3519		0	2493652	2493652
b. Raytheon	CPIF/AF/FF		561987	23500		20000		0		0	605487	605487
Subtotal Product Development:			2403805	302591		389224		3519			3099139	3099139

Remark:

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
a. SETA	CPAF		138799	25281		28500		0		0	192580	192580
b. Other Spt Cont	Various		268687	22668		34476		0		0	325831	
c. OGAs	MIPR		145075	38070		28600		0		0	211745	
d. Program Mgmt	Various		101581	19127		21400		0		0	142108	
Subtotal Support Costs:			654142	105146		112976					872264	

Remark:

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
a. WSMR	MIPR		73884	9692		10000		0		0	93576	
b. OT&E			8898	1352		1321		0		0	11571	
c. TARGETS			122118	9937		7264		0		0	139319	
d. LETHALITY			13347	5198		7086		0		0	25631	
Subtotal Test and Evaluation:			218247	26179		25671					270097	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Undistributed Reductions		BMDO		6							6	
b.												
c.												
d.												
e.												
f.												
Subtotal Management Services:				6							6	

Remark:

Project Total Cost:			3276194	433922		527871	0	3519			4241506	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1266

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1266 Navy Theater Wide	437896	364284	329768	369049	0	0	0	0	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 descent 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 descent 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.

FY 1998 Accomplishments:

- 375680 Continued ALI systems engineering, test article procurement, program management, and test and evaluation. Continued Vertical Launch System (VLS) integration and engineering of the NTW SM-3 missile. Continued KW technology assessments and shipboard system risk reduction activities. Continued NTW TBMD planning and studies, and completed Navy COEA Phase II. Continued AWS integration of SM-3 and provided limited AWS integration in support of ALI demonstration flights.
- 7622 Continued lethality requirement definition support and lethality performance testing of NTW KW.
- 16594 Continued target engineering and initiated PMRF range upgrades to support NTW test and evaluation.
- 38000 IMPACT 98 Supplemental funds used to accelerate the SIGPRO RRA DT-1B computer program development and KW lethal aimpoint development. Initiated procurement of DT-1B SM-3 Long Lead Material, increased development and testing assets at CSEDS and associated NTW Block I Systems Engineering.

Total 437896

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL
	PROJECT: 1266

FY 1999 Planned Program:

•	315856	Conducted extremely 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. Continue 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. Design, develop, manufacture, integrate, and test ALI Control Test Vehicles (CTV), Flight Test Rounds (FTRs), and associated ground hardware and test equipment. Perform AEGIS Combat System (ACS) development engineering to support the ALI program. Continue the NTW test and evaluation process to include participation in the TMD Critical Measurements Program (TCMP)-3A where threat representative data will be collected by NTW weapon system components and interoperability with other BMD systems will be demonstrated within the evolving USACOM sponsored TMD Family of Systems architecture.
•	6769	Continue lethality requirement definition support and lethality performance testing of NTW KW.
•	21659	Continue targets procurement to support NTW test and evaluation, and provide test facilities support.
•	20000	Commence cooperative development with the Government of Japan on selected NTW Block II technologies.
Total	364284	

FY 2000 Planned Program:

•	306151	Continue ALI, initiate Threat Representative Testing (TRT) engineering, and continue Block I systems engineering, test article procurement, program management, risk reduction activities, and test and evaluation.
•	4664	Continue lethality requirement definition support and lethality performance testing of NTW KW.
•	18953	Continue targets procurement to support NTW test and evaluation.
Total	329768	

FY 2001 Planned Program:

•	358174	Continue ALI, TRT, and Block I systems engineering, program management, risk reduction activities, and test and evaluation.
•	6660	Continue lethality requirement definition support and lethality performance testing of NTW KW.
•	4215	Continue targets procurement to support NTW test and evaluation.
Total	369049	

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1266

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	419414	190446	186144	183258
Congressional Adjustments		148000		
Appropriated Value		338446		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-2121		
b. OSD Reductions		-2041		
c. Emergency Supplemental		30000*		
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	437896	364284	329768	369049

*Of this amount, $10 million will be executed in FY1999 and $20 million in FY2000

Change Summary Explanation: FY98 increase represents Congressional Emergency Supplement Appropriation Act funding. FY99 increase represents Congressional plus up and Omnibus Consolidate and Emergency Supplemental Appropriations Act funding. FY00-01 and adjustments establish program, and increase test and evaluation requirements.
Schedule: FY00 President's Budget adjustments to support FUE 2007.
Technical: Increased test and evaluation requirements to include TRT.

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
THAAD - 0603861C	387260	433922	527871	3519	0	0	0	0	0	1352572
THAAD - 0604861C	0	0	83755	556178	417530	289197	188652	0	0	1535312
Upper Tier - 0604218C	0	0	0	0	514318	471852	517902	634550	Cont	Cont
Navy Area - 0604867C	292063	242597	268389	226772	64208	51548	33596	26665	TBD	TBD
Navy Area Procurement - 0208867C	14859	43189	55002	61066	121035	134379	152319	181381	TBD	TBD

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603868C Navy Theater Wide - DEM/VAL; PROJECT: 1266

D. Acquisition Strategy:

E. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Transition to Navy as Execution Agent	4Q									
Control Test Vehicle 1		4Q								
Complete Navy TBMD COEA Phase II			1Q							
Target Test Vehicle 1				1Q						
DAB Review				2Q						
Control Test Vehicle 1A				4Q						
Flight Test Round 1					1Q					
Flight Test Round 2					2Q					
Flight Test Round 3					3Q					
Flight Test Round 4					4Q					
Flight Test Round 5						1Q				
Flight Test Round 6						2Q				
Flight Test Round 7						3Q				

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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	Standard Missile Co.	506219	178665		169576		193478		TBD	1047938	
b.	CPAF	Lockheed Martin	147062	60251		46668		61592		TBD	315573	
c.	CPAF	United Defense	10051	1996		700		550		TBD	13297	
d.	CPAF	Raytheon	26120	9000		0		0		0	35120	
e.	CPFF	JHU/APL	56099	18252		17962		18327		TBD	110640	
f.	CPFF	TSC	4800	2000		2000		2000		TBD	10800	
g.	WR	NSWC Dahlgren	76924	22114		21399		23336		TBD	143773	
h.	MIPR	MIT/LL	13058	6336		6518		6518		TBD	32430	
i.		BMDO	89271	0		0		0		0	89271	
j.		Misc	31864	3194		3716		4240		TBD	43014	
Subtotal Product Development:			961468	301808		268539		310041			1841856	

Remark:

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
a.	CPFF	Techmatics	6669	7315		6535		6900		TBD	27419	
b.	CPAF	VITRO	4427	1245		1300		1360		TBD	8332	
c.	CPFF	SYSCON	2230	1143		1200		1500		TBD	6073	
d.	CPFF	SPA	1081	600		600		600		TBD	2881	
e.		Misc	2908	450		421		637		TBD	4416	
Subtotal Support Costs:			17315	10753		10056		10997			49121	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1266

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
a.	CPAF	Lockheed Martin	1000	1000		1000		1000		TBD	4000	
b.	CPFF	JHU/APL	4200	1389		1025		3214		TBD	9828	
c.	CPFF	MANTECH	1500	250		0		0		TBD	1750	
d.	WR	NSWC Dahlgren	15602	1447		1772		2541		TBD	21362	
e.	WR	NSWC Port Hueneme	1356	2329		5030		6068		TBD	14783	
f.	MIPR	NAIC	6118	0		0		0		0	6118	
g.	WR	PMRF	6529	3127		3001		8257		TBD	20914	
h.	MIPR	SMDC Army	22303	19158		18953		4215		TBD	64629	
i.		Misc	12776	2063		1949		2820		TBD	19608	
j.	MIPR	Sandia Labs		2501		0		0		0	2501	
Subtotal Test and Evaluation:			71384	33264		32730		28115			165493	

Remark:

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.	WR	NAVSEA	2500	2300		2400		2500		TBD	9700	
b.	WR	NSWC Dahlgren	14624	8852		8900		9200		TBD	41576	
c.	WR	NRL	1724	1800		1500		1700		TBD	6724	
d.	WR	NAWC China Lake	8586	3287		3280		3806		TBD	18959	
e.	WR	NWAD	1625	805		1000		1100		TBD	4530	
f.	WR	NSWC Indian Head	2049	1140		1040		1255		TBD	5484	
g.		Misc	2752	275		323		335		TBD	3685	
Subtotal Management Services:			33860	18459		18443		19896			90658	

Remark:

Project Total Cost:			1084027	364284		329768		369049			2147128	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1262

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1262 Medium Extended Air Defense System (MEADS)	49728	9915	48597	63568	34164	0	0	0	0	205972

A. Mission Description and Budget Item Justification

The Medium Extended Air Defense System (MEADS) has been extensively restructured. The revised program will develop, test and potentially certify advances in air and missile defense for the Corps level maneuver forces and deliver a prototype system. The revised program is still envisioned as an international cooperative effort to share overall program costs, enable coalition warfare and promote interoperability among US, German, and Italian forces. There remains a critical void in the development of defense against the threat to our maneuver forces from low-to-medium altitude advanced aircraft and theater ballistic missiles. This effort will continue to explore opportunities to develop new technologies, components, or updated components and systems to meet this challenge. Early efforts should include the initial development of items such as launchers and radar systems to be incorporated into, or serve as adjuncts to, existing air defense systems. Concepts will be validated through a proof of principle method capitalizing on the already programmed Air Directed Surface to Air Missile (ADSAM) demo efforts. Use of the PAC-3 missile will be the baseline interceptor considered for the effort. The THAAD Family of Systems ground based radar along with other in-theater sensors (e.g., JLENS) will also be examined to fulfill the surveillance function. The existing THAAD Tactical Operation Center (TOC) and the associated battle management system will also be transferred into the program to reduce development cost and speed the proof of principle activity. Some technology effort will be dedicated to a fire control radar to satisfy the mobility, strategic deployability, and interoperability requirements. Improvements will be balanced against costs along with the projected evolving threat to prevent an erosion in the capability of the US and our allies to continue to meet the near term threats. The early efforts will focus on studies and analyses to determine trades between requirements and costs. Results from previous and ongoing programs (such as MEADS, PAC-3, ADSAM, NADS, AMRAAM, and FAADS/Sentinel, among others) will be used in these efforts. This approach includes prototyping of system specific and surrogate hardware and software in key areas of surveillance and fire control radar, vertical launch launcher, missile subelements (such as a seeker) and TOC. CAIV analysis will be applied to the currently defined requirements. Top level guidance is provided by the Ballistic Missile Defense Organization and the executing agent is the Air and Missile Defense Program Executive Office. The goal of this program is to advance such improvements to mobile missile and air defense to develop affordable solutions to the MEADS requirements.

Several candidate projects have been identified, ranging from developing and demonstrating high mobility launchers for interceptors currently in testing within other programs, to development of more capable sensors and related system elements. Changes to current and evolving systems to improve responsiveness, flexibility and affordability will be considered.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603869C MEADS - DEM/VAL (PD-V)
	PROJECT: 1262

FY 1998 Accomplishments:

- 43930 NAMEADSMA continued the MEADS Project Definition-Validation (PD-V) Phase, completed the System Design Review (SDR), and released Invitation to Offerers (ITO) for the Design and Development (D&D) Phase. Includes U.S. share of operational costs (prime and support contractors) and administrative costs (travel, training, supplies, equipment, etc.) for NAMEADSMA.
- 3181 U. S. support contractors and other government agencies continued to support the MEADS PD-V Phase by conducting assigned tasks for user coordination, modeling/simulation, survivability, data management, cost analysis, security management, threat assessment, environmental, safety, logistics, and independent evaluations of contractor trades and analysis. Also continued Analysis of Alternatives (AoA) effort to determine MEADS effectiveness supporting forced entry/maneuver operations.
- 2617 U.S. personnel continued to support the MEADS PD-V Phase in accordance with the Memorandum of Understanding (MOU) and to conduct assigned tasks in support of and directly related to both national and international management oversight and review activities, technology transfer and technology assessment efforts, cost estimating, and DAB preparation. Includes U.S. salaries and benefits for NAMEADSMA and the MEADS Product Office.

Total 49728

FY 1999 Planned Program:

- 9915 ADSAM Demonstration

Total 9915

FY 2000 Planned Program:

- 10000 Demonstration studies and trade space analyses to re-examine priority of International Key Performance Parameters (IKPPs).
- 21500 Tailored major end item prototype development of lightweight launcher and BMC4I.
- 13597 Leverage existing technology development in the areas of surveillance and fire control radars.
- 3500 Management Oversight and Support for a reduced combined US and International Program Office. Includes U.S. support contractors and other efforts tied to in house support of executing the replanned program.

Total 48597

FY 2001 Planned Program:

- 7000 Continue studies and trade space analyses to re-examine priority of International Key Performance Parameters (IKPPs). Provide interim report of trade space analysis to focus continued proof of principle activity.
- 39668 Continue tailored major end item prototype development of lightweight launcher and BMC4I.
- 10500 Continue leveraging existing technology development in the areas of surveillance and fire control radars.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603869C MEADS - DEM/VAL (PD-V) / PROJECT: 1262

- 2900 Test planning and target procurement to support prototype validation.
- 3500 Management Oversight and Support to include combined US and International Program Office. Includes support tied to in-house execution of the replanned program.

Total 63568

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	46144	43027	0	0
Congressional Adjustments		-33000		
Appropriated Value		10027		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-52		
b. OSD Reductions		-60		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	49728	9915	48597	63568

Change Summary Explanation:

Funding FY 1998 (-1727) Congressional General Reductions; (+3499) Project increased for closeout of PD-V.
FY 1999 (-112) Congressional General Reductions.
FY 2000 (+ 48597) MEADS Proof of Principle.
FY 2001 (+63568) MEADS Proof of Principle.

Schedule: None

Technical: None

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
ADSAM - 0603869C		107								
PAC-3 EMD - 0604865C	242690	320842	29141	39119						
NADS EMD – 0604867C	292063	242597	268389	226772	64208	51548	33596	26656		
THAAD DEM/VAL – 0603861C	387260	433922	527871	3519						
THAAD EMD – 0604861C			83755	556178	417530	289197	188652			

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603869C MEADS - DEM/VAL (PD-V)
	PROJECT: 1262

D. Acquisition Strategy:

The previous MEADS acquisition strategy was developed based on having two competitive transatlantic industrial teams conduct the PD-V phase in which technology among Germany, Italy and the United States would be leveraged to define the most cost-effective solution to meet the MEADS operational requirements. Contracts to conduct the international industrial teaming and development were awarded in Oct 96 and completed in Dec 98. Deliverables included a total system concept based upon the International Technical Requirements Document, engineering design trades and simulations/modeling. During the PD-V phase, the two international entities submitted proposals to compete for selection as the sole contractor to conduct the D&D and Production phases. This effort is in the process of being novated to support a more streamlined acquisition. Future contracting efforts in FY2000-2001 to acquire prototypes for test and evaluation will be awarded on a competitive basis and will not be restricted to the two previous teams. The MEADS Product Office is also pursuing integration of BMC4I with the Project Manager, Air Defense Command and Control Systems (ADCCS), to take advantage of previous Army developments that can be incorporated into the program.

E. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Study & trade space analysis initiated					2nd Qtr					
Study & trade space analysis completed							4th Qtr			
Major end item prototype development initiated					2nd Qtr					
Major end item prototype development completed								4th Qtr		
Test planning & activity begin						2nd Qtr				
Test planning & activity completed								4th Qtr		

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. International Teaming	FFP	LM/H&R Teams	9605								9605	
b. Proj Def-Val (PD-V)	FFP	NAMEADSMA	104268								104268	
c. MEADS Alternatives	TBD	TBD				39378		51354		21164	111896	
Subtotal Product Development:			113873			39378		51354		21164	225769	

Remark:

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
a. Analysis of Alternatives	LOE/MIPR	BMDO&PEO AMD	2298								2298	
b. Contracts	LOE	BMDO&PEO AMD	3439			3590		4635		4882	16546	
c. Other Govt Agcy	MIPR	BMDO&PEO-AMD	1260			1592		2736		2118	7706	
Subtotal Support Costs:			6997			5182		7371		7000	26550	

Remark:

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
a. Redstone Tech Test Ctr	MIPR	Huntsville, AL	253			1000		1700		2500	5453	
b. ADSAM	TBD	TBD		7915							7915	
Subtotal Test and Evaluation:			253	7915		1000		1700		2500	13368	

Remark:

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. Internal Operating and US Govt Salaries	In-House	MEADS Prod Ofc	7233	2000		3037		3143		3500	18913	
Subtotal Management Services:			7233	2000		3037		3143		3500	18913	

Remark:

Project Total Cost:			128356	9915		48597		63568		34164	284600	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1294

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1294 UAV Boost Phase Interceptor	13994	6426	0	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

The Unmanned Aerial Vehicle (UAV)- Boost Phase Intercept (BPI) project covers two tasks; Task 1 Israeli Boost Phase Intercept System (IBIS) Risk Mitigation, and Task 2 : cooperative UAV-Based BPI Concepts. Task 1 is a cooperative U.S./Government of Israel (GOI) BPI program which involves development and refinement (risk mitigation) of the UAV based BPI concept which destroys tactical ballistic missiles in the boost phase of flight, before engine cutoff, preferably while in enemy territory. This project is based on the use of UAVs armed with onboard interceptors to provide the means of destroying enemy missiles in their boosting phase of flight. Task 1 efforts are performed in Israel and focus on key elements of the Israeli Boost Phase Intercept System (IBIS) concept. Task 2 of this cooperative effort is performed in the U.S. and will support and expand key elements of the IBIS concept. It includes developing the UAV-based BPI 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 Technical Operations (TO) Technology Master Plan (TMP).

Along with attack operations, the BPI concept is 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 very cost effective and complementary to terminal missile defense systems.

This program is a "hedge" risk mitigation effort for the ABL program and can 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 risk mitigation of the platform (HA 10) 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 will share costs on a 75/25% ratio for Task 1.
Task 2 is being accomplished by BMDO/Service Integrated Product Teams (IPT) with additional support provided by Industry.

FY 1998 Accomplishments:

- 3950 Initiated Infrared Search and Track (IRST) contract (April 98)
- 7663 Refined IBIS interceptor design; completed Interim Progress Review (IPR) 3 of Israeli Risk Mitigation Contract
- 2381 Provided UAV BPI inputs to the Technology Master (Roadmap) Plan. Performed "Quick Look" Survivability analysis of the IBIS HA 10, and IBIS Systems Engineering.

Total 13994

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603870C Boost Phase Intercept - D/V; PROJECT: 1294

FY 1999 Planned Program:

- 3700 The Israel Risk Mitigation effort will emphasize HA-10 integration; MOAB II analysis; further development of IRST algorithms; and evaluation of attacking the launcher within the mission parameters.
- 2426 Concentrate on engine modification for the FJ44-2E engine; leverage service technology develop areas of value to mission area; complete evaluation of Israeli concepts; analyze system survivability and analyze attack of launcher concepts for Israeli system.
- 300 Complete development and start flight testing of the IRST/ELRF system.

Total 6426

FY 2000 Planned Program:

-

Total 0

FY 2001 Planned Program:

-

Total 0

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	15766	0	0	0
Congressional Adjustments		6500		
Appropriated Value		6500		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-35		
b. OSD Reductions		-39		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	13994	6426	0	0

Change Summary Explanation:

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
									0	930

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603870C Boost Phase Intercept - D/V; PROJECT: 1294

D. Acquisition Strategy:

E. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
IBIS risk Mitigation Contract (HQ 0006-97-C0010)		4Q								
IRST contract (Raytheon)			3Q							

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Israeli MOD	FFP	Israel	25703	3700						TBD	29403	
b. ONR/NAWC-CL	MIPR	Texas,CA, Michigan	7510	300						TBD	7810	
c. Misc Services	MIPR	Various		1226						TBD	1226	
d.												
e.												
Subtotal Product Development:			33213	5226							38439	

Remark:

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
a. ANSER	CPFF	Washington D.C.	1456	1200						TBD	2656	
b.												
c.												
Subtotal Support Costs:			1456	1200							2656	

Remark:

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
a. Test Resources	MIPR	USAF/WL/M	80	0						TBD	80	
b.												
c.												
Subtotal Test and Evaluation:			80								80	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. N/A												
b.												
c.												
Subtotal Management Services:												

Remarks:

Project Total Cost:			34749	6426							41175	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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 (NMD)	935737	1533532	836555	866680	754204	651170	636848	489817	Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Missile Defense (NMD) Program was designated a Major Defense Acquisition Program (MDAP) in April 1996. The goal of the NMD program is to develop, demonstrate and maintain an option to deploy a national missile defense system to defend the United States against a limited strategic ballistic missile threat by a rouge nation. The technological maturity, threat, cost, and treaty implications of the system will be assessed at a Deployment Readiness Review (DRR) in 3Q/00. Following this review a decision may be made to implement the FY2005 deployment option, which is supported by programmed funds in the FYDP. However, if the threat warrants and the technology has sufficiently matured, and the threat , cost, and treaty implications have been addressed, a decision may be made to deploy sooner than FY2005. In that event, funds programmed for FY2003-2005 would have to be accelerated.

The NMD system consists of a ground based interceptor, ground based sensors, and a Battle Management Command, Control, and Communication (BM/C3) system. The interceptor consists of an Exoatmospheric Kill Vehicle (EKV) atop a Commercial Off-The-Shelf (COTS) booster stack. The ground-based sensors include the development of an 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. In the future the NMD system will also use space-based assets for threat launch detection and tracking**.** The Air Force Space Based Infrared System (SBIRS) is an integral part of enhancing future NMD capabilities.

These NMD elements, the Ground Based Interceptor (GBI), the Ground Based Radar (GBR), Upgraded Early Warning Radars (UEWR), the BM/C3 system, and the supporting system development functions are described herein as individual projects. In prior years, these projects have been executed with separate contracts managed by Army, Air Force, Navy, and BMDO organizations. With the selection of a Lead System Integrator (LSI) contractor in FY98 and government approval of transition plans, the individual element contracts will be transitioned to the LSI resulting in the NMD program being executed primarily through the single LSI contract. However, the same elements will still exist under the LSI contract. The funding allocations in this document reflect this transition of contract responsibility.

NMD INTEGRATION addresses the activities of a single contractor (Boeing North America) to develop and integrate the individual NMD elements into a cohesive NMD system. The LSI contractor will assist the government in: 1) evolving from individual element technology development to an open, integrated system development ready for deployment; 2) moving from total government managed integration to contractor responsibility for integration; 3) planning, designing, and developing an open NMD system that will meet system user requirements; 4) conducting a successful FY 2000 Integrated System Test (IST) followed by a Deployment Readiness Review (DRR). With government approval, the LSI contractor will have the latitude to modify current development programs (e.g., GBI, GBR, BM/C3, UEWR, etc.). As such, the details of these programs as described in the project narratives below may change, pending program modifications recommended by the LSI contractor.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
PROJECT: 2400	

SENSOR TECHNOLOGY includes research and development efforts for critical sensor components which support infrared surveillance, acquisition, tracking, and discrimination functions to be used in the SBIRS Low. 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. Cryocoolers are being developed to support the Focal Plane Array (FPA) technologies. Optical and electronic components are developed for SBIRS Low applications and tested for performance, reliability, and for any degradation due to environmental effects of space, such as radiation and contamination.

The GROUND BASED INTERCEPTOR (GBI) will demonstrate an intercept capability with successful completion of the NMD integrated system test in FY00. Until booster development is complete, Exoatmospheric Kill Vehicle (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. EKV sensor flight tests were successfully accomplished in 3Q/97 and 2Q/98. The LSI contractor selected an EKV contractor in 1Q/99. A backup EKV will be maintained for risk mitigation until the primary EKV is sufficiently proven. Commercial Off-the-Shelf (COTS) booster development began in FY 98 with expected completion late in FY00. The COTS Booster consists of a Gemini-40 first stage and Orbus-1A second and third stages. The booster will be tested during three verification flights in FY00 prior to incorporation into Integrated Flight Tests in FY01.

The BATTLE MANAGEMENT, COMMAND, CONTROL AND COMMUNICATIONS (BM/C3) element incrementally prototypes the BM/C3 functionality required for the NMD mission, and integrates and demonstrates an NMD system in step with evolving sensors and interceptor element capabilities. 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. NMD BM/C3 supports the NMD command and control process required to provide human-in-control; develops, assesses, and nominates situation-applicable missile defense strategies and tactics; fuses and correlates available sensor information; integrates and plans the complementary coordination of sensors and interceptors for optimum system performance; supports kill assessment; provides interface with existing Command, Control and Communication (C3) systems; and provides intra-NMD communications and prototypes an In-flight Interceptor Communications System (IFICS) for BM/C3-GBI. The IFICS will be installed at the U.S. Army Kwajalein Atoll (USAKA).

GROUND BASED RADAR (GBR) is the primary sensor providing surveillance, acquisition, tracking, discrimination, fire control support, and kill assessment for the NMD system. The GBR development leverages off of the Theater Missile Defense Ground Based Radar (TMD-GBR) program. A GBR prototype, designated as GBR-P, installed at USAKA, Kwajalein Missile Range (KMR), will participate in the FY00 NMD integrated system test (IST-5), and be maintained for future upgrades and flight tests. The GBR contract will continue to be managed by the GBR Project Office until the contract expires in FY00. At that time, the GBR will be managed by the LSI contractor.

UPGRADED EARLY WARNING RADARS (UEWR) develops, tests, and demonstrates prototype software upgrades and hardware changes to existing Early Warning Radars required to support the NMD mission. 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

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. As element development matures under the LSI, the focus of the Systems Engineer will remain 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.

DEPLOYMENT PLANNING activities focus on the planning and logistics requirements of fielding an NMD system. This includes identifying critical actions and time-lines for fielding an NMD system in order to reduce further the time-line and risks inherent in such a deployment. Additionally, this effort includes development of environmental analyses and documentation, siting analyses, facilities assessments and designs, and meeting other beneficial occupancy issues.

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 when needed: 1) test infrastructure (including test ranges and instrumentation; 2) test beds for Hardware-in-the-Loop (HWIL) and modeling and simulation activities; 3) Integrated System Test Capability (ISTC) development to conduct integrated ground tests and pre-flight mission check-outs for integrated flight tests; and 4) target development for sensor and intercept tests. SBIRS targets will be supported as required. Management activities include development of the NMD TEMP, approval of the Integrated Test and Evaluation Plan (ITEP) 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.

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.

SYSTEMS ARCHITECTURE AND ENGINEERING supports an initiative to ensure that joint systems architecture/engineering requirements are addressed in a coordinated and synergistic manner across all NMD and Theater Missile Defense (TMD) efforts. Systems analysis work is done to determine the expected operational effectiveness and life cycle cost impacts of the NMD system based on changing threats, mission requirements, acquisition reform initiatives and advances in technology. Implementation within BMDO of DoD initiatives in architectures, systems engineering, and open systems are included.

THREAT AND COUNTERMEASURES defines potential adversary missile forces, which might be confronted by the NMD system. Threat definitions are provided by annual NMD System Threat Assessment Reports (NMD STAR). Threat scenarios are generated by integrating countermeasures (CM) technology into NMD elements.

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

MODELING AND SIMULATION (M&S) 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 M&S for NMD and Theater and Missile Defense (TAMD) Programs. MS&N programs funded by this NMD project include: Wargame 2000, M&S Roadmap, Mission Oriented Information Technology Resources (ITR), BMDO Data Centers, BMD Virtual Data Center (VDC), the BMD Simulation Support Center (SSC), and the infrastructure portion of the Advanced Research Center/Simulation Center (ARC/SC) and the Joint Missile Defense Network (JMDN) that supports the capability to interoperate in a distributed integrated simulation (DIS) environment.

TEST RESOURCES provides the infrastructure to support the NMD test and evaluation program. Test infrastructure includes common test ranges and instrumentation, and common test beds for NMD HWIL testing and simulation activities. Common ground test facilities include: National Hover Test Facility (NHTF) at Edwards AFB, CA; Center for Research Support (CERES) at Schreiver AFB, CO; 7V and 10V chambers at Arnold Engineering Development Center (AEDC) in Tullahoma, TN; Portable Optical Sensor Tester (POST) and Characterization of Low Background Mosiacs (CALM) at Rockwell International in Anaheim, CA. Common range facilities include Kwajalein Missile Range (KMR) in the Marshall Islands; Western Range (WR) at Vandenberg AFB, CA; and the Pacific Missile Range Facility (PMRF) at Kauai, HI. Typical range instrumentation includes special test equipment, data collection assets and range instrumentation upgrades including: Integrated System Test Capability (ISTC) at the Advanced Research Center/Simulation Center (ARC/SC) in Huntsville, AL; improvements and modernization of both the Joint National Test Facility (JNTF), Schreiver, AFB, CO., and the Kwajalein Mobile Range Safety System (KMRSS).

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 Program 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 incorporates service headquarter type functions that are normally located in other appropriations (i.e., O & M accounts), however, the NMD JPO has to pay personnel and support costs out of RDT&E program elements.

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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

FY 1998 Accomplishments:

- 199815 NMD Integration: Completed parallel system integrator concept definition studies. Selected an LSI contractor. Awarded LSI contract. Conducted System Functional Review (SFR) for the NMD system. Completed transition of BM/C3 contract to LSI contract. Initiated development of tactical GBI booster to support FY01 flights and began development of the interceptor canister and weapon support system.

- 18040 Sensor Technology: Delivered initial samples of advanced optical coatings for testing. Initiated/continued endurance testing of the 35/60K, 60K, and 150K coolers. Initiated 100K cooler for fore-optics. Extended cutoff wavelength of Long Wavelength Infrared (LWIR) HgCdTe FPAs from current technology. Initiated optics development in contamination control technology. Continued development, fabrication, and test of advanced, radiation-hardened electronic components and packaging technologies for processors, memory, and analog-digital converters. Continued rad-hard visible star tracker development.

- 266546 GBI: Conducted one EKV seeker flight experiment IFT-2. Reduced flight test data and incorporated results into HWIL simulations to prepare for subsequent IFTs. Upgraded mission and launch control hardware/software to replace old and unreliable equipment/software. Completed fabrication of EKV and PLV hardware to support FY99 flight testing. Initiated fabrication of EKV and PLV components for FY00 flight testing. Continued PET program to develop producible and hardened HgCdTe FPA's. Continued SHIELD program for the development of 256x256 Silicon FPA's.

- 60892 BM/C3: Conducted BM/C3 engineering and integration activities to support BM/C3 Prototype development, BM/C3 communications component prototype development and NMD system integration activities. Completed development of the third increment of the BM/C3 Prototype, integrated with current increments of other BM/C3 components and with applicable external systems. Completed contract transition to LSI. Started dual-path BMC3 development to address risks associated with Integrated System Test in 1Q/00 and JTA-compliant, deployable BM/C3 Build Increments for DRR in 3Q FY00. Supported NMD tests by providing integrated BM/C3 products as test articles. Supported IFT-2 and IGT-1A. Delivered brassboard IFICS and prototype IFICS. Conducted international BMC3/UEWR technology for experiments that will demonstrate algorithms capable of improving target detection and sensitivity, identification, and tracking. Conducted oversight management of the BM/C3 portion of the LSI contract.

- 58430 GBR: Conducted readiness testing of GBR-P to support FY99 NMD flight tests. Facility constructed and occupied in 1Q/98. Completed integration and installation of the GBR-P at USAKA. Delivered Software Blocks 2.1 and 2.2. Conducted on-line system verification test in 3Q/98. Shadowed targets of opportunity for radar calibration in Sep 98. Completed safety testing at KMR and received authorization to radiate at high power in 3Q/98. Provided management of the X–Band Radar (XBR) portion of the LSI contract.

- 10405 UEWR: Continued the conduct of real-time missile tracking experiments using EWR and other applicable existing sensors. Provided UEWR Demonstrator for participation in NMD integrated system tests. Continued system development and program risk definition and risk reduction. Transitioning UEWR contract to LSI. Conducted oversight management of the UEWR portion of the LSI contract.

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

- 26173 System Engineering: Conducted NMD System Interim Preliminary Design Review (IPDR). Assessed and refined user requirements based upon updated CRD, ORD, and CONOPs. Planned and directed C2 Sims. Developed System Evaluation Plan (SEP), and delivered low fidelity version of the High Fidelity System Simulation (HFSS). Conducted NMD System SFR. Finalized interface and configuration control requirements in support of development options. Initiated Configuration Control Board (CCB) and Risk Management Board (RMB). Developed C3 requirements. Developed an NMD Systems Engineering IV & V Master Plan. Assessed NMD threat and develop C3 scenarios. Updated NMD Cost and Analysis Requirements Description (CARD) to reflect C1/C2 requirement to support the updated Program Life Cycle Cost Estimate (PLCCE), and an OSD Independent Cost Estimate (ICE). Analyzed and validated results of NMD flight and ground tests.

- 14400 Deployment Planning: Developed the acquisition logistics strategy and analysis process which enabled the Government to properly assess the LSI's acquisition logistics program. Updated the NMD Integrated Deployment Plan (IDP) and the NMD Capstone Site Activation Plan (CSAP) to reflect programmatic changes and refinements to the NMD architecture. Developed a System Deployment Status Tracking Database for Deployment Readiness activities. Continued environmental analyses of candidate deployment sites and required documentation. Managed funding required for design and construction of NMD program related test and deployment facilities to meet 100% design prior to DRR. Completed 35% standard site designs and adapted on a number of facilities. Provided FY99 Human System Integration (HSI) domain assessment criteria to Service Components for review identifying cost, schedule, and performance concerns, issues, and recommended risk mitigation. Supported development of the NMD System Training Plan and System Safety Program Plan. Reviewed Manpower Personnel and Training (MPT) issues and ensured MPT was on track and ready for Initial Operating Capability (IOC). Evaluated the Industrial Base for C1 Deployment. Identified the Long Lead Item Requirements for C1 deployment. Continued Metrology projects for development of standards for the Infrared Sensors, which was initiated in FY97.

- 130006 Test and Evaluation: Supported IGT-1A at ISTC, and integration of the following into the ISTC: BM/C3 Capability Increment 3; GBI HWIL upgrade, and real-time simulations. Maintained currency of TEMP and Test Strategy with the support of the NMD System T&E Program Integrated Product Team (PIPT). Completed program documentation, pre-launch preparations and oversaw execution of IFT-2. Evaluated post-test results. Completed VV&A of IFT-3 target and implemented accreditation plan for ISTC. Completed lethality and live fire testing plan. Coordinated test range infrastructure and upgrades to support EKV flight tests from KMR. Coordinated range instrumentation upgrades and provided data collection and analysis for NMD testing. Conducted two Risk Reduction Flights in conjunction with Air Force Operational Evaluations (RRF 3 and 4). Conducted target launch for IFT-2. Implemented rolling spare target for IFT-2 and beyond. Conducted Light Gas Gun tests of sub-scale models for lethality hydrocode development.

- 17932 Discrimination: Provided AST core operating costs for IFT-2 and Op Evals to collect optical data to support NMD. 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 and penaids. Updated modeling capabilities in the NMD scenario.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

- 4690 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.

- 6674 Threat and Countermeasures: Provided NMD System Threat Assessment (STA) and operational threat environment intelligence estimates, continued development of threat system scenario descriptions, and upgraded threat modeling capability and digital media threat products.

- 8732 Modeling and Simulations: Continued the development of Wargame 2000 simulation, provided supercomputing resources at the Advanced Research Center/Simulation Center (ARC/SC), continued development of the Modeling and Simulations Roadmap and continued to fund modernization and upgrades of Mission Oriented Information Technology Resources (ITR). The Ballistic Missile Defense Simulation Support Center (BMD SSC) continued to develop processes for testing and improving models, data and algorithms and updated the NMD M&S and data catalogs/repositories. The BMDO Data Centers continued to archive, manage, develop data products, distribute and provide remote access to all relevant BMD test, experiment, M&S and wargame data.

- 8814 Joint National Test Facility: Provided core funding for the JNTF for the BMDO's joint missile defense modeling, simulation, and test center whose focus is the joint inter-service, interoperability, and integration aspects of missile defense system acquisition. The JNTF conducts human-in-the-loop missile defense wargaming for Concept of Operations (CONOPS) exploration and development; provides simulation, communication connectivity and other JNTF assets in support of BMDO and CINC sponsored theater missile defense exercises; provides development, test and user interaction support environments for the NMD BM/C3 Project and NMD Lead System Integrator at the BM/C3 Element Support Center (BESC) and BM/C3 Element Lab (BEL). The JNTF also performed studies and analysis in support of joint missile defense and provides inter-service computational capabilities and wide area network communication networks with Service facilities.

- 328 System Test & Evaluation: Provided support for the BMDO Lethality program. Participated in Service, DoD, and multi-national lethality panels. Supported the conduct of Lethality Quarterly Review's, and Transport Model Upgrades to PEGEM.

- 13312 Test Resources: Provided ground test facility infrastructure and upgrades for NMD testing including: command/control technology evaluation at Center for Research Support (CERES), lethality tests at the AEDC Range G, sensor testing at POST, CALM and 7V/10V. Provide test range infrastructure and upgrades to support EKV testing. Provided range instrumentation, upgrades, data collection, and analysis for BMDO testing.

- 90548 Management and Operational Support: Continued providing management and support for BMDO and NMD JPO 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 935737

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

FY 1999 Planned Program:

- 1109423 NMD Integration: $600M from the Emergency Supplemental Appropriation has been allocated to the NMD program. These funds will be applied to the LSI contractor to continue development and integration of the NMD system in FY99 and FY00. Approximately $150M will be applied in FY99 and $450M in FY00. Complete transition of UEWR and EKV contracts to LSI contract. Conduct element level Preliminary Design Reviews (PDR). Conduct NMD System Preliminary Design Review (SPDR). Conduct IFT-3, IFT-4, IGT-3, IGT-4, and IGT-5. Execute activities required to conduct NMD integrated system test in FY00.

- 2153 Sensor Technology: Deliver samples of advanced optical coatings for testing. Continue testing of LWIR HgCdTe FPA's with extended wavelength cutoff. Continue endurance testing on 100K, 60K, and 35/60K PSC cryocoolers. Continue development of prototype contamination control device. Continue development, fabrication, and testing of advanced, radiation-hardened electronic components and packaging technologies for processors, memory and analog-digital converters. Continue rad-hard visible star tracker effort.

- 147224 GBI: Continue EKV and PLV fabrication and integration for IFT-3 and IFT-4 until the transition of both programs to the LSI contract. Provide data packages for, and participate in, data reviews related to EKV selection. Continue mission and launch control upgrades at the USAKA EKV/PLV integration facility. Provide GFP boosters for PLV and sensor calibration facilities. Fabricate EKV for fourth intercept flight (IFT-6), incorporating technology improvements and lessons learned from IFTs 1 through 4. Support weapon PDR. Continue COTs booster development/preparations for three FY00 booster verification tests. Conduct silo modification at KMR. Deliver readout electronics, and flight ready SHIELD and PET Focal Plane Arrays. Deliver 20/44GHz transceiver hardware to support IFT-5 2Q/00. Funding for this line supports Government LSI oversight.

- 17505 BM/C3: Conduct BM/C3 engineering and integration activities to support BM/C3 development, BM/C3 communications component prototype development and NMD system integration activities. Support LSI development of capability increment 3A in preparation for support of the IST (2Q/00). Continue development of Build Increment-1 to support the DRR in 3Q FY00. Support NMD tests by providing integrated BM/C3 products as test articles. Support IGT's 3 and 4, IFT-3 and IFT-4 (if required). Integrate prototype IFICS at Kwajalein Missile Range (KMR). Continue international BMC3/UEWR technology experiments that will demonstrate algorithms capable of improving target detection and sensitivity, identification and tracking. Funding for this line supports Government LSI oversight.

- 32718 GBR: Participate in RCT-1 and IFT-3 on-line and IFT-4-in line. Complete development of GBR-P flight test software. Deliver software block 2.3. Validate GBR-P hardware and continue repression testing software. The GBR contract will continue to be managed by the GBR Program Office until that contract expires in FY00. At that time the LSI will continue development of the objective XBR. Conduct XBR Preliminary Design Review (PDR). Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
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- 5236 UEWR: Complete transition of legacy technical effort to LSI contract. UEWR element support to key acquisition planning, Systems Engineering, Deployment Planning and Test & Evaluation activities. Manage the UEWR portion of the LSI contract (CPR analysis, CDRL review/comment, etc.). Support 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. Deliver Test Representations and Advanced Algorithms. Evaluate Real Time Defense Information Infrastructure – Common Operating Environment (DII-COE) applicability to UEWR development. Complete prototype of UEWR graphics displays and transition to LSI. Support system flight and ground test planning, execution and limited post-test independent analysis. Support and evaluate flowdown of requirements to UEWR. Support CAIV and trade studies as required. Funding for this line supports Government LSI oversight.

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- 27205 System Engineering: Continue JPO level system engineering and integration activities. Assess and Refine User Requirements (CRD, ORD, and CONOPs). Continue C1/C2/C3 requirements refinement (NMD SRD). Update NMD Cost Analysis Requirements Description (CARD) to support Program Life Cycle Cost Estimate reflecting LSI proposed architecture. Conduct NMD SPDR in 3Q/99. Update the NMD System Threat Assessment Report (STAR). Develop/update detailed threat "design-to" and "analyze-to" parameters and scenarios. Conduct C2Sim exercises and tabletops (C2Sim98 in 1Q/99). Continue integration with the SBIRS Program Office in support of the NMD program requirements. Perform nuclear environments calculations/requirements verification. Conduct data fusion/system discrimination development. Perform system verification, validation and accreditation (VV&A). Maintain independent validation and verification (IV&V) capability to perform system VV&A. Funding for this line supports Government LSI oversight.

- 25902 Deployment Planning: Implement the acquisition logistics strategy and analysis process which enables the Government to properly assess the LSI's acquisition logistics program. Initiate initial NMD System sustainment program planning. Refined the NMD IDP and the NMD CSAP to reflect programmatic changes and refinements in the NMD architecture. Prepare the Operational Suitability (OS) Assessment Report. Update the System Deployment Status Tracking Database for Deployment Readiness activities. Conduct NMD Site Evaluation. Develop an integrated Facilities Siting and Environmental (FS&E) Acquisition Management Plan and schedule. Complete the 35% facilities design for tactical and tactical support facilities for GBI & XBR. Continue to define facility requirements and master construction schedule. Support and provide comments for the 60% and 90% Design Review. Continue to manage funding required for design and construction of NMD program related test and deployment facilities to meet 100% design prior to DRR. Publish the Notice of Intent (NOI) for public notification. Scoping process will be conducted to identify environmental concerns and issues to be addressed in the Environmental Impact Statement (EIS). Support Site Specific Environment Analysis (EIS/EA). Finalize system and site specific Facility Requirements Documents (FRDs). Analyze element Reliability Analysis and Maintenance (RAM) and supportability testability data and issue analysis reports. Continue to evaluate the Industrial Base for C1 Deployment. Evaluate the Industrial Base for C2 deployment. Determine the Long Lead Item Requirements for C1 deployment. Continue the Metrology projects for development of standards for the Infrared Sensors. Implement a System Safety Program Plan to reflect User's safety program to achieve overall safety objectives. Provide FY00 HSI 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. Update and release HSI Program Plan. Develop the NMD System Training Plan. Continue to review MPT issues & ensure MPT is on track and ready for IOC. Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
	PROJECT: 2400

•	83313	Test and Evaluation: Support System Integration Test and IGTs 3 and 4 at the ISTC. Update TEMP with support of the NMD System T&E Program Integrated Product Team (PIPT). Complete program documentation, pre-mission flight tests 3 & 4, pre-launch preparations and oversee execution of IFTs 3 and 4, as well as Risk Reduction Flights (RRF) 5 through 7. Evaluate post-test results. Complete VV&A of IFT-4 and 5 targets. Implement lethality and live fire-testing plan. Coordinate test range infrastructure and upgrades to support EKV flight tests from KMR. Coordinate test range instrumentation upgrades and provides data collection and analysis for NMD testing. Conduct target launches for IFT 3 and 4 from Vandenberg AFB. Oversee LSI test program. Continue development and validation of Parametric Endo-Exoatmospheric Lethality Simulation (PEELS) model for system performance verification. Develop and procure backup target system. SBIRS targets will be supported as required. Funding for this line supports Government LSI oversight.
•	0	Discrimination: This project funding is moved to PE 0603874C starting in FY99.
•	0	Systems Architecture and Engineering: This project funding is moved to PE 0603874C starting in FY99.
•	3000	Threat and Countermeasures: Continue development of threat system scenario descriptions.
•	700	Modeling and Simulations: Continue 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.
•	0	Joint National Test Facility: This project funding is moved to PE 0603874C starting in FY99.
•	1744	Test Resources: Provide 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 in Colorado; lethality testing at the Hypersonic Ballistic Range G, Arnold Engineering Development Center (AEDC); and IR sensor testing at the 7V/10V Chamber at AEDC, and the Portable Optical Sensor Tester (POST) in El Segundo, CA. Provide test range infrastructure and upgrades to support integrated system testing including: Kwajalein Missile Range instrumentation, launch control and silo upgrades ND data collection and analysis. Provide target launch support at Vandenberg AFB CA of Multi-Service Launch System boosters with a suite of target objects provided by Sandia National Laboratory.
•	77409	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	1533532	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
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FY 2000 Planned Program:

- 489328 NMD Integration: Transition GBR-P and PLV contracts to LSI. Conduct NMD Integrated System Test IFT-5. Support the NMD Deployment Readiness Review (DRR). Conduct Boost Vehicle tests, BV-1, BV-2, BV-3 and conduct IFT-6. Conduct IGT's 6 and 7.

- 9715 Sensor Technology: Continue testing of LWIR HgCdTe FPA's with extended wavelength cut-off; initiate a focal plane producibility effort to support fabrication of flight units and reduce manufacturing costs; initiate Silicon very long wave length) FPA program for SBIRS Low surveillance mission; continue visible array rad hard star tracker program; continue FPA performance testing. Complete the 35 Kelvin/60 Kelvin cryocooler effort through life and performance testing. Initiate development of 100 Kelvin cryocooler; continue development of cryogenic integration technologies in cooperation with SBIRS Low contractual designs; continue performance and life testing of cryocoolers; initiate development of 10k cryocooler prototype. Continue development of rad hard electronics components and packaging technologies for processors, memory and analog-digital converters.

- 96967 GBI: Conduct weapon Critical Design Review (CDR). Transition PLV contract to LSI. Perform three booster verification tests to prepare for transition from PLV to COTS booster. Integrate 20/44 GHZ transceiver hardware to enable in-flight BMC3-GBI communications. Participate in IFT-5, the NMD integrated system test. Participate in IFT-6, IGT 5, 6 and 7. Integrate advanced FPA's into flight test hardware for post FY00 IFTs. Funding for this line supports Government LSI oversight.

- 17490 BM/C3: Conduct BMC3 engineering and integration activities to support BM/C3 development. Provide capability Increment-3A to support IFT-5 in 1Q/00 and Build Increment-1 to support the NMD DRR in 3Q FY00. Support IGT's 5, 6 and 7, and IFT-5 and IFT-6. Continue international BM/C3 and UEWR technology initiatives that will improve the target detection, sensitivity, identification, accuracy and cueing of multiple sensor platform. Funding for this line supports Government LSI oversight.

- 19427 GBR: Participate in the Radar Credible Target-2 mission and the NMD integrated system test IFT-5 and IFT-6 with GBR-P in-line. Develop and deliver software block 3.0 with additional algorithms. Complete system segment specification test and evaluation for government acceptance of GBR-P from Raytheon. Complete necessary requirements to provide GBR-P as Government Furnished Property to LSI. Transition GBR Contract management from the GBR Program Office to the LSI. Provide management of the XBR portion of the LSI contract. Conduct CDR for GBR. Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

- 3330 UEWR: Continue to support acquisition planning, review/comment on programmatic documents and participation in System Engineering, Deployment Planning, and Test & Evaluation forums. Provide oversight of the UEWR portion of the LSI contract (CPR analysis, CDRL review/comments, etc.). Continue to support LSI's UEWR development activities and preparation for the critical NMD milestones: Integrated System Test (IST) and Deployment Readiness Review (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 and evaluate flowdown of requirements to UEWR. Support CAIV and trade studies as required. Support evaluation of algorithms and integration into the deployable prototype. Funding for this line supports Government LSI oversight.

- 29006 System Engineering: Continue JPO level system engineering and integration activities. Assess and Refine User Requirements (CRD, ORD, and CONOPs). Continue C1/C2/C3 requirements 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 environments calculations/requirements verification. Conduct data fusion/system discrimination development. Perform system VV&A. Continue to maintain IV&V capability to perform system VV&A. Funding for this line supports Government LSI oversight.

- 6655 Deployment Planning: 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. Issue the OS Assessment Report. Update the System Deployment Status Tracking Database for Deployment Readiness activities. Complete facility design. Prepare advance planning/pre-award documentation for future award of NMD System deployment construction contracts. Complete NEPA environmental compliance process. Update ESH plans. Analyze element RAM and supportability testability data and issue analysis reports. Evaluate the Industrial Base for C1 and C2 Deployment. Continue the Metrology projects for development of standards for the Infrared Sensors. Develop and issue System Producibility and Manufacturing (P&M) Plans. Implement a System Safety Program Plan. Provide FY01 HSI 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. Update and release HSI Program Plan. Finalize the NMD System Training Plan. Review MPT issues and ensure MPT is on track and ready for IOC. Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

- 93848 Test and Evaluation: Support IGTs 5, 6 and 7 at the ISTC. Update TEMP with support of the NMD System T&E PIPT. Complete program documentation, pre-mission flight tests for IFT-5 and IFT-6, pre-launch preparations and oversee execution of IFTs 5 and 6, and RRFs 8 & 9. 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 5 and 6 from Vandenberg AFB (VAFB). Oversee LSI test program. Support three Booster Verification Tests at VAFB. Conduct 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.

- 499 Test Resources: Provide ground facility infrastructure and upgrades for NMD testing including: Integrated System Test Capability and the GBR HWIL at the ARC; command/control technology evaluation at CERES and the JNTF in Colorado; lethality testing at the AEDC Range G; and IR sensor testing at the 7V/10V Chamber at AEDC, and POST in El Segundo CA. Provide test range infrastructure and upgrades to support integrated system testing including: KMR instrumentation, launch control and silo upgrades, and data collection and analysis. Target launch support at Vandenberg AFB CA of MSLS and Orbital/Suborbital Program (OSP) boosters with a suite of target objects provided by Sandia National Laboratory.

- 70290 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 836555

FY 2001 Planned Program:

- 582603 NMD Integration: Conduct NMD Integrated System Test IFT-7, the first flight which consists of the NMD tactical booster. Conduct IFT 7 and 8. Conduct IGT-8. Conduct System Critical Design Review (S/CDR) 2Q/01. $230M is part of the FY2000 request for an FY2001 Advanced Appropriation request.

- 9779 Sensor Technology: Deliver Lot 3(final) FPAs of David MCT focal plane program and complete all tests on hybrid arrays for Lots 1&2; initiate a focal plane producibility effort to support fabrication of flight units and reduce manufacturing costs; continue Silicon (very long wave length) FPA program for SBIRS Low surveillance mission; continue visible array rad hard star tracker program; continue FPA performance testing. Complete the 35 Kelvin/60 Kelvin cryocooler effort through life and performance testing. Continue development of 100 kelvin cryocooler; continue development of cryogenic integration technologies in cooperation with SBIRS Low contractual designs; continue performance and life testing of cryocoolers; continue development of 10k cryocooler prototype. Continue development of rad hard electronics components/devices and a rad hard spaceborne computer (70-150 MIP minimum). Flight test a space optics cleaner prototype and finalize the design; complete all tests on optical rad hand filters and test rad hard anti-laser filters.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL
PROJECT: 2400	

- 48672 GBI: Monitor EKV flight unit integration for IFTs 8-9. Oversee completion of COTS booster-EKV integration for IFTs 7-9. Support IFTs 7-9 conduct and post test data reduction. Management and oversight of LSI weapon system efforts. Funding for this line supports Government LSI oversight.

- 17504 BM/C3: Conduct BM/C3 engineering activities to support BM/C3 development. Provide BI-1 to support Integrated System Performance Verification (ISPV) during IFT-7, and support IFT's 8 and 9. Support IFT-7. Funding for this line supports Government LSI oversight.

- 19548 GBR: Participate in the NMD integrated system test IFT-7 and IFT-8 with GBR-P in-line. Continue algorithm development to meet C2/C3 requirements. Develop P3I program. Validate hardware and software. Complete GBR contract transition to LSI. Begin execution of the GBR-P P3I plan. Funding for this line supports Government LSI oversight.

- 3350 UEWR: Continue to support acquisition planning, review/comment on programmatic documents and participation in System Engineering, Deployment Planning, and Test & Evaluation forums. Provide oversight of the UEWR portion of the LSI contract (CPR analysis, CDRL review/comments, etc.). 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. 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 prototype. Funding for this line supports Government LSI oversight.

- 19870 System Engineering: Continue JPO level system engineering and integration activities. Assess and Refine User Requirements (CRD, ORD, and CONOPs). Continue requirements 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 environments calculations/requirements verification. Conduct data fusion/system discrimination development. Perform system VV&A. Maintain IV&V capability to perform system VV&A. Funding for this line supports Government LSI oversight.

- 6317 Deployment Planning: Continue the development of NMD System sustainment program planning. If a decision is made to deploy the NMD System, start facility construction. Complete element RAM and supportability testability data and issue analysis reports. Provide FY02 HSI 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. Review MPT Issues & ensure MPT is on track and ready for IOC. Continue the Metrology projects for development of standards for the Infrared Sensors. Develop and issue System P&M Plans. Funding for this line supports Government LSI oversight.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999

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

- 87950 Test and Evaluation: Test and Evaluation: Support IGT 8, and 9 at the ISTC. Update TEMP with support of the NMD System T&E PIPT. 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. 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.

- 477 Test Resources: Provide ground facility infrastructure and upgrades for NMD testing including: Integrated System Test Capability at the ARC; command/control technology evaluation at CERES and the JNTF in Colorado; lethality testing at the AEDC Range G; and IR sensor testing at the 7V/10V Chamber at AEDC, and POST in El Segundo CA. Provide test range infrastructure and upgrades to support integrated system testing including: KMR instrumentation, launch control and silo upgrades, and data collection and analysis. Target launch support at Vandenberg AFB CA Orbital/Suborbital Program (OSP) boosters with a suite of target objects provided by Sandia National Laboratory.

- 70610 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 866680

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	941142	950473	864435	664930
Congressional Adjustments				
Appropriated Value		950473		
Adjustments to Appropriated Value				
a. Congressional Reductions		-12344		
b. OSD Reductions		-4597		
c. Emergency Supplemental		600000*		
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	935737	1533532	836555	866680

* Of this amount, $150 million will be executed in FY1999 and $450 million in FY2000

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603871C NMD - DEM/VAL; PROJECT: 2400

Change Summary Explanation:

Funding: FY98: Adjustments to appropriated value, SBIR/STTR and reprogramming.

Schedule: EKV software challenges and damage to an EKV electronics unit caused a delay in intercept flight testing to FY 99. IFT-3, 4 and 5 were rescheduled to permit software and hardware troubleshooting.

Technical: N/A

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
PE 0603871C NMD MILCON Design	540	9,669	0						0	10209
PE 0603871C NMD MILCON Construction				69700	161800	200700	106300	5800		544300
PE 0208871C NMD Procurement				781372	972760	861509	957825	607515		4180981

D. Acquisition Strategy: A central feature of the NMD Program strategy was the award of a contract for an NMD Lead Systems Integrator (LSI). The objective of this approach is to have a single contractor, executing under government direction, who is charged with the contractor accountability to design, develop, test, integrate, and potentially deploy an NMD system. In FY98, the government selected a single contractor to perform in the LSI execution phase. The LSI contract was awarded to Boeing North America in April 98. The LSI will integrate all existing NMD element development activities and initiate development of other elements as necessary. A key aspect of the execution phase of the LSI contract will be the successful completion of an NMD integrated system test, which is intended to demonstrate an initial NMD capability for DRR in FY00.

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		3Q						
b. NMD DRR			3Q					
c. Treaty/HNA			3Q					
d. NMD DAB				2Q				
e. NMD S/CDR				2Q				
f. Weapon PDR		1Q						
g. Weapon CDR			1Q					
h. Weapon ATP						2Q		
i. XBR PDR		3Q						
j. XBR CDR			1Q					
k. XBR ATP				3Q				
l. UEWR PDR		3Q						

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
m. UEWR CDR			1Q					
n. BMC3 PDR		3Q						
o. BMC3 ATP			4Q					
p. Site NOI		1Q						
q. Site Environmental Impact Study Complete			3Q					
r. Site Design Complete					2Q			
s. Site Construction Complete							4Q	
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. IGT-2		2Q						
cc. IFT-3		3Q						
dd. IFT-4		4Q						
ee. BM/C3 Capability Increment 3A		2Q						
ff. IGT-3		2Q						
gg. IGT-4		3Q						
hh. IGT-5			1Q					
ii. IGT-6			2Q					
jj. IFT-5			2Q					
kk. BV-1			2Q					
ll. BV-2			3Q					
mm. BV-3			4Q					
nn. IGT-7			4Q					
oo. IFT-6			3Q					
pp. BM/C3 Build Increment 1			2Q					
qq. BM/C3 Build Increment 2				1Q				

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
rr. IFT-7				2Q				
ss. IFT-8				3Q				
tt. IFT-9				4Q				
uu. IFT-10					1Q			
vv. IGT-8				1Q				
ww. IGT-9				3Q				
xx. IGT-10					1Q			
Contract Milestones								
yy. BMC3 Contract Transition	4Q							
zz. PLV Contract Transition			1Q					
aaa. EKV Downselect		1Q						
bbb. NMD Lead System Integrator Contract Award	3Q							
ccc. EKV Contract Transition		2Q						
ddd. GBR-P Contract Transition			4Q					
eee. SEI Contract Transition	3Q							
fff. UEWR Contract Transition		2Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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												
	FP	Boeing	10000		N/A	N/A	N/A	0	N/A	0	10000	10000
	FP	UMDC	10000		N/A	N/A	N/A	0	N/A	0	10000	10000
	CPAF	Boeing	199815	1109423	N/A	489328	N/A	582603	N/A	CONT	2381169	2381169
		Misc	100	0	N/A	0	N/A	0	N/A	0	100	100
GBI												
	CPFF	Raytheon	246315	35600	N/A	0	N/A	0	N/A	0	281915	281915
	CPFF	Boeing	255394	53200	N/A	37346	N/A	21755	N/A	CONT	367695	367695
	CPIF	Lockheed	193944	34000	N/A	17000	N/A	0	N/A	0	244944	244944
	CPAF	NRC	9867	0	N/A	0	N/A	0	N/A	0	9867	9867
	TM	NRC (New SETA)	6269	2757	N/A	4857	N/A	3997	N/A	CONT	17880	17880
	CPFF	Sparta	5642	1324	N/A	2072	N/A	1656	N/A	CONT	10694	10694
	CPFF	ASGI	1307	0	N/A	0	N/A	0	N/A	0	1307	1307
	CPFF	Mevatec	1045	0	N/A	0	N/A	0	N/A	0	1045	1045
	TM	Mevatec (New SETA)	583	623	N/A	695	N/A	461	N/A	CONT	2362	2362
	TCPFF	SY Technology	4375	2063	N/A	3184	N/A	3277	N/A	CONT	12899	12899
	CPFF	Hughes (PET)	5238	0	N/A	0	N/A	0	N/A	0	5238	5238
	CPFF	Liris (PET)	5236	0	N/A	0	N/A	0	N/A	0	5236	5236
	CPFF	BNA (SHLD)	4228	0	N/A	0	N/A	0	N/A	0	4228	4228
	CPFF	TRW	1457	0	N/A	0	N/A	0	N/A	0	1457	1457
	CPFF	Harris	1061	0	N/A	0	N/A	0	N/A	0	1061	1061
	N/A	SFAE-MD	13478	0	N/A	0	N/A	0	N/A	0	13478	13478
	CPAF	TBE	527	0	N/A	0	N/A	0	N/A	0	527	527
	TM	TBE (New SETA)	13202	5675	N/A	9322	N/A	8592	N/A	CONT	36791	36791
	CPFF	Stone Engineer	730	1397	N/A	1757	N/A	1518	N/A	CONT	5402	5402
	CPFF	CST	172	0	N/A	0	N/A	0	N/A	0	172	172
	CPFF	Dynetics	80	0	N/A	0	N/A	0	N/A	0	80	80
	CPFF	BNA	480	0	N/A	0	N/A	0	N/A	0	480	480

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

	CPFF	Kaman	95	0	N/A	0	N/A	0	N/A	0	95	95
		OGA's	9444	9904	N/A	8910	N/A	5804	N/A	CONT	34062	34062
	TBD	Misc	19244	681	N/A	1824	N/A	1612	N/A	CONT	23361	23361
	Prime Ktr	Term Cost FY00	0	0	N/A	10000	N/A	0	N.A	0	10000	10000
BM/C3												
	CPFF	TRW	94947	0	N/A	0	N/A	0	N/A	0	94947	94947
	CPAF/CPFF	BDM/CSC	10150	0	N/A	0	N/A	0	N/A	0	10150	10150
	CPAF	LSI (BMC3 Dev & Integration)Boeing	5429	0	N/A	0	N/A	0	N/A	0	5429	5429
	MIPR	National Labs	2200	0	N/A	0	N/A	0	N/A	0	2200	2200
	CPFF	Nichols Research	2013	0	N/A	0	N/A	0	N/A	0	2013	2013
	N/A	NSWC	4630	4251	N/A	1851	N/A	1850	N/A	CONT	12582	12582
	MIPR	MITRE (FFRRDC)	7382	1700	N/A	2600	N/A	2600	N/A	CONT	14282	14282
	CPFF	SENCOM	4628	0	N/A	0	N/A	0	N/A	CONT	4628	4628
	N/A	PEO-AMD	4828	0	N/A	0	N/A	0	N/A	0	4828	4828
	MIPR	COE	1060	0	N/A	0	N/A	0	N/A	0	1060	1060
	CPFF	SPARTA	2717	1670	N/A	2160	N/A	1510	N/A	CONT	8057	8057
	CPAF	TBE	3257	0	N/A	0	N/A	0	N/A	0	3257	3257
	CPAF	Nichols	3656	795	N/A	1029	N/A	1027	N/A	CONT	6507	6507
	CPAF	TRW	5901	3700	N/A	3700	N/A	3700	N/A	CONT	17001	17001
	CPAF	Loral	5742	0	N/A	0	N/A	0	N/A	CONT	5742	5742
	CPAF	VRI	2239	0	N/A	0	N/A	0	N/A	CONT	2239	2239
	N/A	Misc	20871	3091	N/A	2769	N/A	2816	N/A	CONT	29547	29547
	NN/A	ESC	1828	1050	N/A	1300	N/A	1300	N/A	CONT	5478	5478
	N/A	UK MOD	0	0	11/99	1232	N/A	1160	N/A	CONT	2392	2392
	TBD	QTRA	0	592	N/A	0	N/A	0	N/A	0	592	592
	TBD	QRI	0	656	N/A	849	N/A	1541	N/A	CONT	3046	3046
GBR												
	CPFF	Raytheon	141530	14041	N/A	7000	N/A	0	N/A	CONT	162571	162571
	CPAF	TBE	7941	2900	N/A	2900	N/A	4056	N/A	CONT	17797	17797
	CPAF	Colsa	13215	2024	N/A	2024	N/A	4929	N/A	CONT	22192	22192
	CPAF	NRC	2810	1925	N/A	1925	N/A	3127	N/A	0	9787	9787
	N/A	SFAE-MD	20437	0	N/A	0	N/A	0	N/A	0	20437	20437

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

	MIPR	MITRE (Lincoln Labs)	9500	2150	N/A	2150	N/A	3200	N/A	CONT	17000	17000
	CPAF	Raytheon	5605	2905	N/A	0	N/A	0	N/A	CONT	8510	8510
	N/A	Misc	10521	2099	N/A	1428	N/A	1862	N/A	CONT	15910	15910
	N/A	Misc/OGA	0	4674	N/A	2000	N/A	2374		CONT	9048	9048
UEWR												
	T&M	Xontech	7000	1000	N/A	0	N/A	0	N/A	0	8000	8000
	T&M	SENCOM	2924	1500	N/A	1230	N/A	1250	N/A	CONT	6904	6904
	CPAF	Alphatech	2314	0	N/A	0	N/A	0	N/A	0	2314	2314
	FFRDC	Mitre	6775	2500	N/A	2100	N/A	2100	N/A	CONT	13475	13475
	Various	X-band Radar	4208	0	N/A	0	N/A	0	N/A	0	4208	4208
	Various	LSI	1339	0	N/A	0	N/A	0	N/A	0	1339	1339
	N/A	Misc	6457	236	N/A	0	N/A	0	N/A	0	6693	6693
SENSOR TECH												
	CPFF	Raytheon	3473	0	N/A	0	N/A	0	N/A	0	3473	3473
	CPFF	Analog Devices	3788	0	N/A	0	N/A	0	N/A	0	3788	3788
	CPIF	Raytheon	300	120	N/A	200	N/A	200	N/A	CONT	820	820
	CPIF	TBD	3820	0	N/A	0	N/A	0	N/A	0	3820	3820
	CPFF	TBD	350	120	N/A	200	N/A	200	N/A	CONT	870	870
	CPFF	Raytheon	2450	120	N/A	500	N/A	500	N/A	CONT	3570	3570
	CPFF	MRC	3392	0	N/A	0	N/A	0	N/A	0	3392	3392
	N/A	Phillips Lab	2900	120	N/A	500	N/A	500	N/A	CONT	4020	4020
	CPAF	AFRL	4135	120	N/A	500	N/A	500	N/A	CONT	5255	5255
	CPAF	Ball Aero	691	0	N/A	0	N/A	0	N/A	0	691	691
	CPAF	Lockheed Martin	600	0	N/A	0	N/A	0	N/A	0	600	600
	CPAF	Creare	2329	0	N/A	0	N/A	0	N/A	0	2329	2329
	CPFF	Raytheon	242	0	N/A	0	N/A	0	N/A	0	242	242
	CPFF	Swales	750	120	N/A	400	N/A	400	N/A	CONT	1670	1670
	CP	Aerospace	1480	0	N/A	0	N/A	0	N/A	0	1480	1480
	CPAF	Ball	3345	120	N/A	800	N/A	800	N/A	CONT	5065	5065
	N/A	AFRL	231	0	N/A	0	N/A	0	N/A	0	231	231
	CPAF	Logicon	125	0	N/A	0	N/A	0	N/A	0	125	125
	CPAF	S Systems Corp	270	0	N/A	0	N/A	0	N/A	0	270	270
	CPFF	Raytheon	874	120	N/A	850	N/A	850	N/A	CONT	2694	2694

BMDO RDT&E COST ANALYSIS (R-3)											DATE February 1999	
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603871C NMD - DEM/VAL						PROJECT 2400	
	CPAF	Crane	1290	0	N/A	0	N/A	0	N/A	0	1290	1290
	CPAF	Lockheed Martin	1582	0	N/A	0	N/A	0	N/A	0	1582	1582
	CPAF	TRW	3935	0	N/A	0	N/A	0	N/A	0	3935	3935
	CPAF	Honeywell	2845	0	N/A	0	N/A	0	N/A	0	2845	2845
	CPAF	Raytheon	1470	0	N/A	0	N/A	0	N/A	0	1470	1470
	CPAF	Rockwell	2030	120	N/A	1500	N/A	1500	N/A	CONT	5150	5150
	N/A	Xontech	1400	0	N/A	0	N/A	0	N/A	0	1400	1400
	N/A	WPAFB	1600	0	N/A	0	N/A	0	N/A	0	1600	1600
	CPFF	JHU/APL	11644	0	N/A	0	N/A	0	N/A	0	11644	11644
	CPFF	JHU/APL(B)	16938	0	N/A	0	N/A	0	N/A	0	16938	16938
	CPFF	MDA	1350	0	N/A	0	N/A	0	N/A	0	1350	1350
	CPFF	USU(SP)	8487	0	N/A	0	N/A	0	N/A	0	8487	8487
	CPFF	USU(DPC)	7999	0	N/A	0	N/A	0	N/A	0	7999	7999
	CPFF	NRC	6884	0	N/A	0	N/A	0	N/A	0	6884	6884
	MIPR	Misc NASA	831	0	N/A	0	N/A	0	N/A	0	831	831
	N/A	USASMDC	4821	0	N/A	0	N/A	0	N/A	0	4821	4821
	N/A	AFSMC	19340	0	N/A	0	N/A	0	N/A	0	19340	19340
	N/A	NRL	4609	0	N/A	0	N/A	0	N/A	0	4609	4609
	N/A	USASMDC	3276	675	N/A	0	N/A	0	N/A	0	3951	3951
	CPAF	JHU/APL	6180	0	N/A	0	N/A	0	N/A	0	6180	6180
	CPFF	Honeywell	0	120	11/99	1000	N/A	1000	N/A	CONT	2120	2120
		TBD	0	120	11/99	500	N/A	500	N/A	CONT	1120	1120
		MRC	404	120	N/A	1426	N/A	1426	N/A	CONT	3376	3376
		Misc Contracts	14951	38	N/A	1339	N/A	1403	N/A	CONT	17731	17731
OTHER NMD INITIATIVES												
	CPIF	TRW	350	0	N/A	0	N/A	0	N/A	0	350	350
		NRC	721	0	N/A	0	N/A	0	N/A	0	721	721
		SAIC	1107	0	N/A	0	N/A	0	N/A	0	1107	1107
		Aerospace	500	0	N/A	0	N/A	0	N/A	0	500	500
		APL	384	0	N/A	0	N/A	0	N/A	0	384	384
		OO-ALC-REA	4200	0	N/A	0	N/A	0	N/A	0	4200	4200
		OO-ALC-M&S	775	0	N/A	0	N/A	0	N/A	0	775	775
		ESC/XRS	1960	0	N/A	0	N/A	0	N/A	0	1960	1960

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

		BESC	400	0	N/A	0	N/A	0	N/A	0	400	400
		NRC (SHIELD)	2210	0	N/A	0	N/A	0	N/A	0	2210	2210
		AST	600	0	N/A	0	N/A	0	N/A	0	600	600
		SNL/IFTU/TSPN	900	0	N/A	0	N/A	0	N/A	0	900	900
		Phillips Lab	882	0	N/A	0	N/A	0	N/A	0	882	882
		AFSPC	1910	0	N/A	0	N/A	0	N/A	0	1910	1910
		SMC/TEB	60	0	N/A	0	N/A	0	N/A	0	60	60
		SMC/ADE	358	0	N/A	0	N/A	0	N/A	0	358	358
		Misc Contracts	43	0	N/A	0	N/A	0	N/A	0	43	43
SPECIAL INTEREST PROGRAMS												
		SMC/TEB*	18000	0	N/A		N/A		N/A	0	18000	18000
Subtotal Product Development:			1640153	1314259		636257		681456			4272125	4272125

Remark: *NMD Test Site Initiatives, Congressionally directed Kodiak Island site work.

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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	14041	N/A	13680	N/A	13493	N/A	CONT	121038	121038
	CPAF/CPFF	BDM	12580	0	N/A	0	N/A	0	N/A	0	12580	12580
	N/A	USSPACECOM	4859	2565	N/A	1458	N/A	1467	N/A	CONT	10349	10349
	N/A	JNTF	11774	1093	N/A	5707	N/A	951	N/A	CONT	19525	19525
	MIPR	DSWA	4965	1450	N/A	1458	N/A	1467	N/A	CONT	9340	9340
	N/A	ARSPACE	2519	0	N/A	487	N/A	489	N/A	CONT	3495	3495
	N/A	AFSPACE	1599	0	N/A	487	N/A	489	N/A	CONT	2575	2575
	N/A	USAF/SMC/SE	3899	0	N/A	87	N/A	489	N/A	0	4475	4475
	N/A	USAF/SMC/ SBIRS	1000	740	N/A	972	N/A	978	N/A	CONT	3690	3690
	N/A	NAVSPACE	1047	0	N/A	47	N/A	47	N/A	CONT	1141	1141
	N/A	NSWC	1017	0	N/A	0	N/A	0	N/A	0	1017	1017
	N/A	Threat and CM	3515	0	N/A	0	N/A	0	N/A	0	3515	3515
	MIPR	POET	48	0	N/A	0	N/A	0	N/A	0	48	48
	MIPR	EADTB	250	0	N/A	0	N/A	0	N/A	0	250	250
	N/A	SMDC	48	0	N/A	0	N/A	0	N/A	0	48	48
	N/A	Misc	0	7316	N/A	4623	N/A	0	N/A	0	11939	11939
DEPLOYMENT PLANNING												
	CPFF	TRW	15413	0	N/A	0	N/A	0	N/A	0	15413	15413
	MIPR	NIST	1939	1500	N/A	1000	N/A	1000	N/A	CONT	5439	5439
	N/A	SFAE-MD	4573	0	N/A	0	N/A	0	N/A	0	4573	4573
	N/A	USAF/SMC	1215	817	N/A	500	N/A	500	N/A	CONT	3032	3032
	N/A	USSPACECOM	3690	1704	N/A	600	N/A	600	N/A	CONT	6594	6594
	CPFF	TBD	2610	10000	N/A	2000	N/A	2000	N/A	CONT	16610	16610
	N/A	USA Corp of Eng	1100	10000	N/A	2000	N/A	2000	N/A	CONT	15100	15100
	CPFF	TBD	1000	0	N/A	0	N/A	0	N/A	0	1000	1000
	N/A	Misc contracts	8873	0	N/A	0	N/A	0	N/A	0	8873	8873
	TBD	Misc	0	1881	11/99	555	11/99	217	11/99	CONT	2653	2653

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

MANAGEMENT AND OPERATIONAL SUPPORT												
	CPAF/CPFF	CSC	69387	23115	N/A	21576	N/A	20635	N/A	CONT	134713	134713
	N/A	SFAE-MD	32069	19541	N/A	18711	N/A	18765	N/A	CONT	89086	89086
	N/A	USASMDC	5715	3260	N/A	3222	N/A	3211	N/A	CONT	15408	15408
	N/A	Misc (SBIR)/RES.	9331	432	N/A	0	N/A	0	N/A	0	9763	9763
	N/A	USSPACECOM	0	4939	N/A	0	N/A	0	N/A	0	4939	4939
	N/A	Operational accounts	69057	26122	N/A	26781	N/A	27999	N/A	CONT	149959	149959
DISCRIMINATION												
	CPFF	Boeing	9693	0	N/A	0	N/A	0	N/A	0	9693	9693
	FFRDC	MIT/LL	12755	0	N/A	0	N/A	0	N/A	0	12755	12755
	CPFF	Xontech	3333	0	N/A	0	N/A	0	N/A	0	3333	3333
	N/A	USASMDC	1758	0	N/A	0	N/A	0	N/A	0	1758	1758
		TBD	9204	0	N/A	0	N/A	0	N/A	0	9204	9204
	N/A	Misc contracts	19517	0	N/A	0	N/A	0	N/A	0	19517	19517
SYSTEM ARCH AND ENGINEERING												
		SPARTA	3449	0	N/A	0	N/A	0	N/A	0	3449	3449
	CPAF/CPFF	CSC	2679	0	N/A	0	N/A	0	N/A	0	2679	2679
		JNTF	867	0	N/A	0	N/A	0	N/A	0	867	867
		USASMDC	991	0	N/A	0	N/A	0	N/A	0	991	991
		Misc contracts	1744	0	N/A	0	N/A	0	N/A	0	1744	1744
THREAT AND COUNTERMEASURE												
a.	N/A	Sandia	2500	0	N/A	0	N/A	0	N/A	0	2500	2500
b.	FFRDC	MIT/LL	3800	0	N/A	0	N/A	0	N/A	0	3800	3800
c.	N/A	OGAs	2385	0	N/A	0	N/A	0	N/A	0	2385	2385
d.		TBD	2600	0	N/A	0	N/A	0	N/A	0	2600	2600
e.	N/A	Misc contracts	10269	3000	N/A	0	N/A	0	N/A	0	13269	13269
Subtotal Support Costs:			442460	133516		105951		96797			778724	778724

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

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												
a.	CPAF	TBE	29090	8949	N/A	10076	N/A	9443	N/A	0	57558	57558
b.	CPFF	Colsa	10965	2820	N/A	3175	N/A	2976	N/A	0	19936	19936
c.	CPFF	Boeing	7400	690	N/A	777	N/A	728	N/A	0	9595	9595
d.	CPFF	Raytheon	5900	2107	N/A	2373	N/A	2223	N/A	0	12603	12603
e.	CPAF	TRW	246	0	N/A	0	N/A	0	N/A	0	246	246
f.	CPFF	TRW	4254	0	N/A	0	N/A	0	N/A	CONT	4254	4254
g.	CPFF	Raytheon	2900	2107	N/A	2372	N/A	2223	N/A	0	9602	9602
h.	CPAF	SAIC	1616	700	N/A	788	N/A	738	N/A	CONT	3842	3842
i.	CPAF	Nichols	3447	0	N/A	0	N/A	0	N/A	0	3447	3447
j.	CPFF	SRS	2282	1462	N/A	1646	N/A	1543	N/A	0	6933	6933
k.	N/A	USAKA	15866	11099	N/A	12497	N/A	11711	N/A	CONT	51173	51173
l.	N/A	SPAWAR	900	900	N/A	900	N/A	900	N/A	0	3600	3600
m.	N/A	Sandia	4147	1200	N/A	1351	N/A	1266	N/A	CONT	7964	7964
n.	N/A	USASMDC	2910	2900	N/A	3265	N/A	3060	N/A	CONT	12135	12135
o.	N/A	JNTF	1110	1000	N/A	1126	N/A	1055	N/A	CONT	4291	4291
p.	N/A	NRL	200	0	N/A	0	N/A	0	N/A	0	200	200
q.	TBD	Misc contracts	71851	14065	N/A	6044	N/A	7200	N/A	CONT	99160	99160
GBI TARGETS												
r.	N/A	USASMDC	1754	4023	N/A	4530	N/A	4245	N/A	CONT	14552	14552
s.	N/A	Sandia	43734	4285	N/A	4825	N/A	4521	N/A	CONT	57365	57365
t.	N/A	SMC	11483	1972	N/A	2221	N/A	2081	N/A	CONT	17757	17757
u.	N/A	Lockheed	42214	14388	N/A	16201	N/A	15182	N/A	CONT	87985	87985
v.	CPFF	Sy Technology	991	500	N/A	563	N/A	528	N/A	CONT	2582	2582
w.	CPAF	TBE	1645	450	N/A	450	N/A	450	N/A	CONT	2995	2995
x.	CPFF	TRW	2785	0	N/A	0	N/A	0	N/A	CONT	2785	2785
y.	CPFF	Boeing	40	0	N/A	0	N/A	0	N/A	0	40	40
z.	CPFF	Raytheon	40	0	N/A	0	N/A	0	N/A	0	40	40
aa.	CPFF	Vista	170	0	N/A	0	N/A	0	N/A	0	170	170
bb.	CPFF	Colsa	10	0	N/A	0	N/A	0	N/A	0	10	10
cc.	CPFF	Stone Engineer	0	25	11/99	25	N/A	25	N/A	CONT	75	75

BMDO RDT&E COST ANALYSIS (R-3)													DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603871C NMD - DEM/VAL								PROJECT 2400
dd.	TBD	OSC	1815	6932	N/A	7805	N/A	7315	N/A	CONT	23867	23867	
ee.	TBD	Misc contracts	7058	739	N/A	10838	N/A	8537	N/A	0	27172	27172	
MSX TARGETS													
ff.	N/A	USASMDC	7075	0	N/A	0	N/A	0	N/A	0	7075	7075	
gg.	N/A	Sandia	11664	0	N/A	0	N/A	0	N/A	0	11664	11664	
hh.	CPAF	TBE	1950	0	N/A	0	N/A	0	N/A	0	1950	1950	
ii.	N/A	MICOM	1272	0	N/A	0	N/A	0	N/A	0	1272	1272	
jj.	CPFF	Stone Engineer	150	0	N/A	0	N/A	0	N/A	0	150	150	
kk.	N/A	NASA-LBJ	200	0	N/A	0	N/A	0	N/A	0	200	200	
ll.	N/A	Tooele Depot	73	0	N/A	0	N/A	0	N/A	0	73	73	
mm.	N/A	Sierra Depot	100	0	N/A	0	N/A	0	N/A	0	100	100	
nn.	N/A	PMR	100	0	N/A	0	N/A	0	N/A	0	100	100	
oo.	N/A	Rock Island ARS	100	0	N/A	0	N/A	0	N/A	0	100	100	
pp.	TBD	Misc contracts	1791	0	N/A	0	N/A	0	N/A	0	1791	1791	
MODELLING AND SIMULATION													
qq.	N/A	AMSC	469	0	N/A	0	N/A	0	N/A	0	469	469	
rr.	N/A	BCOE	349	0	N/A	0	N/A	0	N/A	0	349	349	
ss.	N/A	MDDC	879	0	N/A	0	N/A	0	N/A	0	879	879	
tt.	SS/CPFF	Colsa (ARC)	7062	0	N/A	0	N/A	0	N/A	0	7062	7062	
uu.	Comp/CPFF	MRC (SC)	2354	0	N/A	0	N/A	0	N/A	0	2354	2354	
vv.	N/A	USASMDC	3190	700	N/A	0	N/A	0	N/A	0	3890	3890	
ww.	N/A	NRL	1027	0	N/A	0	N/A	0	N/A	0	1027	1027	
xx.	N/A	AFSPACE	413	0	N/A	0	N/A	0	N/A	0	413	413	
yy.	C/CPAF	TRW (JNTF)	15364	0	N/A	0	N/A	0	N/A	0	15364	15364	
zz.	C/CPAF	Lockheed Martin (JNTF)	23045	0	N/A	0	N/A	0	N/A	0	23045	23045	
aaa.	N/A	BMDO	1506	0	N/A	0	N/A	0	N/A	0	1506	1506	
bbb.	N/A	Mission Oriented ITR	2086	0	N/A	0	N/A	0	N/A	0	2086	2086	
ccc.	N/A	JNTF GOV	1832	0	N/A	0	N/A	0	N/A	0	1832	1832	
JOINT NATIONAL FACILITY													
ddd.	C/CPAF	TRW	1808	0	N/A	0	N/A	0	N/A	0	1808	1808	
eee.	C/CPAF	Lockheed Martin	4525	0	N/A	0	N/A	0	N/A	0	4525	4525	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2400

fff.	C/CPAF	Vanguard	1055	0	N/A	0	N/A	0	N/A	0	1055	1055
ggg.	N/A	Government	1426	0	N/A	0	N/A	0	N/A	0	1426	1426
SYSTEM TEST AND EVALUATION		TBD	328	0	N/A	0	N/A	0	N/A	0	328	328
TEST RESOURCES												
hhh.	N/A	USASMDC	8338	0	N/A	0	N/A	0	N/A	0	8338	8338
iii.	N/A	Phillips Lab	2649	0	N/A	0	N/A	0	N/A	0	2649	2649
jjj.	N/A	Wright Lab	3090	0	N/A	0	N/A	0	N/A	0	3090	3090
kkk.	N/A	Det2-SMC	900	0	N/A	0	N/A	0	N/A	0	900	900
lll.	N/A	NIST	300	0	N/A	0	N/A	0	N/A	0	300	300
mmm.	N/A	Arnold Engin.	3875	0	N/A	0	N/A	0	N/A	0	3875	3875
nnn.	N/A	NSWC	2187	0	N/A	0	N/A	0	N/A	0	2187	2187
ooo.	N/A	SPAWAR	1210	0	N/A	0	N/A	0	N/A	0	1210	1210
ppp.	N/A	Misc contracts	13300	1744	N/A	499	N/A	477	N/A	CONT	16020	16020
Subtotal Test and Evaluation:			407865	85757		94347		88427			676396	676396

Remark:

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.												
b.												
c.												
d.												
e.												
f.												
Subtotal Management Services:												

Remark:

Project Total Cost:			2490478	1533532		836555		866680			5727245	5727245

Remark:

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

DATE: **February 1999**

BUDGET ACTIVITY: **4 - Demonstration and Validation**

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

	COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	684181	200133	195722	218608	215329	216049	182536	186580	TBD	TBD
1155	Discrimination	31579	0	0	0	0	0	0	0	TBD	TBD
1170	TMD Risk Reduction	30955	14637	17251	19330	19195	19130	16359	16623	Continuing	Continuing
2160	TMD Existing System Mods	10275	2447	0	0	0	0	0	0	TBD	TBD
2259	Israeli Cooperative Project	94878	0	0	0	0	0	0	0	TBD	TBD
3153	Systems Architecture and Engineering	14143	0	0	0	0	0	0	0	TBD	TBD
3157	Environmental, Siting and Facilities	3350	0	0	0	0	0	0	0	TBD	TBD
3251	Systems Engineering and Technical Support	47599	19987	22398	18774	20384	21666	15656	15986	Continuing	Continuing
3261	TMD MB/C3I (BM/C3I Concepts)	68958	0	0	0	0	0	0	0	TBD	TBD
3265	User Interface	14484	17229	9871	11264	11103	11074	9654	9982	Continuing	Continuing
3270	Threat and Countermeasures Program	22911	0	0	0	0	0	0	0	TBD	TBD
3352	Modeling and Simulations	62965	17148	11268	11592	11497	11465	9796	9955	Continuing	Continuing
3353	JNTF - TF	38956	0	0	0	0	0	0	0	TBD	TBD
3354	Targets Support	69453	17866	41966	40133	40135	40028	34224	34778	Continuing	Continuing
3359	System Test and Evaluation	38676	4786	11734	24662	24639	24614	21918	21934	Continuing	Continuing
3360	Test Resources	61557	46179	13515	14227	13661	13593	11600	11773	Continuing	Continuing
4000	Operational Support	73442	59854	67719	78626	74715	74479	63329	65549	Continuing	Continuing

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL

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 the United States and its Allies 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.

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.

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	582000	176846	219480	217220
Congressional Adjustments		31000		
Appropriated Value		207846		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-7606		
b. OSD Reductions		-107		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	684181	200133	195722	218608

Change Summary Explanation: FY 1998 Change due to Congressional Emergency Supplemental Appropriation for Iranian Missile Protection Act (IMPACT 98) of +$102M; Congressional Reprogramming of +$4.852M from Navy to BMDO for PMRF; -$30.916M for Defense Wide Reductions; and Below Threshhold Reprogramming of +$3.898M to meet program requirements. FY99 changes due to Defense Wide Reductions and internal reprogramming for higher priority effort. FY 2000 and FY2001 funding was decreased $23758 and $18612 respectively, and reallocated to the Navy Theater Wide program to enable an earlier FUE of 2007, as well as to meet additional test and evaluation requirements for threat representative testing. FY2001 funding was increased +$20M to meet requirements for additional Lethality analysis.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL	PROJECT 1155

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1155 Discrimination	31579	0	0	0	0	0	0	0	TBD	TBD

All funding in Project 1155 has been transferred to PE 0603874C starting in FY 1999.

A. Mission Description and Budget Item Justification

This project 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 analysis of the resulting test data. This program provides predictive models of target signatures in both Radar and Infrared spectrums. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection. This program provides for data storage and retrieval of all Ballistic Missile Defense Office (BMDO) sponsored tests per statutory requirements.

Data Centers and Management. Storage, archival, and retrieval of signature related data is provided by the BMDO-funded Missile Defense Data Center (MDDC) and Advanced Missile Signature Center (AMSC). Both MDDC and AMSC meet the statutory requirements for program data archiving. Starting in FY 98, Data Centers and Management are transferred to Project 3352.

Data Collection Platforms. This project provides core operating costs for Airborne Surveillance Testbed (AST) target signature collection sensor and platform. Mission costs for AST are provided by user acquisition programs. This project provided FY 96 termination costs for the COBRA EYE sensor. This project monitors other BMDO signature data collection programs to ensure complete coverage and avoid duplication.

Algorithms and Analysis. This project performs analysis of radar and optical data on ballistic missile threat signatures and intercept events for the Theater High Altitude Area Defense (THAAD), Navy Theater Wide (NTW), and Navy Area Defense System (NADS) programs. This project develops and evaluates discrimination and kill assessment algorithms for the THAAD, NTW, and NADS programs. In analysis, this project provides accurate, objective, and timely flight data analysis in support of target signature phenomenology characterization and sensor algorithm development and evaluation. This includes TMD optical sensor data from the TMD targets program, project 1170, project 3270, and others. This project provides post-flight characterizations of expected and unexpected target features. Under the guidance of the Target Signatures Working Group (TSWG) develop target models and provide high fidelity signature sets of TMD targets. Evaluate TMD software aimpoint selection, discrimination, and handover algorithms against Dem/Val targets and UOES threats. Provide analysis and recommendations for TMD aimpoint selection, discrimination, and sensor handover. In algorithms, this project develops and analyzes algorithms that have the highest payoff potential for the critical functions of detection, tracking, bulk classification, typing, discrimination, target object map generation, aimpoint selection, and kill assessment. Maintenance and upgrades to the simulation facilities required to develop and evaluate these algorithms against real and simulated data is provided for. The Lexington Discrimination System (LDS) is used to merge radar and optical data analysis on a real-time basis for algorithm development and assessment. Specific tasks include: (1) Use LDS to support

development and evaluation of objective system algorithms to be installed on the THAAD and NTW programs; (2) Use signature data to identify robust discriminants using field measurements; (3) Develop and deliver individual radar discrimination algorithms based on identified discriminants; (4) Develop, deliver, and exercise on the LDS, algorithms which utilize radar and optical data to facilitate seeker Target Object Map and aim-point selection for TMD systems; and (5) Complete the LDS real-time multiple-sensor, multiple-target handling capability and test TMD algorithms/architectures using this capability.

Modeling. This project provides high confidence, target and background scene predictions for sensors and BMD systems. These generated scenes are the foundation for high confidence simulations of engagements that cannot or will not be flight tested. The high-fidelity, physics-based models, predicted composite scenes, and associated analytic output developed in this task are evaluated against measured data to ensure confidence in simulation results and provide a reliable route to systems verification and validation. To facilitate this objective, this task also provides crucial data-driven software tools for exploiting measured data and integrating measurements with simulations in support of technology development, test and evaluation, and acquisition efforts.

This project also provides for participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and background and plume phenomenology include: U.S./U.K. Scientific Cooperation Research Exchange (SCORE); use of the UK Multifunctional Electronically Scanned Adaptive Radar (MESAR); NATO Extended Air Defense (EAD)/TMD Ad Hoc Working Group - Plume Phenomenology Expert Group (U.S., U.K., France, Canada); U.S./French Bilateral Group - Plumes, Backgrounds, and Reentry Signatures; U.S./Israeli TBM Signature and Phenomenology Research; and the U.S./German Phenomenology Research committee.

FY 1998 Accomplishments:

•	13016	Data Collection Platform: Provide AST core operating costs to collect optical data of TMD target development flights and intercepts.
•	13307	Algorithms and Analysis: Continue data analysis support for TMD systems in Dem/Val and EMD. Provide support for TMD radar/optical discrimination algorithms and architectures for advanced TMD threats and penaids. Develop real-time algorithms for battlefield learning using neural networks, field data, and simulations on LDS. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
•	5256	Models: Deliver validated signature models for high priority engagement scenarios. Continue participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and signature phenomenology.
Total	31579	

FY 1999 Planned Program:

•		See PE 0603874C
Total	0	

FY 2000 Planned Program:

•		See PE 0603874C
Total	0	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL PROJECT 1155

FY 2001 Planned Program:

- See PE 0603874C

Total 0

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

C. Acquisition Strategy: This project funds data collection platforms, algorithms, and model development through executing agents in the Air Force (Phillips Laboratory), Army (Space and Strategic Defense Command), Navy (Naval Research Laboratory) and OSD (Institute for Defense Analysis) via existing contracts. With the executing agents, free and open competitive contracts will be used to the maximum extent possible.

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

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1155

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1170

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	30955	14637	17251	19330	19195	19130	16359	16623	Continuing	Continuing

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 beginning early in 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 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.

FY 1998 Accomplishments:

- 27566 Purchased boosters and remaining payload hardware for TCMP 3 flights, focused on countermeasures and mid range threats. Continued payload fabrication, hardware integration, and sensor planning.
- 1250 Continued to collect data and to develop the primary kill assessment algorithms for Engineering Manufacturing and Development (EMD) in support of the THAAD Radar system and Navy Theater Wide program. Completed development of three kill assessment algorithms (blast wave speed, piece size, and RCS polarization).

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL / PROJECT: 1170

•	600	Used Seeker Experimental System to provide technology assessment for MWIR SM BK IVA focal plane array performance, NTW LWIR focal plane array performance, and THAAD non-uniformity correction techniques. Discrimination performance measurements were performed for THAAD (booster segmentation issue), Navy Area (complex targets), and NTW (baseline 2 color LWIR).
•	350	Observed the HERA Blk 2B flight test with the HALO/IRIS optical auxiliary sensor data collection asset. Conducted static RCS tests on TMD targets. Analyzed the FMA item static RCS data. Conducted radar cross section variability analysis on TMD threat missile systems.
•	1189	Completed Jet interaction program planning, wind tunnel test model development, analysis of transient JI data to understand response times, and computational analysis.
Total	30955	

FY 1999 Planned Program:

•	6097	Complete TCMP-3A launch vehicle and payload fabrication. Conduct pathfinder testing on 3A. Complete 3B booster procurement.
•	693	Finalize documentation, and provide technical support and on-site support of flight 3A.
•	2828	Conduct TCMP-3A flight test.
•	3611	Deploy sensors and analyze data in support of flight 3A.
•	490	Continue to plan and execute collection of intercept data. Assess NTW Blk II sensor alternatives for kill assessment.
•	918	Government Project Personnel and Support
Total	14637	

FY 2000 Planned Program:

•	4164	Complete TCMP payload build-up, integration and testing for TCMP-3B.
•	2500	Complete launch vehicle build-up, integration and testing for flight 3B. Conduct TCMP-3B flight test.
•	5690	Finalize documentation, and provide technical support and on-site support of flight 3B. Perform flight operations.
•	3910	Deploy sensors and analyze data in support of flight 3B.
•	987	Government Project Personnel and Support
Total	17251	

FY 2001 Planned Program:

•	1940	Conduct mission planning for TCMP-4.
•	7653	Design and purchase payload hardware for TCMP-4 flight tests.
•	7543	Design and initiate purchase of launch vehicle hardware for TCMP-4 flight tests.
•	1060	Initiate sensor planning for TCMP-4. Complete data analysis for TCMP-3 flight tests.
•	1134	Government Project Personnel and Support
Total	19330	

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1170

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

C. Acquisition Strategy:

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
ALI Kill Assessment Data Collection Plan				4Q						
Block II Sensor Assessment				4Q						
TCMP User Meetings			2Q	1Q	2Q	2Q	2Q	2Q	2Q	2Q
TCMP Launches				4Q	4Q			1Q (2 flights)		2Q (2 flights)
TCMP Data Workshops					1Q	1Q		4Q		4Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1170

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
a. TCMP Payload		MIT/LL, Lexington, Mass.		1000		5017		8786			14803	
b. TCMP Launch Vehicle		OSC, Chandler, AZ		5600		2500		7543			15643	
c. TCMP Booster Mods		Aerojet, CA		1300		1200		1770			4270	
Subtotal Product Development:				7900		8717		18099			34716	

Remark:

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
a. TCMP Technical Support/Data		TBE, Huntsville, AL		275		400		275			950	
b. TCMP Data Analysis		PRA, Huntsville, AL		280		280		280			840	
c. TCMP Technical Support		NRC, Huntsville, AL		275		275		275			825	
d. TCMP Flight Analysis		AF-TRW		397		600		400			1397	
Subtotal Support Costs:				1227		1555		1230			4012	

Remark:

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
a. TMD Kill Assessment		USN		490	1 Oct 98	0	0	0	0	490	980	490
b. TCMP Range/Flight Ops		KMR/Raytheon		1602		4292					5894	
c. TCMP Range/Flight Ops		CDC, Wake Island		1000		200					1200	
d. Sensor Deployment		Various		1500		1500					3000	
Subtotal Test and Evaluation:				4592		5992				490	11074	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 1170

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. Govt Prog Pers		USASMDC		918	1 Oct 98	987	1 Oct 99	1,134	1 Oct 00		1906	
Subtotal Management Services:				918		987		1			1906	

Remark:

Project Total Cost:				14637		17251		19330		490	51708	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL	PROJECT 2160

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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 Mods	10275	2447	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

CUEING AND NETTING. The overarching objective of the cueing and netting task was to enable the US Marine Corps AN/TPS-59 long-range surveillance radar to accept external cues from, and pass cues to, different theater sensors in order to facilitate theater ballistic missile (TBM) identification, location, and tracking. The effort consisted of the development, testing, and operational demonstration of hardware and software improvements to the radar and other supporting systems which were completed in FY98.

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.

EXTENDED AIRBORNE GLOBAL LAUNCH EVALUATOR (EAGLE). EAGLE was a complementary effort to SHIELD that would have developed a prototype TBM detection, tracking, and cueing system for demonstration and evaluation aboard Air Force AWACS TS-3 test aircraft. It consisted of a passive infrared search and track sensor and an eye-safe laser radar (Ladar). EAGLE was planned to provide precise cues to deployed GBR and SPY-1 fire control radars as well as improved estimates of TBM launch and impact points. The EAGLE program was canceled as a result of the Theater Airborne Surveillance Study (TASS) recommendation to transfer the EAGLE technology to the Airborne Laser's sensor suite.

AIRBORNE SENSOR FOR BALLISTIC MISSILE TRACKING FY97 Congressional Language mandated funding be moved from "TMD Existing Systems - EAGLE" to "Airborne Sensor for Ballistic Missile Tracking". The language also directed the Under Secretary of Defense for Acquisition and Technology {USD (A&T)} to conduct a study (TASS) and provide a plan to congressional defense committees for developing an airborne sensor capability for ballistic missile tracking. The plan suggested the Airborne Laser sensor be evaluated and modified to conduct a post-boost missile tracking adjunct mission and invested in several airborne sensor system programs designed to increase overall TBM Defense performance. The remaining FY97 funds were allocated to developing an Airborne Laser post-boost adjunct mission capability, TBM Data Fusion Improvements with the SHIELD program (see Task 2), and for a classified TBM Adjunct Mission Study. In FY98, the Airborne Sensor for Ballistic Missile Tracking effort continued the SHIELD TMD Data Fusion Improvements, development for the TBM Adjunct Mission, and airborne sensor work associated with the Low Cost Autonomous Attack System and the Airborne Laser program.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 2160

FY 1998 Accomplishments:

- 313 CUEING AND NETTING. Conduct an operational demonstration of the TPS-59 capability to accept and pass an external cue. Conduct an operational demonstration of fusing infrared and radar data to improve impact point predictions and reduce impact ellipse size.
- 2815 SHIELD. Continue SHIELD development, test and evaluation activities; continue to incrementally develop test and demonstrate improved processing capabilities and fusion of other intelligence and sensor data sources with DSP. SHIELD and ALERT processors will be able to accept multiple data inputs from DSP, and additional infrared and radar sensors.
- 1147 AIRBORNE SENSORS for BALLISTIC MISSILE TRACKING. Continue development of sensor improvement efforts and mission studies for Joint STARS, Ladar/ IRST sensor development, and data fusion development and test.
- 6000 IMPACT 98 initiative for Early Warning Enhancements

Total 10275

FY 1999 Planned Program:

- 2447 SHIELD: Continue SHIELD development, test and evaluation activities; continue to incrementally develop test and demonstrate improved processing capabilities and fusion of other intelligence and sensor data sources with DSP. Infrared and data fusion efforts will culminate with operational code for ALERT and Space Based Infrared System Increment 1 capabilities.

Total 2447

FY 2000 Planned Program:

-

Total 0

FY 2001 Planned Program:

-

Total 0

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

C. Acquisition Strategy:

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

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2160

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
a.												
Subtotal Product Development:												

Remark:

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
a. AF Cueing Support		Air Force		2447							2447	
Subtotal Support Costs:				2447							2447	

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:				2447							2447	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE February 1999		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL					PROJECT 2259	
COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2259 Israeli Cooperative Project	94878	0	0	0	0	0	0	0	TBD	TBD

All funding in Project 2259 has been transferred to PE 0603875C starting in FY 1999.

A. Mission Description and Budget Item Justification

This project includes the Arrow Deployability Project (ADP), the Israeli Test Bed (ITB), Israeli Cooperative Research & Development (R&D), 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 information that will reduce risks in U.S. TMD development programs. The U.S. also benefits from the eventual presence of an anti-ballistic missile defense system in Israel, which provides deterrence of future tactical ballistic missile (TBM) conflicts in that region. This defensive system also contributes to a more robust defensive response should deterrence fail.

The Israeli / Arrow program consists of efforts to develop a ballistic missile defense system for Israel. It includes the U.S.-Government of Israel (GOI) initiative to assist the GOI development of an anti-tactical ballistic missile (ATBM) interceptor and launcher. The program also includes an Israeli developed fire control radar (Green Pine), fire control center (Citron tree) and launch control center (Hazelnut Tree). Comprised of three phases, this initiative began with the Arrow Experiments project (Phase I) that developed the preprototype Arrow I interceptor. Followed by the ACES project (Phase II) which is a continuation of Phase I, and consists of critical lethality tests using the upgraded Arrow II interceptor. Arrow provides the basis for an informed GOI engineering and manufacturing decision for an ATBM defense capability. If successful, the Arrow II will satisfy the Israeli requirement for an interceptor for defense of military assets and population centers and will support U.S. technology base requirements for new advanced anti-tactical ballistic missile technologies that could be incorporated into the U.S. theater missile defense (TMD) systems.

The third phase is the ADP, which began in Fiscal Year 1996. This phase of the project will pursue the research and development of technologies associated with the deployment of the Arrow Weapon System (AWS) and will permit the GOI to make a decision regarding deployment (without financial participation by the U.S. beyond the R&D stage). This effort will include system-level flight tests of the total Arrow Weapon System. An interface will be developed for AWS interoperability with 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 may occur in the future.

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 trains 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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
PROJECT 2259	

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 and interoperability issues. The planned inclusion of the Distributed Interactive Simulation (DIS) will enable joint exercise experiments to be conducted both in Israel and across the water between US TMD and IS TMD systems.

The Israeli Cooperative R&D program supports the advancement of emerging TMD technologies. This support will advance the technology demonstration phase which will provide for the defense of the State of Israel. It further supports the U.S. technology base needs for these technologies, and furthers the pursuit of interoperability with U.S. TBMD systems. This task supports efforts in developing an interface to allow for interoperability between Israeli TMD systems and U.S. TBMD systems and the implementation of such a system.

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. 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 Israeli anti-tactical ballistic missile (ATBM) programs, including the Arrow missile development activity, the ADP, 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.

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 International Agreement was signed in March 1996 and Presidential certification was completed in May 1996.

The ITB became operational in the second quarter of FY 1992. The ITB experiments validated the performance of the prospective near-term Israel Theater Missile Defense System. It provided valuable insight into the potential role of Human-In-The-Loop (HIL) for a TMD system. The ITB is being utilized to determine Combined Standard Operating Procedures (CSOP) between the US and Israel for TMD.

The ISA&I Project activities demonstrated that defense of the State of Israel from tactical ballistic missile (TBM) attacks is 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
PROJECT 2259	

FY 1998 Accomplishments:

- 46519 Arrow Deployability Project and Support. Continue AWS integrated flight tests. Evaluate U.S. and Arrow components for electro-magnetic interference. Transfer the results of the AWS tests to U.S. TMD interceptor developers. Continue interoperability, lethality, kill assessment and producibility studies. Develop an US/Israeli Interoperability Capability.
- 1877 Continue ITB experiments on near-term improvements to the TMD system and on deployability. Provide improved threat model and Arrow II update enhancements. Continue supporting CSOP requirements.
- 1482 ISA&I. Analyze results of ITB Interoperability experiments. Continue evaluations of the performance of the near-term TMD system based on ADP system flight tests. Continue analysis of TMD refinements for future threats.
- 45000 IMPACT 98 Initiative for Arrow Third Battery

Total 94878

FY 1999 Planned Program:

- See PE 0603875C

Total 0

FY 2000 Planned Program:

- See PE 0603875C

Total 0

FY 2001 Planned Program:

- See PE 0603875C

Total 0

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

C. Acquisition Strategy: This is a cooperative U.S./GOI development program. By completing the Arrow Deployability Project, U.S. TMD programs will be afforded state-of-the-art technical data for program risk reduction and the GOI will have developed information to make a sound Arrow Weapon System deployment decision. 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.

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

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 2259

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3153

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3153 Systems Architecture and Engineering	14143	0	0	0	0	0	0	0	TBD	TBD

All funding in Project 3153 has been transferred to PE 0603874C starting in FY 1999

A. Mission Description and Budget Item Justification

In January 1997, the BMDO Director established the Office of the Chief Architect/Engineer. This reorganized project ensures that appropriate issues relating to Joint Systems Architecture and Engineering (JSAE) are addressed in a coordinated and synergistic manner across all National Missile Defense (NMD) and Theater Air and Missile Defense (TAMD) efforts. The office reports directly and independently to the BMDO Director to provide the necessary mission-area oversight of critical BMDO technical issues.

Within this project, the BMDO critical JSAE tasks are divided into the areas of Joint Systems Analysis; Baseline and Risk Management; Interfaces and Interoperability (Battle Management/Command, Control, and Communications (BM/C3)); Modeling and Simulation (M&S) Requirements and Standards; Developmental Planning; and Test and Evaluation (T&E). The project provides BMDO with a technical assessment of the expected effectiveness of major programs under development and requirements for supporting technology. Through FY98, the work is funded through two program elements, one for TAMD and the other for NMD.

This program element focuses on TAMD systems and technology. The primary thrust of the work is to show analytically the need for and expected performance of different defense systems under development to handle 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. 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 help to reduce system and architectural risks, improve system interoperability, focus technology planning and prioritization, and integrate T&E and M&S efforts.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3153

FY 1998 Accomplishments:

- 9579 Architecture/Engineering Analysis: Develop an overall analysis plan for the BMDO and oversee the analysis process. Participate in engineering trade studies with the TAMD systems engineer. Perform commonality studies on the Upper Tier TMD systems. Continue 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. Direct the Joint Systems Engineering Team (JSET). Manage the systems technology implementation process and develop pre-planned program improvement requirements.
- 4564 Architecture/Engineering Core: Lead BMDO JSAE efforts to develop strategies, policies, and processes. Provide 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. Lead 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. Participate in the development of JTA version 2.0; conduct JTA compliance engineering; hold TESG and BOTEC meetings; oversee HLA compliance and migration; and produce the BMDO Open Systems Assessment and the TEAS.

Total 14143

FY 1999 Planned Program:

See PE 0603874C.

Total 0

FY 2000 Planned Program:

- See PE 0603874C

Total 0

FY 2001 Planned Program:

- See PE 0603874C

Total 0

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
0603871C – National Missile Defense	3690	0	0	0	0	0	0	0		
0603874C – BMD Technical Operations	0	17899	17201	15730	15872	15873	15135	15505		

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3153

C. Acquisition Strategy: Systems analysis work in this project is contracted. In November 1995, a two year competitive contract for this work (with two, one year extension options) was awarded to a ten-member corporate team. 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 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3153

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3157

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3157 Environmental, Siting and Facilities	3350	0	0	0	0	0	0	0	TBD	TBD

A. Mission Description and Budget Item Justification

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) system. 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 occupational Health Program which includes the Environmental Assessment and Environmental Impact Statement process, environmental compliance, pollution prevention, and other environmental efforts for TMD activities. Develops guidance for Executing Agents on facilities, siting, acquisition, and environmental matters.

FY 1998 Accomplishments:

- 1608 Supported TMD programs with siting analyses, environmental analyses and documentation, environmental compliance and pollution prevention programs, and test range studies. Continued environmental analyses on conducting TMD testing at Eglin Gulf Test Range, Pacific Missile Range Facility, and air dropped target missiles from aircraft. Worked on the System Integrated Tests requirements development and continued on the Navy Area, THAAD and PAC-3 systems. The program managed activities associated with maturing acquisition programs, fielding of systems, integrated system tests, and test and evaluation programs.
- 67 Completed facility planning for TMD facility requirements. Began planning and development of unique range test facilities for both Atlantic and Pacific requirements. Initiated planning for the FY00 and FY01 System Integration Tests.
- 1675 Provided funds to execute overall FY98-00 MILCON, Minor MILCON, and RDT&E facility design, construction projects and related activities. Facility projects include: Multi-purpose Missile Test Facility, Launch Complex Infrastructure Modernization, and Fire Protection System Modernization at USAKA; Hazardous Material Storage Facility at Wake Island, and the THAAD Missile Storage Facility at Anniston Army Depot, AL. Continual improvements to TMD's test and evaluation facilities are required to support the ever increasing complexity of test scenarios.

Total 3350

FY 1999 Planned Program:

- Funding has been transferred to Project 3360, PE 0603872C

Total 0

FY 2000 Planned Program:

- Funding has been transferred to Project 3360, PE 0603874C

Total 0

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3157

FY 2001 Planned Program:

- Funding has been transferred to Project 3360, PE 0603874C

Total 0

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
3157 Minor MILCON & Design, Joint TMD Dem/Val, PE 0603872C	1965									
2408 MILCON Design, NMD PE0603871	540									
2408 Environmental Assessment, NMD PEO603871	282									

C. Acquisition Strategy: BMDO is assisted by executing agents in the Army, Navy, Air Force and contractor support. They provide technical assistance of facilities, siting, and environmental activities. The U.S. Army Space and Strategic Defense Command, U.S. Army Corps of Engineers, the U.S. Army Program Executive Office-Missile Defense and Navy PEO Theater Air Defense provide specific additional technical assistance in delivering the Facilities, Siting, and Environmental documentation products needed for program execution. BMDO tasks the Services through Program Management Agreements to perform the required tasks in support of the TMD program. BMDO performs quarterly on-site reviews to verify and validate completed tasks

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Environmental Analysis for Eglin Gulf Test Range			1-4Q							
Environmental Analysis for Pacific Missile Range Facility			1-4Q							
Environmental Analysis for Target Missile Air Drop			1-4Q							
Environmental Analysis for Long Range Air Launch			3-4Q							
Environmental Analysis for Advanced Interceptor Technology			*							
THAAD 1ST Objective Battalion, Ft Bliss			1-4Q							
PAC-3 Missile Assembly Bldg, White Sands			1-4Q							
Launch Facilities Infrastructure Modernization, USAKA			1-4Q							
Fire Protection System Modernization, USAKA			1-4Q							
Hazardous Material Storage Building, Wake Island			3-4Q							

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3157

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3251

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	47599	19987	22398	18774	20384	21666	15656	15986	Continuing	Continuing

Some funding has been transferred to PE 0603873C, Projects 3251 and 3261, starting in FY99

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.

FY 1998 Accomplishments:

- 918 Continued UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications. Began use of TOTS in test analysis at various BMD test ranges.
- 9721 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.
- 1460 Provided support for the TAMD ACQ Study and for a classified project.
- 9787 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.
- 11450 Increased system engineering and integration support at the TMD system level. Continued to identify inter-Service integration interfaces; prepared engineering documents to identify changes required in theater air defense C3I systems to support TBMD; updated TMD Integrated Test Plan; updated system description documents; and planned, coordinated, and analyzed C2 wargames for CINC CONOPS development.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3251

•	6707	Provided support to Service integration, interoperability, and resolution of interface issues; determined adequacy of threshold/objective hardness specifications for C4I support equipment; identified SEOs for C4I/support equipment to meet/exceed identified exposure levels to ensure critical operational effectiveness; continued environmental modeling and simulation tool improvements; assisted in coordinating technology infusion to support pre-planned product improvements; continued support to TMD program offices in refining software development practices and mitigating technical, cost, and schedule risks across BMD/TMD software development, integration, testing, and maintenance efforts.
•	1499	Supported BMDO services (e.g., security, contracting, supplies).
•	2007	Provided technical support to Combat Developments Directorate-Ft Bliss, TX.
•	4050	Provide funding for government personnel and project management
Total	47599	

FY 1999 Planned Program:

•	994	Continue UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications.
•	5929	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.
•	7070	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.
•	1823	Support BMDO services (e.g., security, contracting, supplies).
•	4171	Provide funding for government personnel and project management
Total	19987	

FY 2000 Planned Program:

•	999	Continue UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications.
•	6400	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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3251

- 8326 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.
- 2663 Support BMDO services (e.g., security, contracting, supplies).
- 4010 Provide funding for government personnel and project management

Total 22398

FY 2001 Planned Program:

- 1075 Continue UK sensor data fusion efforts including Target Oriented Tracking System (TOTS) integration testing and development and testing of TOTS applications.
- 5289 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.
- 6243 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.
- 2142 Support BMDO services (e.g., security, contracting, supplies).
- 4025 Provide funding for government personnel and project management

Total 18774

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

C. Acquisition Strategy: This project uses a combination of FFRDC, competitively awarded SETA contracts, and a Memorandum of Understanding (MOU) with the United Kingdom Ministry of Defense.

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

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3251

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
a.												
Subtotal Product Development:												

Remark:

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
a. SETA Supt	CPAF	SPARTA-Va		5929		6400		5289			17618	
Subtotal Support Costs:				5929		6400		5289			17618	

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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. FFRDCs/POET	MIPRs	Multiple		7070		8326		6243			21639	
b. BMDO Ops/Personnel		BMDO		5994		6673		6167			18834	
c. International Program	MIPR	UK Ministry of Def.		994		999		1075			3068	
Subtotal Management Services:				14058		15998		13485			43541	

Remark:

Project Total Cost:				19987		22398		18774			61159	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE February 1999		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL						PROJECT 3261
COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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 MB/C3I (BM/C3I Concepts)	68958	0	0	0	0	0	0	0	TBD	TBD

All funding in Project 3261 has been transferred to PE 0603873C, starting in FY 1999.

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, Computers and Intelligence (BM/C4I) 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 a 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/C4I for TAMD, the Ballistic Missile Defense Organization (BMDO) uses this project to provide oversight, leadership, guidance, and support to the Services' TAMD BM/C4I programs. The focus is on Joint approaches to integrate and synergize the Services' programs.

In recent years, this project has been focused on three thrusts: (1) early warning and dissemination of theater ballistic missile launch information, (2) communication interoperability, and (3) command and control upgrades. In concert with this successful approach, BMDO has developed a TAMD BM/C4I Architecture to enable further improvements in TAMD performance. By focusing project efforts on this architecture, the integration of individual activities will be enhanced while continuing to support earlier objectives.

This TAMD BM/C4I Architecture can be viewed as a set of FoS connectivities and common mission functions integrated via three networks. The first network to be implemented is the Joint Data Network (JDN): a near-real-time network based primarily on the Tactical Digital Information Link [TADIL-J / LINK-16] datalink to provide overall FoS situational awareness, command and control, and weapon coordination. The second network to be implemented is 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 CINCs. The third and final network to be implemented is 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 synergy of multiple systems.

To achieve the TAMD BM/C4I 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] TMD messages in FoS C2 nodes; and the development and integration of GCCS TMD applications. The overall objective of this project is to ensure the integration of Service systems so that they will be both affordable and interoperable.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL
	PROJECT: 3261

FY 1998 Accomplishments:

•	7121	BM/C3I Integration- Army: Field two Tactical Operations Centers (TOC) to active Army brigades; support JTIDS range Extension (JRE)efforts; participated in JTIDS network management activities; initiate Joint Defensive Planner (JDP) integration into Army host platforms.
•	12294	BM/C3I Integration- Air Force: Continue TADIL-J TAMD m essage set integration, complete AOC and ABCCC, initiate remaining JSTARS upgrade for TAMD; Continue to support JRE IPT process and joint protocol standardization; complete JDP 1.0 and TCTA software integration in TBMCS V1.0; Complete development of functional and software architecture for Automated Application of Intelligence Preparation of the Battlespace (A2IPB) and start A2IPB prototype development; begin integrated surveillance system (ISS) architecture development and analysis of situational awareness correlation/fusion techniques; implement R2 correlation algorithm for live exercise testing; develop communication planning module(CPM) protyping and demonstration plan.
•	8769	BM/C3I Integration- Navy & USMC: Continue support of Joint development of JRE and integrate JDP into JMCIS for initial assessment/evaluation. Complete testing of AN/TPS-59 cue capability; and continue TAOM BMC3I software development.
•	3164	BM/C3I Integration- Joint/Combined: Update TADIL-J message set approval, support JRE development and NATO TAMD BMC3 analyses, and initiate definition and development of joint composite tracking network (JCTN).
•	2610	BM/C3I Integration-JNTF: Continue BM/C3I work shops; support JDP requirements update based on initial test/demo results; and provide Global Command and Control System (GCCS) capability for TAMD application evaluation.
•	35000	BM/C3I Integration- Joint/Combined Impact 98 PAC3/CEC Interface Design Document (IDD) for the real time data exchange; Real Time Data Exchange (RTDE) between PAC3 and AEGIS using CEC at ASCIET 99; RTDE data analysis report; PAC3/CEC IDD for Engage on Remote (EOR) live fire activity; draft THAAD/CEC concept of operations; THAAD/CEC simulation demonstration.
Total	68958	

FY 1999 Planned Program:

•		See PE 0603873C
Total	0	

FY 2000 Planned Program:

•		See PE 0603873C
Total	0	

FY 2001 Planned Program:

•		See PE 0603873C
Total	0	

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3261

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
3261 TAMD BM/C3I PE 0603872C	68958									68958
3261 TAMD BM/C3I PE 0603873C		36427	42556	45768	44434	44352	43442	44397		301376

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 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Data Link handbook published	*									
TAMD software library & re-use data	*									
Two CIC/SAAWF prototype	*									
AWACS software implemented		*								
Complete testing of AN/TPS-59			X							
Field two TOCs to active Army brigades			X							
Update TADIL-J message set approval			X							

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3261

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)			DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL		PROJECT 3265

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	14484	17229	9871	11264	11103	11074	9654	9982	Continuing	Continuing

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.

Task 1 supports 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.

Task 3 supports 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 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.

Task 5 promotes 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.

Task 6 supports 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL / PROJECT: 3265

FY 1998 Accomplishments:

•	2800	Support USEUCOM Joint Project Optic Needle and TMD exercise Central Enterprise.
•	2800	Support USCENTCOM Joint Project Optic Cobra.
•	2800	Support USFK Joint Project Ornate Impact and TMD exercise Foal Eagle.
•	2600	Support USACOM Joint Project Optic Windmill and other TMD exercises.
•	2300	Support USPACOM TMD exercises.
•	400	Integrate capability to display simulated TBMs on developing operator radar scopes supporting Field Training Exercises.
•	100	Review Operational TMD Requirements Documents (ORDs)/Capstone Requirements Documents (CRDs).
•	172	Conduct theater and strategic wargaming, including GLOBAL 98.
•	439	Conduct mission analysis for TMD (including allies/friends).
•	073	Conduct Warfare Analysis Laboratory Exercises.
Total	14484	

FY 1999 Planned Program:

•	3338	Support CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	3338	Support CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	3138	Support CINC USACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	3112	Support USFK by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	3006	Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	169	Support development of JTAMD doctrine, CONOPS, and TTPs needed for FoS Interoperability.
•	423	Promote development of allied involvement in TAMD doctrine, CONOPS, TTPs, and exercises.
•	705	Support conduct of JTAMD FoS simulations, seminars and desktop/interactive and planning activities.
Total	17229	

FY 2000 Planned Program:

•	1693	Support CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	1693	Support CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	1693	Support CINC USACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	1493	Support USFK by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	1278	Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
•	1256	Support development of JTAMD doctrine, CONOPS, and TTPs needed for FoS Interoperability.
•	765	Support conduct of JTAMD FoS simulations, seminars and desktop/interactive and planning activities.
Total	9871	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3265

FY 2001 Planned Program:

- 1899 Support CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
- 1899 Support CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
- 1899 Support CINC USACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
- 1749 Support USFK by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
- 1597 Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, and analyzing results.
- 1353 Support development of JTAMD doctrine, CONOPS, and TTPs needed for FoS Interoperability.
- 868 Support conduct of JTAMD FoS simulations, seminars and desktop/interactive and planning activities.

Total 11264

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

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	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
FoS Interoperability Procedures	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Allied Involvment in TAMD	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
TAMD FoS Preparation Events	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3265

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a. CINC TMD Assessment Program	Cost Plus Award Fee	SRS Technologies	13974	4620	Continued	4652	Continued	4702	Continued	16287	44235	23317
b. EUCOM Program	MIPRS	Theater	5469	2679	NA	1167	NA	1403	NA	NA	10718	NA
c. CENTCOM Program	"	"	5469	2679	"	1167	"	1403	"	"	10718	"
d. USFK Program	"	"	5469	2479	"	1167	"	1403	"	"	10518	"
e. ACOM Program	"	"	4919	2479	"	967	"	1253	"	"	9618	"
f. PACOM Program	"	"	4421	2293	"	751	"	1100	"	"	8565	"
Subtotal Test and Evaluation:	NA	NA	39721	17229	NA	9871	NA	11264	NA	16287	94372	23,317

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:			39721	17229		9871		11264		16287	94372	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3270

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	22911	0	0	0	0	0	0	0	TBD	TBD

All funding for Project 3270 has been transferred to PE 0603876C starting in FY 1999

A. Mission Description and Budget Item Justification

Threat and Countermeasures Program. The BMDO Threat Program defines potential adversary military forces missile threats. To accomplish this mission, BMDO has a threat development 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 component tasks: Intelligence Threat, Threat Systems Engineering, and Threat Applications.

Intelligence Threat Task. The purpose of this task is to provide an Intelligence Community-Validated TMDand 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 the TMD and NMD "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 BMDO cost and operational effectiveness analyses (COEA). 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 System Threat Scenario Descriptions.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL	PROJECT 3270

Produces threat computer digital media and supporting documentation for use by the development and acquisition communities.

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 TMDand 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 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 1998 Accomplishments:

- 6433 Intelligence Threat Task: Provide Capstone STAR, speciality threats, targets analysis, operational threat environment intelligence assessments, management, and planning support
- 4611 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 environments.
- 11867 Threat Systems Engineering Task: Perform TMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD CM technical experiments and evaluations. Support Countermeasures Hands-On Program (CHOP) “Skunkworks” teams in conducting CM concept, design, fabrication, tests. Conduct non-technical analysis, oversight, and database management.

Total 22911

FY 1999 Planned Program:

- See PE 0603876C

Total 0

FY 2000 Planned Program:

- See PE 0603876C

Total 0

FY 2001 Planned Program:

- See PE 0603876C

Total 0

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL PROJECT 3270

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

C. 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.

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

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3270

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL	PROJECT 3352

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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 and Simulations	62965	17148	11268	11592	11497	11465	9796	9955	Continuing	Continuing

All tasks and associated funding in Project 3352, with the exception of the Extended Air Defense Test Bed and Extended Air Defense Simulation (TMD unique projects), have been transferred to PE 0603874C starting in FY 1999.

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 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL
	PROJECT: 3352

FY 1998 Accomplishments:

•	17076	Defined, developed, tested, integrated, and delivered EADTB Capability 4.3. Began integration of runtime infrastructure to support High Level Architecture (HLA) compliance/HLS study. Compiled V&V documentation to support user accreditation decisions. Provided selective co-funding of EADTB application. Obtained EADTB study documentation. Defined, directed and integrated Phase II of the SSR Certification Program. Participated in TAMD Joint Engagement Operations Study. This figure also included Government project personnel and support.
•	16644	Provided super-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 EADTB, EADSIM, the THAAD Test Bed, TISES, and TMDSE. Major areas of support included maintenance, modification, and enhancements of/to: CFD analysis; COEA of TMD systems; technical base analysis; concept studies; and alternative trade-off analysis. This figure also included Government project personnel and support.
•	10733	Provided BMDO MS&N support in four primary areas: assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. Provided continued support to continue development and refinement of the M&S Roadmap. This area also included funding for Service M&S activities. Top priorities included continued development of the EADTB SSRs. Specific Service SSR support included continued/completed development of: Army - PAC 2/3, THAAD, MEADS, JTAGS, ADTOC; Air Force - AWACS, Generic Fighter, CEC; and Navy - TBMD Aegis, JNTF - ALERT, SBIRS and JDN Interoperability.
•	1382	Continued to fund modernization and upgrades of Mission Oriented ITR in BMDO and BMDO-funded missile defense development programs in order to satisfy validated requirements of the ITR user community.
•	11872	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 testing operational concepts involving Theater Air and Missile Defense. Major emphasis was given to VV&A of Wargame 2000 software and simulation operations. 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.
•	5258	Provided the BMDO Data Centers Program with funding to archive, manage, develop data products, distributed and provided remote access to all relevant BMD test, experiment, M&S, and wargame data. Specific priorities include: AMSC - provide TAMD FoS, NTW and Navy Area TBMD and other TMD program data management support; BCoE - provided Navy Thearter Wide (NTW) and Navy Area TAMD programs data management support; MDDC - provided TAMD FoS, THAAD, PAC-3/PATRIOT, MEADS, ARROW, and other TMD programs data management support; BMD SSC - provided Optic Cobra, TMDSE, SIT-98 and SIT-99, Wargame 2000, and EADTB data management support.
Total	62965	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3352

FY 1999 Planned Program:

- 17148 Deliver EADTB development and enhancements. Perform EADTB Final Formal Qualification Testing and deliver EADTB Version 4.4R at the end of 1st quarter. Provide limited on-site support to a select group of EADTB sites. Continue limited EADTB VV&A activities. Closeout and transition to new prime contract. Provide EADSIM baseline maintenance.

Total 17148

FY 2000 Planned Program:

- 11268 Deliver EADTB enhancements to meet formal BMDO approved study/test requirements. Perform EADTB Final Formal Qualification Testing and as required, commence development of EADTB Version 5.0. Provide limited on-site support to a select group of EADTB sites. Continue limited EADTB VV&A activities. Provide EADSIM baseline maintenance.

Total 11268

FY 2001 Planned Program:

- 11592 Deliever 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.

Total 11592

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 0603171C	8099	700	0	0	0	0	0	0
3352 Support Technologies - ATD, PE 0603173C	5015	0	0	0	0	0	0	0
3352 BMD Technical Operations, PE 0603874C	0	50079	29350	29306	30791	27651	27983	28315

C. Acquisition Strategy: The tasks in this project are met through full and open competition. The prime contractor for development and operation of the EADTB is Raytheon Systems Company (previously called Hughes Aircraft Compnay), which was awarded a Cost Plus Award Fee (CPAF) contract in September 1989. The follow-on contract will also be awarded through full and open competition.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Deliever EADTB Capability 4.4R				1Q						
EADTB Final Formal Qualification				2Q						
Deliever EADTB Capability 5.0					1Q					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3352

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
a. EADTB Development	CPAF	Raytheon Systems Corporation (HSV)	15829	17148	9/89					TBD	32977	
b. EADTB Development	CPAF	TBD – (HSV)				11268	9/99	11592	TBD	TBD	22860	
Subtotal Product Development:			15829	17148		11268		11592			55837	

Remark: The follow-on contractor for the EADTB Development has not been determined at this time. The contract will be awarded through full and open competition.

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark: * As stated in the CPS.

Project Total Cost:			15829	17148		11268		11592			55837	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3353

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3353 JNTF - TF	38956	0	0	0	0	0	0	0	TBD	TBD

All of the funding in Project 3353 has been transferred to PE 0603874C starting in FY 1999.

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 JNTF assets in support of BMDO- and CINC-sponsored theater missile defense exercises. Test planning and analysis for Theater Missile Defense (TMD) is conducted at the JNTF. Ballistic Missile Defense (BMD) system-level analysis of missile defense issues is 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.

FY 1998 Accomplishments:

- 21595 Continue JNTF Recurring Operations & Maintenance (O&M) support for services (such as facility, security, supplies, data management, property management, configuration management, media services, logistics engineering, and quality assurance), computer O&M, communications O&M, program management, software engineering, systems engineering, utilities, and government project personnel and personnel support.
- 9529 Continue JNTF Nonrecurring Operations & Maintenance support for facility modernization, contract recompetition, physical security upgrades, and information technology improvements and modernization.
- 7832 Continue JNTF Core Capability support of small, core cadre of experienced personnel to maintain technical expertise for current and expected JNTF responsibilities (such as information systems security engineering, wargaming, command and control simulations, studies and analysis, and research & development management support.

Total 38956

FY 1999 Planned Program:

- See PE 0603874C

Total 0

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL
	PROJECT 3353

FY 2000 Planned Program:

- See PE 0603874C

Total 0

FY 2001 Planned Program:

- See PE 0603874C

Total 0

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
3353 Joint National Test Facility, PE 0603871C	8584	0	0	0	0	0	0	0		
3353 Joint National Test Facility, PE 0603874C		52847	57889	56498	61718	60166	60990	62514		
3352 Modeling & Simulation, PE 0603871C	2849	0	0	0	0	0	0	0		
3352 Modeling & Simulation, PE 0603872C	13054	0	0	0	0	0	0	0		

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. Contract Advisory & Assistance Services are provided by Vanguard Research as Cost Plus Award Fee. In February 1999, the OMC and RDC will be combined and referred to as the CRDC (Combined Research & Development Contract) with TRW being the prime contract and Lockheed-Martin a Sub-contract to TRW.

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
TMD Wargame			2 Q							
TMD Tabletop			4 Q							
CINC Exercise Support			1-4 Q							
TMD System Exerciser Test Support			1-4 Q							
Joint TMD Planner Support			1-4 Q							
TMD BM/C4I Modeling			1-4 Q							

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)											DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603872C Joint TMD - DEM/VAL							PROJECT 3353
Wargame 2000 Host Support			1-4 Q								
EADTB Studies Support			1-4 Q								
BMD Simulation Support Center			1-4 Q								
Special Program Center Threat Support			1-4 Q								
Joint Technical Architecture Support			1-4 Q								
Information Technology Improvement & Modernization			1-4 Q								

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3353

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
a.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:												

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3354

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	69453	17866	41966	40133	40135	40028	34224	34778	Continuing	Continuing

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 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 (600-3000 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3354

FY 1998 Accomplishments:

•	27975	Initiated Dem/Val of Short and Long Range Air Launch Target (LRALT) development.
•	28900	Continued development and sensor characterization of advanced target payloads.
•	5559	Provided funding for demonstration of Hera from Wake Island to Kwajalein.
•	7019	Provided technical support for targets program operations, including initial definition of ABL target requirements.
Total	69453	

FY 1999 Planned Program:

•	8135	Provide for validation of TMD targets; which includes support for program management, maintenance & refurbishment, and research & development.
•	96	Continue development and sensor characterization of FMAs.
•	2447	Provide for government project personnel and support.
•	7188	Provide for development of a MBRV.
Total	17866	

FY 2000 Planned Program:

•	9768	Provide technical support and booster hardware for target program operation.
•	21928	Continue development of LRALT, and initiate development of a Low Fidelity Test Target, and full trajectory threat emulating target capabilities.
•	10270	Continue development and sensor characterization of FMAs and advanced target payloads.
Total	41966	

FY 2001 Planned Program:

•	10028	Provide technical support and booster hardware for target program operation.
•	19635	Continue development of LRALT, a Low Fidelity Test Target, and full trajectory threat emulating target capabilities.
•	10470	Continue development and sensor characterization of FMAs and advanced target payloads.
Total	40133	

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3354

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
2257 PATRIOT, PE 0604865C	242690	320342	29141	39119	0	0	0	0	TBD	TBD
2257 PATRIOT, PE 0208865C	316789	245494	300898	367762	400205	379220	366228	266880	TBD	TBD
2260 THAAD, PE 0602218C	0	0	0	0	162136	191272	208120	246902	TBD	TBD
2260 THAAD, PE 0604861C	0	0	577493	556178	417530	293886	205852	0	TBD	TBD
2260 THAAD, PE 0603861C	387260	433172	34133	3519	0	0	0	0	TBD	TBD
2260 THAAD, PE 0208861C	0	0	0	0	0	91729	182628	603924	TBD	TBD
1266 NAVY THEATER WIDE, PE 0603868C	437896	344284	329768	369049	0	0	0	0	TBD	TBD
1266 NAVY THEATER WIDE, PE 0604868C	0	0	0	0	0	92000	323000	406000	TBD	TBD
1266 NAVY THEATER WIDE, PE 0602218C	0	0	0	0	352182	280580	309782	387648	TBD	TBD
2263 NAVY AREA, 0604867C	292063	242347	268389	226772	64208	51548	33596	26665	TBD	TBD
2263 NAVY AREA, PE 0208867C	14859	43189	55002	61066	121035	134379	152319	181381	TBD	TBD
3354 TARGETS, PE 0603874C	0	1962	2320	0	0	0	0	0	CONT	CONT
3360 TEST RESOURCES, PE 0603874C	0	41428	51909	23759	25003	24150	24267	24756	CONT	CONT
3360 TEST RESOURCES, PE 0603872C	61557	46179	13515	14227	13661	13593	11600	11773	CONT	CONT

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 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 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
SRALT Demo		3Q						
Navy Area		4Q	1 - 4Q's	1 & 2Q's				
Navy Theater Wide		1Q	1 - 4Q's	1 – 4Q's	1 – 4Q's			
PATRIOT		1 – 4Q's	1 & 2Q's					
THAAD		1 – 4Q's	1 – 3Q's			1 – 4Q's	1 – 4Q's	1Q
Others (support of Technology Programs)	3Q & 4Q	2 – 4Q's	1 – 4Q's	3Q	3Q & 4Q			

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Target Acquistion	Allot	USASMDC (Huntsville, AL)	N/A	15419	N/A	38946	N/A	37505	N/A	Cont Effort	91870	N/A
Subtotal Product Development:				15419		38946		37505			91870	N/A

Remark:

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
Subtotal Support Costs:												

Remark:

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
Subtotal Test and Evaluation:												

Remark:

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. Gov Project Per & Supt	Allot	USASMDC (Huntsville, AL)	N/A	2447	N/A	3020	N/A	2628	N/A	Cont Effort	8095	N/A
Subtotal Management Services:				2447		3020		2628			8095	N/A

Remark:

Project Total Cost:				17866		41966		40133				

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3359

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	38676	4786	11734	24662	24639	24614	21918	21934	Continuing	Continuing

Some of the funding for Project 3359 has been transferred to PE 0603873C starting in FY1999.

A. Mission Description and Budget Item Justification

Beginning in FY99, within this program element, this project funds only the joint BMD lethality program. This joint lethality program focuses on the capability to confidently predict the effects of intercepting missiles with weapons of mass destruction warheads. This is performed through two core areas: Lethality assessment and analysis, and key laboratory and field experiments. It includes estimates of probability of kill of chemical/biological submunitions, creation of models to determine chemical/biological ground effects, confirmation of damage laws from low mass/high-velocity intercepts, confirmation of damage laws from high velocity rods, development of generic lethality targets. These activities complement the activities performed within the individual system test programs.

FY 1998 Accomplishments:

- 25554 Transition TMDSE Build 2 to the Joint National Test Facility. Begin Build 3 development of TMDSE which adds THAAD radar Testbed HWIL, multiple AEGIS ships and Patriot elements, and increased fidelity of BMC^3. Perform test planning for scheduled SITs. Perform HWIL tests and analysis in conjunction with the schedule. Plan and execute a mini-SIT 98 using PATRIOT's Large Scale Search and Track test and other TMD assets and conduct post SIT analysis. Integration and interoperability testing of the TMD Family of Systems will be performed. Begin acquiring a target for SIT-00.
- 7994 Support the standard lethality threat representative targets, performance of the necessary tests and experiments to obtain lethality data. Maintain endgame Parametric Endo-Exo Lethality Simulation (PEELS) and Post Engagement Ground Effects Model (PEGEM) simulations at current state of knowledge of lethality phenomena. Provide realistic model based on test data and analyses for atmospheric transport, diffusion, deposition, and evaporation of Chemical, Biological Weapon (CBW) agents released from ground level to high altitude. Provide plans to examine lethality as a function of mass and velocity, high velocity phenomena, agent response, and ground effects.
- 1584 (As a result of the realignment, some of the previously planned evaluation activities are now conducted under projects 3251 and 3153.) Maintain support to execute the Consolidated Evaluation Program and methodology and conduct special studies and technical investigations. Plan FoS test program and draft key program documents, e.g., draft Capstone TEMP and FoS T&E CARD. Participate in THAAD, PAC-3, and NTWDS Test Readiness Reviews. Provide evaluation support to the BMD Acquisition Review Council (BMDARC). Participate in SM-2 Blk IVA Flight Test Readiness Reviews. Provide analyzed test data inputs to support evaluation and analysis for the BMDARC review of PATRIOT for it's DAB and for the Navy Area TBMD UOES. Assess results of HWILT 98 events and TMDSE testing. Support data analysis and review.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL / PROJECT: 3359

- 3544 Manage operational assessment activities for the TMD FoS. Continue monitoring of THAAD testing. Monitor PAC-3 EMD testing and Navy Area testing. Provide updated inputs to the CER utilizing current test data from MDAPs, SITs, Joint Exercises, and Wargames, as well as analytical techniques to estimate the TMD system maturity.

Total 38676

FY 1999 Planned Program:

- 4786 Lethality: Maintain endgame Parametric Endo-Exo Lethality Simulation (PEELS) and postgame (PEGEM) model simulations at current state of knowledge of lethality phenomena. Provide realistic model based on test data and analyses for atmospheric transport, diffusion, deposition, and evaporation of Chemical, Biological Weapon (CBW) agents released from ground level to high altitude. Provide plans to examine lethality as a function of mass and velocity, high velocity phenomena, agent response, and ground effects.

Total 4786

FY 2000 Planned Program:

- 5123 Lethality (Modeling): Maintain Parametric Endo-Exo Lethality Simulation (PEELS) and Post Engagement Ground Effects Model (PEGEM) for predicting lethality phenomena. Assess PEELS and PEGEM capability for modeling high velocity and high altitude intercepts. Incorporate PAC-3 scaled intercept and sled test data to calibrate expected ground effects. Incorporate laboratory and field experiment data into model upgrades.
- 6611 Lethality (Assessment and Experiments): Initiate end-to-end assessment of capabilities to confidently predict the effects from intercepts of missile weapons of mass destruction (WMD) warheads. Perform laboratory experiments on warhead materials and CBW agents to increase knowledge base of lethality phenomena and ground effects. Initiate systematic series of field experiments to obtain critical data required to model CBW agent behavior (droplet formation, atmospheric transport, diffusion, deposition, and evaporation). Evaluate existing high velocity equations of state and fracture data and validity of hydrocodes in the high velocity impact regimes. Assess suitability of data collection assets for tracking CBW agent clouds. Assess the benefit of rod lethality enhancers in hit-to-kill intercepts.

Total 11734

FY 2001 Planned Program:

- 6000 Lethality (Modeling): Maintain Parametric Endo-Exo Lethality Simulation (PEELS) and Post Engagement Ground Effects Model (PEGEM) for predicting lethality phenomena. Assess PEELS and PEGEM capability for modeling high velocity and high altitude intercepts. Incorporate SM-2 Block IV-A Arena test data to calibrate expected ground effects. Incorporate laboratory and field experiment and MDAP test data into model upgrades.
- 8662 Lethality (Assessment and Laboratory Experiments): Continue end-to-end assessment of capabilities to confidently predict WMD intercept effects. Extend laboratory experiments on warhead materials to expand our knowledge base of lethality phenomena. Continue laboratory experiments to obtain critical data required to model CBW agent behavior (droplet formation, atmospheric transport, diffusion, deposition, and evaporation). Perform laboratory experiments to determine meteorological effects on CBW agents. Evaluate existing high velocity equations of state and fracture data and validity of hydrocodes in the high velocity impact regimes.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3359

•	10000	Lethality (Field Experiments): Continue systematic series of field experiments to obtain critical data required to model CBW agent behavior. Track and obtain data on agent cloud transport, diffusion, and ground effects. Evaluate sensor requirements and capabilities to measure hit/kill signatures and identify warhead types. Establish criteria for rapid assessment of target damage. Conduct experiments to determine the benefit of rod lethality enhancers in hit-to-kill intercepts.
Total	24662	

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

C. Acquisition Strategy: This effort will use existing BMDO and Service executing agents 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.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Assess Limitations of WMD Negation Models		3Q		1Q		1Q	4Q
Conduct Systematic End-to-End Lethality Analysis			4Q		2Q, 4Q		4Q
Assess High Velocity Impact Scaling		3Q	4Q	1Q			
Exploratory Lab & Field Experiments			2Q, 4Q	3Q			
Systematic Lab Experiments			4Q		2Q, 4Q		
Critical Anchoring Field Experiments		4Q	2Q, 4Q	3Q	2Q, 4Q	3Q	3Q
Measure Kill Assessment and Warhead Type Signatures				1Q		1Q	

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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.												
Subtotal Product Development:												

Remark:

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
a.												
Subtotal Support Costs:												

Remark:

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
a. Lethality Analysis	Multiple	Various		4786		11734		24662			41182	
Subtotal Test and Evaluation:				4786		11734		24662			41182	

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:				4786		11734		24662			41182	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3360

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	61557	46179	13515	14227	13661	13593	11600	11773	Continuing	Continuing

Funding associated with PMA 3157 has been transferred into this project beginning in FY99. Some FY00-05 funding has been transferred to PE 0603874C. The funding that remains in the JTMD PE, 0603872C is for TMD unique Test Resources.

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 at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN
- 7V and 10V Space Chambers at the Arnold Engineering Development Center, Tullahoma, TN
- The Center for Research Support (CERES) at the Joint National Facility, Schriver AFB, CO

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
- Eglin Gulf Test Range (EGTR) at Fort Walton Beach, FL

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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 3360

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.

In FY99, 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) system. 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.

FY 1998 Accomplishments:

•	11034	Provided ground test facility infrastructure and upgrades for BMDO testing including: end game hardware-in-the-loop testing of integrated IR sensor systems including THAAD and Navy Theater Wide TBMD at KHILS, wind tunnel testing at Tunnel 9 to support AIT, sensor testing at NRaD and AEDC 7V/10V, propellant loading expertise and GBI hover test support from the NHTF, THAAD, PATRIOT and Navy Theater Wide lethality testing at AEDC Range G, IR phenomenology characterization at Tunnel 9 and KHILS, and maintain primary IR standards and black body and optical materials calibrations at the NIST. Supported THAAD objective window testing at Tunnel 9. Provided orbital experiment and satellite operations support at CERES and SBIRS Low Flight Demonstration System Support at CERES.
•	8339	Provided planning and test range infrastructure, including caretaker activities at Wake Island, KTF, WSMR and Ft Wingate, and upgrades for BMDO testing including development of TMD launch and range facilities, and associated range instrumentation sites, including a second environmental shelter at Wake Island.
•	7159	Provided range instrumentation, upgrades, data collection, and analyses for BMDO testing including data collecting and processing by SLBD, HAOI at WSMR and HALO/IRIS sensor. Supported FOC of upgraded KMRSS to support Multiple Shot Engagements. Achieved IOC of second NP-3 RASA.
•	33725	Provide planning, instrumentation upgrades, and facility improvements at PMRF as well as planning and infrastructure support for the KTF in preparation for JTMD related test activities.
•	1300	Provide technical support for Resource activities at BMDO
Total	61557	

FY 1999 Planned Program:

•	3278	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, and Navy Theater Wide TBMD.
•	5823	Provide planning, test range infrastructure, and caretaker activities at Wake Island in preparation for Family of Systems (FoS) and TMD testing in FY00.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL / PROJECT: 3360

•	5414	Provide range instrumentation, upgrades, data collection, and analyses for BMDO TMD testing including data collecting and processing by HALO/IRIS.
•	1258	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 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.
•	1115	Ensures 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.
•	29291	Provide planning, instrumentation upgrades, and facility improvements at PMRF as well as planning and infrastructure support for the KTF in preparation for JTMD related test activities.
Total	46179	

FY 2000 Planned Program:

•	2496	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, and Navy Theater Wide TBMD.
•	6240	Provide planning, test range infrastructure, and caretaker activities at Wake Island in preparation for Family of Systems (FoS) and TMD testing in FY00.
•	4779	Provide range instrumentation, upgrades, data collection, and analyses for BMDO TMD testing including data collecting and processing by HALO/IRIS.
Total	13515	

FY 2001 Planned Program:

•	3222	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, and Navy Theater Wide TBMD.
•	5711	Provide planning, test range infrastructure, and caretaker activities at Wake Island in preparation for Family of Systems (FoS) and TMD testing in FY00.
•	5294	Provide range instrumentation, upgrades, data collection, and analyses for BMDO TMD testing including data collecting and processing by HALO/IRIS.
Total	14227	

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3360

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
2257 PATRIOT, PE 0604865C	242690	320342	29141	39119	0	0	0	0	TBD	TBD
2257 PATRIOT, PE 0208865C	316789	245494	300898	367762	400205	379220	366228	266880	TBD	TBD
2260 THAAD, PE 0602218C	0	0	0	0	162136	191272	208120	246902	TBD	TBD
2260 THAAD, PE 0604861C	0	0	577493	556178	417530	293886	205852	0	TBD	TBD
2260 THAAD, PE 0603861C	387260	433172	34133	3519	0	0	0	0	TBD	TBD
2260 THAAD, PE 0208861C	0	0	0	0	0	91729	182628	603924	TBD	TBD
1266 NAVY THEATER WIDE, PE 0603868C	437896	344284	329768	369049	0	0	0	0	TBD	TBD
1266 NAVY THEATER WIDE, PE 0604868C	0	0	0	0	0	92000	323000	406000	TBD	TBD
1266 NAVY THEATER WIDE, PE 0602218C	0	0	0	0	352182	280580	309782	387648	TBD	TBD
2263 NAVY AREA, 0604867C	292063	242347	268389	226772	64208	51548	33596	26665	TBD	TBD
2263 NAVY AREA, PE 0208867C	14859	43189	55002	61066	121035	134379	152319	181381	TBD	TBD
3354 TARGETS, PE 0603874C	0	1962	2320	0	0	0	0	0	CONT	CONT.
3354 TEST RESOURCES, PE 0603874C	0	41410	51909	23759	25003	24150	24267	24756	CONT	CONT.
3360 TARGETS, PE 0603872C	69453	17866	41966	40133	40135	40028	34224	34778	CONT	CONT.

C. Acquisition Strategy: In using ranges and test facilities and providing technical assistance of facilities, siting, and environmental activities, BMDO implements a Reliance process which:

- maintains perspective of national technical test capabilities relative to BMD
- responds to program requirements
- uses existing test resources where possible
- requires coordination prior to development of new resources
- and consolidates management of existing resources where possible and practicable.

This policy results in 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 Command (USASMDC)
- U.S. Navy Office of Naval Research
- Navy Program Office – Theater Air Defense
- U.S. Air Force Research Laboratory
- U.S. Army Corps of Engineers
- and the U.S. Army Program Executive Office-Missile Defense.

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3360

The majority of the ground test facilities are government owned and are operated with some degree of contractor support, and support multiple BMDO users. The test ranges are part of the DoD Major Range and Test Facility Base (MRTFB). The HALO/IRIS and AST sensors are operated by competitively awarded contracts.

D. Schedule Profile

	FY 1998				FY 1999				FY 2000				FY 2001				FY 2002				FY 2003				FY 2004				FY 2005			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
KHILS – AIT										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – DITP (Quantum Well, Integration Tests)					X	X	X	X	X	X	X	X	X	X	X	X																
KHILS – DTRA (Nuclear Requirements)									X	X	X	X	X	X	X	X	X	X	X	X												
KHILS – THAAD (Seeker Entries, Target Modeling & Algorithm Support)					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
KHILS – BPI (System Studies)					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – MEADS (HIL Testing)													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – Theater Wide SM 3 (HIL Testing)												X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – GBI (KV Down Select, Flight Test Support)					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
KHILS – Target VV&A					X	X	X	X	X	X																						
7V/10V – GBI: BNA	X	X	X	X																												
7V/10V – GBI: Raytheon	X	X	X	X																												
Tunnel 9 – THAAD Support	X	X	X	X																												
Tunnel 9 – Arrow Support	X	X	X	X																												
Tunnel 9 – Phenomenology Support	X	X	X	X																												
Tunnel 9 – AIT Support			X	X																												
Tunnel 9 – Navy Lower Tier Support				X																												
NHTF – Hover Ops	X	X	X	X																												
NHTF – Air Force NMD	X	X	X	X																												
NHTF – SM-X				X																												
NHTF – GBI (National)		X																														
NHTF – NTW				X																												
Range G – PAC-3	X	X	X																													
Range G – NMD			X	X																												
Range G – Navy Theater TBMD				X																												
Range G – Phenomenology Impact	X	X																														
POST – SBIRS Low	X	X	X	X																												
CERES – RCS Programs Support	X	X	X	X																												

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3360

CERES – MSTI Support	X	X																													
CERES – Space Based Laser Ops Concept Development	X	X	X	X																											
CERES – CLEMENTINE II	X	X	X																												
NIST/LBIR – Characterize Detector Transfer Standards	X	X	X	X																											
NIST/LBIR – Measure THAAD, SM-D Sapphire Emissivity	X	X																													
NIST/LBIR – Calibrate Los Alamos National Lab Blackbody	X	X																													
NIST/LBIR – Measure MSX Sphere Spectral Emissivity		X	X																												
NIST/LBIR – Calibrate AEDC 7V Blackbody		X	X																												
NIST/LBIR – POST Blackbody for SBIRS and EKV		X	X	X																											
NIST/LBIR – Measure Emissivity (NRaD, Sapphire, EKV Mirror)			X	X																											
HALO/IRIS Data Collection	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
RCSS Operational Capability						X																									
KMR TCMP Launch						X																									
WSMR Navy SM2-Blk IV Testing						X	X	X	X	X																					
NP-3 RASA IOC			X																												
NP-3 RASA FOC						X																									
Environmental Analysis for Eglin Gulf Test Range					X	X																									
Environmental Analysis for Pacific Missile Range Facility					X	X	X																								
Environmental Analysis for Target Missile Air Drop					X																										
Environmental Analysis for Long Range Air Launch					X	X	X	X																							
Environmental Analysis for Advanced Interceptor Technology					X	X	X	X	X																						
THAAD 1ST Objective Battalion, Ft Bliss					X	X																									
PAC-3 Missile Assembly Bldg, White Sands					X	X																									
Launch Facilities Infrastructure Modernization, USAKA					X	X	X	X	X																						
Fire Protection System Modernization, USAKA					X	X	X	X	X																						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. PMRF Upgrades	Allot	Navy, PMRF		19887	10/01/98						19887	
b. Optical Sensor Upgrade	Allot	Navy, PMRF		4893	10/01/98						4893	
c. Army TMD Facility/ Environmental Programs Development	Allot	Army PEO, Huntsville		490	10/01/99						490	
d. Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TAD, Arlington VA		147	10/01/99						147	
e. Air Force TMD Facility/Environmental Programs Development	Allot	AF SMC, Los Angeles CA		10	10/01/99						10	
f. Environmental, Safety & Health Initiatives		TBD		166							232	
Subtotal Product Development:				25659							25659	N/A

Remark:

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
a. KTF	Allot	Navy, Kauia Test Facility		4893	10/01/98	0		0			4893	
b. HALO/IRIS Support	Allot	SMDC, Huntsville, AL		5122	10/01/98	4779	10/01/99	5294	10/01/00	TBD	15195	
c. Wake Island Support	Allot	SMDC, Wake Island		5693	10/01/98	6240	10/01/99	5711	10/01/00	Cont	17644	
d. KHILS Support	Allot	Air Force, Florida		3112	10/01/98	2496	10/01/99	3222	10/01/00	Cont	8830	
e. Facility Acquisition Life-Cycle Management		U.S. Army Corps of Engineers, Huntsville AL		100	10/01/99	0	10/01/00	0	10/01/01	Cont	100	
f. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc Rosslyn, VA		1600	08/01/99	0	08/01/00	0	8/01/01	Cont	1600	
Subtotal Support Costs:				20520		13515		14227			48262	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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 Test and Evaluation:												

Remark:

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:												

Remark:

Project Total Cost:				46179		13515		14227		Continuing Effort	N/A	N/A

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 4000

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	73442	59854	67719	78626	74715	74479	63329	65549	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides support in three basic areas: personnel and related support costs; funding to meet fluctuation costs and contract terminations; and assistance required to fund support service contracts for the Theater Missile Defense (TMD) program..

Personnel and related support costs common to all TMD projects include support of the Office of the Director, Ballistic Missile Defense Organization and his staff located within the Washington, D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, U.S. Army PEO Missile Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office, and the National Test Facility. This project supports funding for overhead/indirect personnel costs, benefits, and infrastructure costs such as rents, utilities, supplies, etc.

The BMDO prioritizes funding within this project to meet operational, contractual, and statutory fiscal requirements for the TMD program. Operational requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF), such as accounting services provided by the Defense Finance and Accounting Service (DFAS). Contractual requirements include 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. Finally, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

Assistance required to support BMDO overhead management functions for the TMD program is contained in this project. This assistance ranges from operational contracts to fully support functions such as ADP operations, automated tool, Access control offices, and graphics support, to supportive efforts required, as well as to supplement the BMDO government personnel. Typical efforts include cost estimating, security management, contracts management, strategic relations management and information management. These efforts include assessment of technical project design, development and testing, test planning, assessment of technology maturity and technology integration across BMDO projects; and support of design reviews and technology interface meetings. Program control tasks include assessment of schedule, cost, and performance, with attendant documentation of the many related programmatic issues. The requirement for this area is based on most economical and efficient utilization of contractors versus government personnel.

The Fiscal Year 1996 Defense Authorization Act eliminated the management program element effective with the Fiscal Year 1997 President's Budget submission. This overhead management and indirect program support funding has been realigned in accordance with Public Law 104-106.

FY 1998 Accomplishments:

- 73442 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 73442

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603872C Joint TMD - DEM/VAL; PROJECT: 4000

FY 1999 Planned Program:

- 59854 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 59854

FY 2000 Planned Program:

- 67719 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 67719

FY 2001 Planned Program:

- 78626 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 78626

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

C. Acquisition Strategy:

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

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

DATE: **September 1998**

BUDGET ACTIVITY: **4 - Demonstration and Validation**

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

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	0	95721	141821	128551	143563	133414	138205	140331	Continuing	Continuing
3155 TAMD Integration	0	22277	34605	36278	33997	31764	37394	38152	Continuing	Continuing
3251 Systems Engineering and Techincal Support	0	13845	13268	13074	13660	13628	12800	12378	Continuing	Continuing
3261 TMD BM/C3I (BM/C3I Concepts)	0	38679	41204	44605	43214	43053	42109	42965	Continuing	Continuing
3359 System Test and Evaluation	0	20920	52744	34594	52692	44969	45902	46836	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 system designed to protect the United States and its Allies 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).

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. The projects in this Program Element provide for optimal Theater and Air Missile Defense (TAMD) architectural solutions to address the entire theater level threat. The efforts are directly linked with the architectural definition, design, integration, interoperability, and Test & Evaluation of the TMD Family of Systems.

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.

C. Acquisition Strategy: See Individual R2a summaries.

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

DATE: September 1998

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	N/A	96915	130289	141315
Congressional Adjustments				
Appropriated Value		96915		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-1194		
b. OSD Reductions				
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)		95721	141821	128551

Change Summary Explanation: Rephased TAMD Integration funding in FY00 and FY01 to be in proper alignment with required effort.

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

DATE: September 1998

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3155

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3155 TAMD Integration	0	22277	34605	36278	33997	31764	37394	38152	Continuing	Continuing

A. Mission Description and Budget Item Justification

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 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 population centers within an assigned theater of operations. The TAMD FoS architecture will focus on the integration of Theater Ballistic Missile Defense (TBMD), Cruise Missile Defense (CMD), Air Defense (AD), Attack Operations (AO), and Passive Defense (PD). In addition, BMC4I capability improvements, such as definition of JTAMD Systems and BMC4I to achieve a Single Integrated Air Picture (SIAP) capability, will be included in this project. A significant amount of effort will also be put into maintaining and upgrading modeling and simulation tools, including Commanders Analysis Planning Simulation (CAPS), Extended Air Defense Test Bed (EADTB), Extended Air Defense Simulation (EADSIM), further development of the Theater Missile Defense System Exerciser (TMDSE), and additional development of other models as required. Support will be provided to Joint TAMD FoS testing, demonstrations and exercise efforts. The results of the TAMD process will be documented in the TAMD Master Plan which outlines the Operations Architecture, Systems Architecture, Technical Architecture and Investment Strategy. A TMD Systems Requirments Document (SRD) and subsequent Interface Control Documents will be used by BMDO to capture the FoS engineering requirements for TAMD integration.

FY 1998 Accomplishments:

-

Total 0

FY 1999 Planned Program:

- 6839 Single Integrated Air Picture (SIAP) Definition and Risk Mitigation- Develop an operational and engineering definition of potential material solutions for SIAP, JCTN Integration Analysis, JCTN/JDN Gateway Development, Technical Requirements documentation, and development of of tools and prototypes for SIAP analysis, Virtual Distributed Analysis of SIAP requirements and behavior. Develop common software module approaches and solutions.
- 8941 TAMD Integration - Support 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.

•	4878	Modeling and Simulation Development - Develop TAMD System Specific Representations and advanced modeling and simulation capabilities, using EADTB, EADSIM, CAPS, TMDSE and other models as necessary.
•	1619	System Effectiveness - Evaluate the post engagement effects of successful and partially successful engagements on defended areas and potential impacts on use of alternative systems to engage "short-falls" and partially successful engagements.
Total	22277	Total

FY 2000 Planned Program:

•	7812	SIAP Definition and Risk Mitigation- Continue SIAP Definition analysis, address how the union of Joint Data Network and Joint Composite Tracking Network meeting SIAP requirements, resolve issues surrounding affects of SIAP technologies on user displays. Use virtual demonstrations to develop and experiment with new operational concepts.
•	19225	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
•	5859	Modeling and Simulation Development - Continue to develop TAMD System Specific Representations and advanced modeling and simulation capabilities to support TAMD requirements.
•	1709	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.
Total	34605	

FY 2001 Planned Program:

•	14154	SIAP Development - Begin transition to SIAP development tasks. Demonstrate capability to range extend JCTN nodes across theater, begin to develop engineering level prototype JCTN integration solutions, demonstrate connectivity and ability to do composite tracking and data sharing using prototype, demonstrate JCTN/JDN Gateway solutions. Develop common software components for re-use in subsequent procurement activities.
•	13366	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.
•	6812	Models and Simulations Development - Continue to develop TAMD System Specific Representations and advanced modeling and simulation capabilities to support TAMD requirements.
•	1946	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.
Total	36278	

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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)			DATE: September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I		PROJECT: 3155

3359 System Test & Evaluation		25551	60032	40331	58923	51084	49339	50398		
3261 TMD BM/C3I		32082	37870	43597	42281	42215	43146	44094		

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.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
TAMD Master Plan		1Q	1Q	1Q	1Q	1Q	1Q	1Q
Continuing Upgrades to EADTB, CAPS, and TMDSE Models		4Q						
Master Plan T&E Section (Demo Annex)		4Q						
SBIRS Low Study - Initial Preparation of Findings and Recommendations		1Q						
Delivery of SSRs for EADTB f/AEGIS(NTW), THAAD, and SBIRS Low		2Q						
Second Phase Systems for JCTN IPR		2Q						
SIAP Technical Requirements Document Interim Progress Review (IPR)		2Q						
Initial IPR for Joint Mission Area Assessment		2Q						
SBIRs Low QDR Follow-on Study Delivered to Under Secretary of Defense for Acquisition and Technology (USD(A&T)		3Q						
Deliver SSRs f/EADTB for PATRIOT, JTAGS, AEGIS, BDE, AMDPCS (ADTOC), and AWACS		3Q						
Development of the CMD and TBMD Systems Architecture Baseline		4Q						
SIAP Definition and Analysis Technical Requirements Document		4Q						
Second Phase Systems for JCTN Report		4Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE September 1998
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603873C Family of System E & I					PROJECT 3155
Follow-on Plan for SIAP User in the Loop Analysis		4Q						
User in the Loop SIAP Analysis Evaluation Results		4Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: September 1998

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 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. Army - TMDSE Development	Suballocation			3818		4007		4659		Cont	12484	
b. Army, Navy, Air Force - EADTB SSR development	Suballocation			2068		1852		2153		Cont	6073	
Subtotal Product Development:				5886		5859		6812			18557	

Remark:

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
a. Army - Analysis Support	Suballocation	DAMO-FDE/SMDC		250		325		350			925	
b. Navy - Analysis Support	Suballocation	OPNAV-N86		250		325		350			925	
c. Air Force - Analysis Support	Suballocation	AFSAA		250		325		350			925	
d. Marine Corps - Analysis Support	Suballocation	MARCORSYSCOM		100		150		150			400	
e. JNTF support	Suballocation	JNTF		100		150		200			450	
f. POET support	MIPR	FFRDCs		42		75		100			217	
Subtotal Support Costs:				992		1350		1500			3842	

Remark:

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
a.												
Subtotal Test and Evaluation:												

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: **September 1998**

BUDGET ACTIVITY: **4 - Demonstration and Validation**

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

PROJECT: **3155**

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. TAMD Integration Analysis	CPAF	SPARTA, other misc		8437		19225		13366			41028	
b. SIAP Definition/System Effectiveness Analysis	Multiple	Multiple		6962		8171		14600			29733	
Subtotal Management Services:				15399		27396		27966			70761	

Remark:

Project Total Cost:				22277		34605		36278			93160	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE: September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I — PROJECT: 3251

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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 Techincal Support	0	13845	13268	13074	13660	13628	12800	12378	Continuing	Continuing

*The funding in this project for FY99-03 was transferred from PE 0603872C. See that R2 for FY96-98 funding.

A. Mission Description and Budget Item Justification

This project provides system engineering 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; 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 1998 Accomplishments:

- See PE 0603872C

Total 0

FY 1999 Planned Program:

- 13845 Provide minimum-level system engineering and integration support at the TMD system level to include the following efforts: continue to identify inter-Service integration interfaces; prepare engineering documents that identify changes required in theater air defense C3I systems to incorporate TBMD; upgrade TMD Integrated Test Plan; upgrade system description documents; complete TMD integration trade studies; and plan, coordinate, and analyze C2 wargames for CINC CONOPS development.

Total 13845

FY 2000 Planned Program:

- 13268 Provide minimum-level system engineering and integration support at the TMD system level to include the following efforts: continue to identify inter-Service integration interfaces; prepare engineering documents that identify changes required in theater air defense C3I systems to incorporate TBMD; upgrade TMD Integrated Test Plan; upgrade system description documents; complete TMD integration trade studies; and plan, coordinate, and analyze C2 wargames for CINC CONOPS development.

Total 13268

FY 2001 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I / PROJECT: 3251

•	13074	Provide minimum-level system engineering and integration support at the TMD system level to include the following efforts: continue to identify inter-Service integration interfaces; prepare engineering documents that identify changes required in theater air defense C3I systems to incorporate TBMD; upgrade TMD Integrated Test Plan; upgrade system description documents; complete TMD integration trade studies; and plan, coordinate, and analyze C2 wargames for CINC CONOPS development.
Total	13074	

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

C. **Acquisition Strategy:**

D. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
							X	X	X	X
							X	X	X	X

BMDO RDT&E COST ANALYSIS (R-3)

DATE: September 1998

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 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.												
Subtotal Product Development:												

Remark:

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
a?												

Remark:

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
a?												
Subtotal Test and Evaluation:												

Remark:

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? Systems Engineering	CPAF	TRW		13845		13268		13074		Cont	40187	
Subtotal Management Services:				13845		13268		13074			40187	

Remark:

Project Total Cost:				13845		13268		13074			40187	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE September 1998
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I	PROJECT 3261

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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)	0	38679	41204	44605	43214	43053	42109	42965	Continuing	Continuing

*The funding in this project for FY99-03 was transferred from PE 0603872C. See that R2 for FY96-98 funding.

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, Computers and Intelligence (BM/C4I) 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 a 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/C4I for TAMD, the Ballistic Missile Defense Organization (BMDO) uses this project to provide oversight, leadership, guidance, and support to the Services' TAMD BM/C4I programs. The focus is on Joint approaches to integrate and synergize the Services' programs.

In recent years, this project has been focused on three thrusts: (1) early warning and dissemination of theater ballistic missile launch information, (2) communication interoperability, and (3) command and control upgrades. In concert with this successful approach, BMDO has developed a TAMD BM/C4I Architecture to enable further improvements in TAMD performance. By focusing project efforts on this architecture, the integration of individual activities will be enhanced while continuing to support earlier objectives.

This TAMD BM/C4I Architecture can be viewed as a set of FoS connectivities and common mission functions integrated via three networks. The first network to be implemented is the Joint Data Network (JDN): a near-real-time network based primarily on the Tactical Digital Information Link [TADIL-J / LINK-16] datalink to provide overall FoS situational awareness, command and control, and weapon coordination. The second network to be implemented is 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 CINCs. The third and final network to be implemented is 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 synergy of multiple systems.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I
	PROJECT: 3261

To achieve the TAMD BM/C4I 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 interoperable.

Fos Interoperability 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 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 1998 Accomplishments:

- See PE 0603872C

Total 0

FY 1999 Planned Program:

- 7192 BM/C3I Integration - Army: Deliver Army Develop ICP and system implementation documentation for Army AMD systems for JDN message development; integrate 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); integrate JTT into AMDPCS at ADA Bde; and above levels; integrate AMDPCS with German SAMOC under US/GE Interoperability program; deliver Army AMDWS/JDP Interface documentation to the JDP Program office; software integration report on upgrades to TADIL-A PATRIOT cueing for TBMs; deliver ASCIET 99 Joint Network design and load files for Link-16 Net Design; deliver demonstration plan for Army JRE; deliver Army annex to Integration plan of JRE; deliver Joint Requirements documents for Army JRE. .
- 9026 BM/C3I Integration - Air Force: Implement JDP V1.0 TRNs and JTMDP V2.0 requirements in JDP 2.0; develop enhancements and field JDP V1.0 including enemy order of battle and JMTK; implement model fidelity study results via Service-generated system data tables; produce JRE host integration plan with Service annexes; conduct JRE Joint Lab demonstration; integrate Navy and Army S-TADIL J UHF capability in AF JRE Gateway; develop Joint test environment to supplement live testing with operationally realistic loads (MASC); deliver Time Slot Reallocation recommendations; field JDP, V 1.0 with TBMSC; initiate creation of testbed capability at identifies facility(ies); complete 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; develop a Joint communications plan/architecture to identify the out-of-theater, reach-back requirements for A2IPB; publish Joint Area Limination TRD; develop a Correlation Roadmap;

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE September 1998
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I	PROJECT 3261

- 6925 BM/C3I Integration - Navy & USMC: Integrate JDP 2.0 with GCCS-M; conduct JRE Joint lab demonstration; produce JRE host integration plan with Service annexes; complete Joint Service staffing requirements document; develop test plans for JTIDS TSR development; develop test plan for Common Air Command & Control system, (CAC&CS); deliver TEMP draft on CAC&CS; complete software testing on SIAP; conduct demonstration on the SIAP.
- 8913 BM/C3I Integration - Joint/Combined: Provide joint testing support for TAMD messages; continue theater/IBS integration process into TADIL-J messages; submit "best-of-breed" candidates to CAN; develop TADIL ICP for joint correlation algorithm base; complete UK sensor management and passive warning studies; provide 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; document and test procedures for adding MIDB codes to TDPs; conduct tests using live TDDS and TIBs data, recording and simulation; initial preparation of the Advanced Concept Technology Demonstartor (ACTD).
- 1552 BM/C3I Integration – JNTF: Update VV&A plan; VV&A JDP V 2.0 for release; final update to JDP requirements 2Q99; perform user assessment of GCCS TAMD applications; demonstrate JDP capabilities; provide and maintain an operational representative GCCS host workshop.
- 5071 FoS Interoperability - 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 38679

FY 2000 Planned Program:

- 7761 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.
- 11148 BM/C3I Integration -Air Force: Demonstrate and test JRE UHF S-TADIL J capability; integrate EHF MDR capability into JRE; implement JDP V 3.0; support JDP 3.0 GCCS/JPN 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;
- 3475 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I / PROJECT: 3261

- 11742 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.
- 2392 BM/C3I Integration- JNTF: Develop Air tasking orders to support TAMD exercises; perform DII COE standards compliance validation ona ll TRMD 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.
- 4686 FoS Interoperability - 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 41204

FY 2001 Planned Program:

- 8223 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.
- 12707 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.
- 3532 BM/C3I Integration- Navy & USMC: Transition JRE into lead Service Program offices; integrate JDP V 3.0 with GCCS-M.
- 15709 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.
- 2263 BM/C3I Integration- JNTF: Assist other Service GCCS customers in their integration of TAMD applications.
- 2171 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 44605

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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE September 1998
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of System E & I	PROJECT 3261

3261 TAMD BM/C3I PE 0603872C	68.958								Complete	68.958
3261 TAMD BM/C3I PE 0603873C		36.427	42.556	45.768	44.434	44.352	43.442	44.397	Continue	301.376

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
Complete testing of AN/TPS-59	X							
Field two TOCs to active Army brigades	X							
Update TADIL-J message set approval	X							
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		X						
Final version and fielding of JDP V 3.0			X					
Complete final A2IPB prototype development (Build 2)				X				
Install A2IPB at JNTF				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 Limination prototype at the CUBE or JNTF			X					
Initiate final evolutionary prototype development			X					

	DATE
	September 1998

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

Complete final evolutionary prototype and certify Area Limination software as DII COE segment				X				
Begin fielding Area Limination 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: September 1998

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 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. Army – PEO AMD	Allotment	Multiple		7192		7761		8223		Continue	23176	
b. Air Force ESC	Allotment	Multiple		9026		11148		12707		Continue	32881	
c. USMC Sys Com	Allotment	Multiple		4189		1494		1518		Continue	7201	
d. Navy PEO-TAD	Allotment	Multiple		2736		1981		2014		Continue	6731	
e. BMDO	Allotment	Multiple		8913		11742		15709		Continue	36364	
f. JNTF	Allotment	Multiple		1552		2392		2263		Continue	6207	
Subtotal Product Development:				33608		36518		42434			112560	

Remark:

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
a? Army PEO-AMD	Allotment	Multiple		0989		1269		0529		Continue	2787	
b? Air Force ESC	Allotment	Multiple		0898		1269		0529		Continue	2696	
c? USMC Sys Com	Allotment	Multiple		0296		1269		0529		Continue	2094	
d? Navy PEO-TAD	Allotment	Multiple		0989		0293		0292		Continue	1574	
e? BMDO	Allotment	Multiple		1405		0293		0292		Continue	1990	
f? JNTF	Allotment	Multiple		0494		0293		0		Continue	787	
Subtotal Support Costs:				5071		4686		2171			11928	

Remark:

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
a?												
Subtotal Test and Evaluation:					0		0		0			0

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: **September 1998**

BUDGET ACTIVITY: **4 - Demonstration and Validation**

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

PROJECT: **3261**

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?												
Subtotal Test and Evaluation:					0		0		0			0

Remark:

Project Total Cost:				38679		41204		44605			124488	

Remark:

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

DATE: September 1998

BUDGET ACTIVITY: 4 - Demonstration and Validation

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

PROJECT: 3359

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	0	20920	52744	34594	52692	44969	45902	46836	Continuing	Continuing

*The funding in this project for FY99-03 was transferred from PE 0603872C. See that R2 for FY 1998 funding.

A. Mission Description and Budget Item Justification

This project continues effort previously started under PE 0603872C (for FY96-98) and provides for BMDO planning, oversight, and coordination of integrated Test and Evaluation activities, as well as inter-service Test and Evaluation efforts for assessment of the Family of Systems (FoS). Once the test plans are developed, test resource and target development and support is provided. (Test resources located in Project 3360 include test facilities, ranges and test instrumentation; target development and support is found in Project 3354). The program provides for support to the Major Defense Acquisition Program (MDAP) mandatory Live-Fire Test and Evaluation (LFT&E). This includes estimates of probability of kill of chemical/biological submunitions, creation of models to determine chemical/biological ground effects, confirmation of damage laws from low mass/high-velocity intercepts, confirmation of damage laws from high velocity rods, development of generic lethality targets. Additionally, this project provides the following: independent assessments of the Joint TMD system; maturity evaluation of technology programs; multiple-fidelity models and simulation to support system development testing; and execution of independent technical reviews, system analyses and performance evaluations which contribute to new or enhanced capabilities; management of the development process, and the decision-making process related to the allocation of resources. The performance evaluation has as its primary goals the identification and understanding of system-level performance drivers and the mitigation of technical risk, and to provide timely answers to critical issues and questions required by decision authorities through an annual Consolidated Evaluation Report (CER).

FY 1998 Accomplishments:

- See PE 0603872C

Total 0

FY 1999 Planned Program:

- 16856 Plan and prepare for execution of SIT-II. Complete TMDSE Build 3 transition to the Joint National Test Facility.
- 735 Execute Capstone TEMP and methodologies for assessing test issues as part of the FoS test program. Conduct special studies and technical investigations. Participate in PAC-3 Test Readiness Reviews. Provide inputs to the PAC-3 evaluation in support of the BMD Acquisition Review Council (BMDARC) prior to PAC-3 MS III. Participate in SM-2 Blk IVA Flight Test Readiness Reviews. Provide evaluation support to BMDARC for the Navy Area TBMD UOES. Assess results of TMDSE FoS HWIL testing.
- 2500 Conduct operational assessments on TMD FoS events.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I	PROJECT: 3359

- 446 Provide updated CER utilizing current test data from MDAPs and SITs, Joint Exercises, and Wargames as well as analytical techniques to estimate the TMD system maturity.
- 383 Provide technical support for System Test activities

Total 20920

FY 2000 Planned Program:

- 45800 Plan and prepare for SIT II. Plan and conduct HWITL 00 test. Maintain/upgrade TMDSE.
- 1039 Execute Capstone TEMP and methodologies for assessing test issues as part of the FoS test program. Conduct special studies and technical investigations. Participate in PAC-3 Test Readiness Reviews. Provide inputs to the PAC-3 evaluation in support of the BMD Acquisition Review Council (BMDARC) prior to PAC-3 MS III. Participate in SM-2 Blk IVA Flight Test Readiness Reviews. Provide evaluation support to BMDARC for the Navy Area TBMD UOES. Assess results of TMDSE FoS HWIL testing.
- 5107 Conduct operational assessments on TMD FoS events.
- 461 Provide updated CER utilizing current test data from MDAPs and SITs, Joint Exercises, and Wargames as well as analytical techniques to estimate the TMD system maturity.
- 337 Provide technical support for System Test activities

Total 52744

FY 2001 Planned Program:

- 27318 Execute SIT II. Maintain/upgrade TMDSE.
- 1066 Execute Capstone TEMP and methodologies for assessing test issues as part of the FoS test program. Conduct special studies and technical investigations. Participate in PAC-3 Test Readiness Reviews. Provide inputs to the PAC-3 evaluation in support of the BMD Acquisition Review Council (BMDARC) prior to PAC-3 MS III. Participate in SM-2 Blk IVA Flight Test Readiness Reviews. Provide evaluation support to BMDARC for the Navy Area TBMD UOES. Assess results of TMDSE FoS HWIL testing.
- 5391 Conduct operational assessments on TMD FoS events.
- 473 Provide updated CER utilizing current test data from MDAPs and SITs, Joint Exercises, and Wargames as well as analytical techniques to estimate the TMD system maturity.
- 346 Provide technical support for System Test activities

Total 34594

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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE September 1998
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603873C Family of System E & I / PROJECT: 3359

C. Acquisition Strategy: This effort will use Service executing agents through existing contracts to construct a TMD Family of Systems HWIL capability, TMD System Exerciser (TMDSE) and conduct TMD system level live flight testing. The strategy provides for lethality sled testing managed by BMDO and executed by Service labs against TMD targets. It also provides Service and BMDO system evaluation funding. The evaluation process is an iterative process which should begin early in the development cycle to add value to the development of the system. Critical system characteristics and issues should be identified early in the process and be evaluated to allow for informed decision-making. Family of System evaluations and assessments will be performed by BMDO and Service OTAs.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
SIT II				2Q				
SIT 2002						2Q		

BMDO RDT&E COST ANALYSIS (R-3)

DATE: September 1998

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 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.												
Subtotal Product Development:												

Remark:

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
a. T&E Support	CPAF	SRS		998		1039		1066		Cont	3103	
Subtotal Support Costs:				998		1039		1066			3103	

Remark:

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
a. Test Planning/Execution	Suballocation	Joint/Combined		3565		32374		15154			51093	
b. OT&E	Suballocation	Other Test Agengies		2550		5107		5391			13048	
c. HWIL Develop/Testing	Suballocation	Joint/Combined		13807		14224		12983			41014	
Subtotal Test and Evaluation:				19922		51705		33528			105155	

Remark:

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.												
Subtotal Management Services:												

Remark:

Project Total Cost:				20920		52744		34594			108258	

Remark:

	DATE **September 1998**
BUDGET ACTIVITY **4 - Demonstration and Validation**	PE NUMBER AND TITLE **0603873C Family of System E & I**

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

	COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	0	184842	190650	160295	163655	160266	152504	155630	Continuing	Continuing
1155	Discrimination *	0	18208	24568	26794	22095	24230	15535	15827	Continuing	Continuing
3153	Systems Arch and Engineering *	0	16084	15789	14455	14564	14535	13795	14130	Continuing	Continuing
3352	Modelling and Simulation **	0	48341	29350	29306	30791	27651	27983	28315	Continuing	Continuing
3353	JNTF *	0	51815	56088	55037	60027	58354	59104	60514	Continuing	Continuing
3354	Targets ***	0	1952	2320	0	0	0	0	0	Continuing	Continuing
3360	Test Resources	0	41428	51909	23759	25003	24150	24267	24756	Continuing	Continuing
4000	Operational Support	0	7014	10626	10944	11175	11346	11820	12088	Continuing	Continuing

* The funding in this project for FY99-03 was transferred from PEs 0603871C and 0603872C. See those R2s for FY98 funding.
** The funding in this project for FY99-03 was transferred from PEs 0603173C, 0603871C and 0603872C. See those R2s for FY98 funding.
*** The funding in this project for FY99-03 was transferred from PE 0603872C. See that R-2 for FY98 funding.

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 phenomenology data collection and analysis, test resources and facilities, modeling and simulation, and BMD architecture 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 will be 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 "3+3" 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 new PE, Technical Operations programs will be more 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations

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.

C. Acquisition Strategy: See Individual R2 summaries.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	0	190147	161136	165802
Congressional Adjustments		1000		
Appropriated Value		191147		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-6191		
b. OSD Reductions		-114		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	0	184842	190650	160295

Change Summary Explanation:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 1155

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1155 Discrimination *	0	18208	24568	26794	22095	24230	15535	15827	Continuing	Continuing

* The funding in this project for FY99-03 was transferred from PEs 0603871C and 0603872C. See those R2s for FY98 funding.

A. Mission Description and Budget Item Justification

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 Infrared spectrums. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection. This program provides for data storage and retrieval of all BMDO sponsored tests per statutory requirements.

Data collection and exploitation of data will be achieved by ground, air, and sea based assets for domestic and foreign tests. This will include 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 data 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.

FY 1998 Accomplishments:

•	0 FY98 funding for this project was contained in PE's 0603871C and 0603872C,
Total	0

FY 1999 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 1155

- 8758 Algorithms and Analysis: Continue data analysis support for TMD systems in Dem/Val and EMD. Provide support for TMD radar/optical discrimination algorithms and architectures for advanced TMD threats and penaids. Develop real-time algorithms for battlefield learning using neural networks, field data, and simulations on LDS. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
- 6230 Models: Deliver validated signature models for high priority engagement scenarios. Continue participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and signature phenomenology.
- 3220 IR Data Collection Upgrade: Begin upgrade to support both NMD and TMD Test & Evaluation Data Collection.

Total 18208

FY 2000 Planned Program:

7869 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.

1975 Models: Continue development and validation of high fidelity signature and environment codes.

14724 IR Data Collection Upgrade: Platform upgrade to support both TMD and NMD flight test data collection and intelligence means.

Total 24568

FY 2001 Planned Program:

7658 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.

3126 Models: Continue development and validation of high fidelity signature and environment codes.

16010 IR Data Collection Upgrade: Platform upgrade to support both TMD and NMD flight test data collection and intelligence means.

Total 26794

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	17932									
1155 Joint TMD, PE 0603872C	31579									

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 Resourses on Non-X band system plan	1Q	1Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 1155

ODA Model and simulation support	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q				
Delivered SAMM 2.0	2Q							
SHARC code 4.1	2Q							
Release SSGM 98	1Q							

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. IR Sensor Upgrade	C, CPFF	TBD	0	3100	1Q99	4900	1Q00	3500	1Q01	10500	22000	
b. IR Sensor Upgrade	C, CPFF	Raytheon,TX & CA	0	120	1Q99	9824	1Q00	12510	1Q01	47546	70000	
Subtotal Product Development:				3220		14724		16010		58046	92000	

Remark:

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
a. OSC SW Dev	CPFF	TBE, Huntsvlle AL		547	1Q99	499	1Q00	494	1Q01		1540	
b. Bkgnds SW Dev	Allot	AFRL, MA		1020		24		502			1546	
c. SSGM Software Dev	Allot	NRL, Wash DC		400		400		400			1200	
d. SSGM SW Dev	CPFF	PRA, Calif Other, VA		300		0		0		300	600	
e. SSGM SW Dev	C,CPFF	TBD		1100	2/99	1100	1Q00	1300	1Q01	Cont.	3500	
f. Cont. Eng Supprt	C, CPFF	Other, VA		925	1Q99	909	1Q00	888	1Q01	Cont.	2722	
Subtotal Support Costs:				4292		2932		3584		300	11108	

Remark:

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
a. Mission Planning supt.	Other			553	1Q99	0		0		0	553	
b. MESAR Trials	MIPR	PEO-TAD, Wash		800		108		0		0	908	
a.												
b.												
c.												
Subtotal Test and Evaluation:				1353		108					1461	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Plumes Analysis	Allotment	AFRL, CA		1030		24		502		Cont.	1556	
b. Radar Analy / Supprt	MIPR	MIT/LL Lex, MA		4359	1Q99	3355	1Q00	3150	1Q01	Cont.	10864	
c. Optical analy (ODA)	C, CPFF	NRC, H'sville AL		2915	1Q99	2620	1Q00	2916	1Q01	Cont.	8451	
d. Prog Man Pers	Allotment	SMDC, H'sville AL		898		745		544		Cont.	2187	
e. Other Intnl prgms	Other			141		60		88			289	
a.												
Subtotal Management Services:				9343		6804		7200			23347	

Remark:

Project Total Cost:				18208		24568		26794		58346	127916	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3153

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3153 Systems Arch and Engineering *	0	16084	15789	14455	14564	14535	13795	14130	Continuing	Continuing

* The funding in this project for FY99-03 was transferred from PEs 0603871C and 0603872C. See those R2s for FY98 funding.

A. Mission Description and Budget Item Justification

This project supports the Office of the Chief Architect/Engineer 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. The office reports directly and independently to the BMDO Director to provide the necessary mission-area oversight of critical BMDO technical issues.

Within this project, the BMDO critical JSAE tasks are divided into the areas of Joint Systems Analysis; Baseline and Risk Management; Interfaces and Interoperability (Battle Management/Command, Control, and Communications (BM/C3)); Modeling and Simulation (M&S) Requirements and Standards; Developmental Planning; and Test and Evaluation (T&E). The project provides a technical assessment of the expected effectiveness of major programs under development and requirements for supporting technology. Through FY98, work was funded through two program elements, one for Joint TAMD and the other for NMD.

The primary thrust of the work is to analytically show the need for and expected performance of different defense systems under development to handle 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.

Through management of the Systems Architecture/Engineering Board (SAEB), this project provides the technical recommendations for missile defense acquisition and budget allocation decisions.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3153

FY 1998 Accomplishments:

- FY98 Funding for this project contained in program elements 0603871C and 0603872C

Total 0

FY 1999 Planned Program:

- 11552 Architecture/Engineering Analysis: Through the IALG, develop an overall analysis plan for the BMDO and oversee the analysis process. Participate in engineering trade studies with the TAMD systems engineer. Perform commonality studies on the Upper Tier TMD systems. Continue 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. Direct the Joint Systems Engineering Team (JSET). Manage the systems technology implementation process and develop pre-planned program improvement requirements.
- 4532 Architecture/Engineering Core: Lead BMDO JSAE efforts to develop strategies, policies, and processes. Provide 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. Lead 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. Conduct Joint Technical Architecture (JTA) compliance engineering; hold T&E Steering Group (TESG) and BMD Operation T&E Council (BOTEC) meetings; oversee High Level Architecture (HLA) compliance and migration; and produce the BMDO Open Systems Assessment and the Test and Experiment Activities Summary (TEAS).

Total 16084

FY 2000 Planned Program:

- 11918 Architecture/Engineering Analysis: Through the IALG, develop an overall analysis plan for the BMDO and oversee the analysis process. Participate in engineering trade studies with the TAMD systems engineer. Perform commonality studies on the Upper Tier TMD systems. Continue 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. Direct the Joint Systems Engineering Team (JSET). Manage the systems technology implementation process and develop pre-planned program improvement requirements.
- 3871 Architecture/Engineering Core: Lead BMDO JSAE efforts to develop strategies, policies, and processes. Provide 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. Lead 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. Conduct Joint Technical Architecture (JTA) compliance engineering; hold T&E Steering Group (TESG) and BMD Operation T&E Council (BOTEC) meetings; oversee High Level Architecture (HLA) compliance and migration; and produce the BMDO Open Systems Assessment and the Test and Experiment Activities Summary (TEAS).

Total 15789

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603874C BMD Technical Operations	3153

FY 2001 Planned Program:

- 10394 Architecture/Engineering Analysis: Through the IALG, develop an overall analysis plan for the BMDO and oversee the analysis process. Participate in engineering trade studies with the TAMD systems engineer. Perform commonality studies on the Upper Tier TMD systems. Continue 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. Direct the Joint Systems Engineering Team (JSET). Manage the systems technology implementation process and develop pre-planned program improvement requirements.
- 4061 Architecture/Engineering Core: Lead BMDO JSAE efforts to develop strategies, policies, and processes. Provide 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. Lead 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. Conduct Joint Technical Architecture (JTA) compliance engineering; hold T&E Steering Group (TESG) and BMD Operation T&E Council (BOTEC) meetings; oversee High Level Architecture (HLA) compliance and migration; and produce the BMDO Open Systems Assessment and the Test and Experiment Activities Summary (TEAS).

Total 14455

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
3153 System Arch & Engineering 0603871C	4690	0	0	0	0	0	0	0		
3153 System Arch & Engineering 0603872C	14143	0	0	0	0	0	0	0		

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	2Q						
Support Report to Congress on Asia-Pacific Threa		2Q						
BMD System Architecture Study		3Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3153

BMDO Corporate Lethality Plan		1Q						
Prepare JTA Annual Report		1Q	1Q	1Q	1Q	1Q	1Q	1Q
BMDO Open Systems Assessment	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q	1Q, 3Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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.												
b.												
c.												
d.												
e.												
f.												
Subtotal Product Development:												

Remark:

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
a.												
b.												
c.												
d.												
e.												
f.												
Subtotal Support Costs:												

Remark:

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
a.												
b.												
c.												
d.												
e.												
f.												
Subtotal Test and Evaluation:												

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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.		SPARTA		4540		4400		4000		TBD	12940	
b.		CSC		4500		4300		4000		TBD	12800	
c.		SRS		1200		1200		1100		TBD	3500	
d.		Vanguard Research		1000		1000		700		TBD	2700	
e.		JNTF		449		500		500		TBD	1449	
f.		FFRDC		3500		3500		3400		TBD	10400	
g.		Misc Contract		895		889		755		TBD	2539	
Subtotal Management Services:				16084		15789		14455			46328	

Remark:

Project Total Cost:				16084		15789		14455			46328	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3352

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3352 Modelling and Simulation **	0	48341	29350	29306	30791	27651	27983	28315	Continuing	Continuing

** The funding in this project for FY99-03 was transferred from PEs 0603173C, 0603871C and 0603872C. See those R2s for FY98 funding.

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 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 Roadmap/Strategic Plan, Mission Oriented Information Technology Resources (ITR), BMDO Data Centers, BMD Virtual Data Center (VDC), the BMD Simulation Support Center (BMD SSC), and the infrastructure portion of the Advanced Research Center/Simulation Center (ARC/SC) and the Joint Missile Defense Network (JMDN) that supports the capability to interoperate in a distributed interactive simulation (DIS) environment.

Wargame 2000 is being developed as a simulation to run wargames and exercises at the JNTF for the next 10 years. The requirements are to: design the simulation using 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 purpose of the BMDO Data Centers Program is to archive, manage, develop data products, distribute and provide remote access to all relevant BMD data from large volumes of science and technical data/information from experiments, tests, demonstrations, wargaming, simulations, model executions, joint effective analysis, and evaluations. Operation and management of the Data Center activities are accomplished at four sites: Advanced Missile Signature Center (AMSC), Arnold Engineering and Development Center (AEDC), Arnold Air Force Base, Tullahoma, TN; Backgrounds Center of Expertise (BCoE), Naval Research Laboratory (NRL), Washington, DC; Missile Defense Data Center (MDDC), Space and Missile Defense Command (SMDC), Huntsville, AL; and the BMD SSC, Joint National Test Facility (JNTF), Schriever AFB, CO. Each BMDO funded Data Center activity specializes in a particular discipline and is co-located with an existing DoD center of expertise .

In addition to the BMD Data Center functions, the BMD SSC will archive M&S tools which are joint, global and with multi-level fidelity to seamlessly link with existing and planned simulations or C4I networks, platforms and weapon systems, with little or no apparent differences between simulation and reality. This activity

will also include the development of a centralized M&S catalogue of data bases to identify current and under-development BMDO simulation tools and retain the BMDO assessment capability with support from the Services.

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. Projects to be supported via these tasks include all BMD mission oriented ITR activities. Specific tasks include documenting the Joint Missile Defense Network (JMDN) baseline, development of a Mission Oriented ITR Integrated Database (MIID) that captures user requirements, processing of Mission Oriented ITR-related service requests, establishing the Mission Oriented ITR Working Group, and the identification and support of High Performance Computing requirements.

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.

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

FY 1998 Accomplishments:

-

Total 0

FY 1999 Planned Program:

- 11577 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, the Theater High Altitude Area Defense System (THAAD) Test Bed, and the Integrated System Test Capability. The ARC also supports development of the Ground –Based Radar (GBR), Integrated System Test Capability (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; technical base analysis; concept studies; and alternative trade-off analysis.
- 2495 Provide Army project personnel and support funding for the ARC/SC and EADTB.
- 4452 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 Strategic Plan and Roadmap; Wargame 2000; BMD SSC; Simulation Tool Working Group (STWG) management; execution of STWG action plans; and model assessments/evaluations.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3352

- 5371 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; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; complete the Mission Oriented portion of the Five Year Information Resources Management Plan (FYIRMP); and execute transition of the Mission Oriented ITR Integrated Database (MIID) to the government.
- 12509 Provide JNTF Project funding to support continued development of Wargame 2000 and BMD SSC. 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 support an NMD Initial Operational Capability (IOC), Block 10 Demo, integration with BMC3, initial TMD capability development and a NMD C2SIM 99 with Block 20.
  The BMD SSC will continue support to TMD and NMD in the following areas: assist in software development process improvement for M&S, develop processes for testing and improving models and algorithms, incorporate new WEB technologies into the BMD SSC, and update the TMD, NMD and Building Block M&S catalogs/repositories. Provide on-line query capabilities using BMDO Core M&S and interconnect with Defense Modeling and Simulation Office (DMSO) Modeling and Simulation Resource Repository (MSRR) as an official DoD Node.
- 11517 Provide 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 include: AMSC - provides NMD Family of Systems (FoS), Cruise Missile Defense, Boost Phase Interceptor, and Midcourse Space Experiment (MSX) programs data management support, and develop and implement VDC; BCoE - provides NTW and Navy Area Joint Forces interoperability and integration, program data management support; the BCoE also provides the primary development effort for the VDC. MDDC - provides TAMD and NMD FoS, NMD Ground Based Interceptor (GBI), Ground Based Sensors (GBS) and others data management support, and develop and implement VDC; BMD SSC - provides Optic Cobra, TMDSE, System Integrated Test (SIT) -98, SIT-99, Wargame 2000, EADTB, NMD Data management support, and develops and implements the VDC network.
- 420 OSD Reserves

Total 48341

FY 2000 Planned Program:

- 12000 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, the Theater High Altitude Area Defense System (THAAD) Test Bed, and the Integrated System Test Capability. The ARC also supports development of the Ground –Based Radar (GBR), Integrated System Test Capability (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; technical base analysis; concept studies; and alternative trade-off analysis.
- 2640 Provide funding for Army salaries in support of the ARC/SC and EADTB.
- 2878 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 Strategic Plan and Roadmap; Wargame 2000; BMD SSC; Simulation Tool Working Group (STWG) management; execution of STWG action plans; and model assessments/evaluations.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3352

- 1941 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; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; and continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs.
- 9891 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.
  .

Total 29350

FY 2001 Planned Program:

- 12000 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, the Theater High Altitude Area Defense System (THAAD) Test Bed, and the Integrated System Test Capability. The ARC also supports development of the Ground –Based Radar (GBR), Integrated System Test Capability (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; technical base analysis; concept studies; and alternative trade-off analysis.
- 2754 Provide funding for Army salaries in support of the ARC/SC and EADTB.
- 2896 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 Strategic Plan and Roadmap; Wargame 2000; BMD SSC; Simulation Tool Working Group (STWG) management; execution of STWG action plans; and model assessments/evaluations.
- 3545 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; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; and continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs.

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3352

- 8111 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 29306

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
2400 NMD Program, PE 0603871C	8099	700	0	0	0	0	0	0	TBD	TBD
3352 Support Technologies - ATD, PE 0603173C	5015	0	0	0	0	0	0	0	TBD	TBD
3352 Joint TMD, PE 0603172C	62965	16648	11268	11592	11497	11465	9796	9955	TBD	TBD
3353 Technical Operations, PE 0603874C			7687	7286	5765	5749	5867	5986	TBD	TBD

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, BDC, BMD SSC and other test bed facilities. The ARC/SC contractor is a Cost Plus Fixed Fee (CPFF) first awarded in June of 1989.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Update TOM Program Plan	1Q	1Q	1Q	1Q	1Q	1Q	1Q
Provide JNTF Support for HPCMO Distributed Center Implementation	1Q						
Wargame 2000 NMD IOC Block 10 Delivered	1Q						
Conduct operational testing of VDC IOC	3Q						
Delivery of Final FY99 M&S Roadmap	1Q						
System and Operational testing of VDC Phase 1	3Q						
BMDSSC Version Release 4.0	2Q						
Testing of VDC IOC Phase II	3Q						
Wargame 2000 Demo	2Q						
Work Breakdown Structure Implementation	2Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE: February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation			PE NUMBER AND TITLE: 0603874C BMD Technical Operations				PROJECT: 3352

Delivery of FY 00 M&S Roadmap	2Q						
VDC FOC System Test		2Q					
EADTB V&V Baseline	3Q						
Wargame 2000 Integration with BMC3	3Q						
Complete Interim Development of Mission Oriented ITR Integrated Database	4Q						
M-O FYIRMP	3Q						
MIID Transition	3Q						
BMD SSC Version Release 6.0	4Q						
99A C2SIM with Wargame 2000	4Q						
Wargame 2000 TAMD IOC		4Q					
Wargame 2000 Follow-on Cap (FOC)		4Q					
BMDSSC Data Center FOC	4Q						
Cost Model Implementation w/in DC	4Q						
Transition VDC Operation to BMD SSC		2Q					
Wargame 2000 TAMD FOC			4Q				
Publish JMDN Architecture Description	4Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. ARC Infrastructure	SS/CPFF	Colsa Corporation (HSV)		8683	10/95	9000		9000		TBD	26683	
b. Simulation Center Infrastructure	C/CPFF	Madison Research (HSV)		2894	10/95	3000		3000		TBD	8894	
c. WG2K Software Dvlpmt, Rqmt Analysis, System Engineering and design test	C/CPAF	TRW (JNTF)		12509	2/99	9891		8111		TBD	30511	
d. Services M&S				1476		0		0		TBD	1476	
e. ROW and Radar Analysis Tools (MDDC)	CPAF	XonTech (HSV)		600	8/98	0		0		TBD	600	
f. MDDC Development	CPAF	TBD		2305	TBD	0		0		TBD	2305	
g. AMSC Development	CPAF	Sverdrup (TN)		2270	10/96	0		0		TBD	2270	
h. Backgrounds Data Center of Expertise	CPFF	Raytheon		1888	2/93	0		0		TBD	1888	
i. Virtual Data Center/BMDSSC	CPAF	TRW (JNTF)		2258	11/94	0		0		TBD	2258	
j. BMDO Data Centers				2196		0		0		TBD	2196	
k. Mission Oriented ITR				5371	10/95	1941		3545		TBD	10857	
Subtotal Product Development:				42450		23832		23656			89938	

Remark:

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
a.												
b.												
c.												
d.												
e.												
f.												

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3352

Subtotal Support Costs:												

Remark:

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
a.												
b.												
c.												
d.												
e.												
f.												
Subtotal Test and Evaluation:												

Remark:

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. Army Salaries		Huntsville		2495		2640		2754		TBD	7889	
b. BMDO M&S Management				2976		2878		2896		TBD	8750	
c. OSD Reserves				420							420	
d.												
e.												
f.												
Subtotal Management Services:				5891		5518		5650			17059	

Remark:

Project Total Cost:				48341		29350		29306			106997	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3353

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3353 JNTF *	0	51815	56088	55037	60027	58354	59104	60514	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 JNTF 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. 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 BMDO Data Centers program will be transferred from project 3352 (Modeling, Simulation, and Networks) beginning FY 2000.

FY 1998 Accomplishments:

Total 0 The funding for this project was in PEs 0603871C and 0603872C in FY 1998.

FY 1999 Planned Program:

- 32634 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.
- 6322 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. 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 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3353

•	12859	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. 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. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide a missile defense data repository that will archive, manage, develop, distribute, and provide remote access to all relevant BMD test, experiment, M&S, and wargame data.
Total	51815	

FY 2000 Planned Program:

•	32478	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.
•	4791	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. 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.
•	18819	Provide a core capability of technical expertise that makes the JNTF a center of excellence in missile defense acquisition support and allows for fast response on new tasking. 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. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide a missile defense data repository that will archive, manage, develop, distribute, and provide remote access to all relevant BMD test, experiment, M&S, and wargame data.
Total	56088	

FY 2001 Planned Program:

•	32083	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.
•	4725	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. 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 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3353

•	18229	Provide a core capability of technical expertise that makes the JNTF center of excellence in missile defense acquisition support and allows for fast response on new tasking. Provide analyses 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. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories. Provide a missile defense data repository that will archive, manage, develop, distribute, and provide remote access to all relevant BMD test, experiment, M&S, and wargame data.
Total	55037	

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 Modelling & Simulation, PE 0603871C	2299									
3352 Modelling & Simulation, PE 0603872C	7912									
3352 Modelling & Simulation, PE 0603173C	4412									
3352 Modelling & Simulation, PE 0603174C		11517								
3353 Joint National Test Facility, PE 0603871C	8814									
3353 Joint National Test Facility, PE 0603872C	38956									

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. Contract Advisory & Assistance Services are provided by Vanguard Research as Cost Plus Award Fee. In February 1999, the OMC and RDC will be combined and referred to as the CRDC (Combined Research & Development Contract) with TRW being the prime contractor and Lockheed-Martin a subcontractor to TRW.

D. Schedule Profile	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
NMD JTA Support	1Q						
TMD JTA Support	1Q						
Annual BMD JTA Compliance Report	1Q	1Q	1Q	1Q	1Q	1Q	1Q
TAMD Wargame	4Q	4Q	4Q	4Q	4Q	4Q	4Q
C2 Simulation (NMD)	3Q	3Q	3Q	3Q	3Q	3Q	3Q
C2 Simulation Exercise	3Q						
Attack Operations Campaign Analysis Report	3Q						
JTA Annual Report Annex	4Q	4Q	4Q	4Q	4Q	4Q	4Q
JNTF Contract Consolidation	2Q						
Upgrade Wargame 2000 Equipment	4Q						

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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.												
b.												
c.												
d.												
e.												
f.												
Subtotal Product Development:												

Remark:

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
a. Lockheed-Martin	C/CPAF	JNTF	0	32759	FY95	36868	FY99	36060	FY99	TBD	105687	
b. TRW	C/CPAF	JNTF	0	8299	FY95	9152	FY99	8952	FY99	TBD	26403	
c. Vanguard Research	C/CPAF	JNTF	0	4557	FY95	4664	FY95	4508	FY00	TBD	13729	
d. JNTF	Government	JNTF	0	4418	N/A	3802	N/A	3904	N/A	TBD	12124	
a. USN NRL	Government	JNTF	0	866	N/A	809	N/A	805	N/A	TBD	2480	
a. MITRE	FFRDC	JNTF	0	916	N/A	793	N/A	808	N/A	TBD	2517	
Subtotal Support Costs:				51815		56088		55037			162940	

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 that 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.

Activities for this project are divided into Capability, Modernization, and Operations Support. Capability provides the JNTF with a core cadre of experienced personnel to maintain technical expertise in support of current JNTF responsibilities and to analyze the implications of additional or revised tasking. Modernization provides essential improvement of JNTF computers, communications, and facilities in support of resident and nonresident missions. Operations Support includes operations and maintenance of

BMDO RDT&E COST ANALYSIS (R-3)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3353

the facilities, computer hardware and software, communications, networks, system engineering, security, and other capabilities essential to common system support of the missions assigned by the BMDO; it is funded by BMDO and some reimbursement from tenants. Reimbursement is obtained by charging fee-for-service rates for operational space occupancy (based on square footage) and computer O&M (based on workstation count).

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
a.												
b.												
c.												
d.												
e.												
f.												
Subtotal Test and Evaluation:												

Remark:

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.												
b.												
c.												
d.												
e.												
f.												
Subtotal Management Services:												

Remark:

Project Total Cost:				51815		56088		55037			162940	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3354

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	1952	2320	0	0	0	0	0	Continuing	Continuing

*** The funding in this project for FY99-03 was transferred from PE 0603872C. See that R-2 for FY98 funding.

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.

FY 1998 Accomplishments:

•

Total 0

FY 1999 Planned Program:

• 1952 These funds will be used to continue support of STARS target program.

Total 1952

FY 2000 Planned Program:

• 2320 These funds will be used to continue support of STARS target program. Without an additional outyear funding, these funds will be used to complete the destruction of the remaining STARS motors.

Total 2320

FY 2001 Planned Program:

Total 0

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
3354 TARGETS, PE 0603872C	69453	17866	41966	40133	40135	40028	34224	34778	Continuing	Continuing
2400 NMD, PE 0603871C	837843	1501743	809275	838204	725657	623600	604567	456874	Continuing	Continuing
3360 TEST RESOURCES, PE 0603874C	0	41410	51909	23759	25003	24150	24267	24756	Continuing	Continuing

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3354

C. C. Acquisition Strategy:

The U.S. Army Space and Missile Command (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 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
SBIRS LOW – SDT-1					X					
SBIRS LOW – SDT-2					X					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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 Product Development:												

Remark:

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
Subtotal Support Costs:												

Remark:

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
Subtotal Test and Evaluation:												

Remark:

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. Maintenance of System	Allot	USASMDC, Huntsville, AL		1952	10/01/98	2320	10/01/99			TBD	4272	N/A
Subtotal Management Services:				1952		2320					4272	

Remark:

Project Total Cost:				1952		2320					4272	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3360

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	0	41428	51909	23759	25003	24150	24267	24756	Continuing	Continuing

* FY98 funding can be found in PE 0603872C, Joint TMD - DEM/VAL and PE 0603871C, NMD.

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
- Infrared and Blackbody Standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD.
- Hypervelocity Ballistic Range G Light Gas Gun at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN
- 7V and 10V Space Chambers at AEDC, Tullahoma, TN
- Center for Research Support (CERES) at the Joint National Facility (JNTF), Schriver AFB, CO
- Holloman High Speed Test Track (HHSTT) at Holloman AFB, NM
- AEDC Hypervelocity Wind Tunnel Number 9 (Tunnel 9) at White Oak, MD
- Portable Optical Sensor Testbed (POST) at Anahiem, CA
- National Hover Test Facility (NHTF) located at Edwards AFB, CA

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) target signature collection sensor and platform (previously managed within project 1155).
- High Altitude Optical Imaging System (HAOIS) based at White Sands Missile Range, Las Cruces, NM.
- Mobile Range Safety System and Kwajalein Range Safety Control System Upgrades
- NP-3 Aircraft upgrade for remote area safety support.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3360

Sea-Lite Beam Director (SLBD), based at White Sands Missile Range, Las Cruces, NM
Miscellaneous improvements to BMDO infrastructure and support systems

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 target signature characteristics, phenomenology data, and target/interceptor diagnostics on flight tests. It also provides for the living quarters for personnel support 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 provide 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. 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. (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 1998 Accomplishments:

•		See R-2A Exhibit for PE 0603872C, Joint TMD - DEM/VAL, Projects 3157 and 3360.
Total	0	

FY 1999 Planned Program:

•	7449	Provides 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. Support THAAD flight test anomaly investigation and objective window testing at Tunnel 9. Provide orbital experiment and satellite operations support at CERES.
•	10922	Provides 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 other related range support
•	5608	Provides for upgrades to NP-3 aircraft, launch support and instrumentation upgrades at White Sands Missile Range (WSMR), caretaker activities at Fort Wingate, as well as other general range support.
•	16013	Provides AST core-operating costs to collect optical data of NMD and TMD development flights, target development flights and flight test intercepts.
•	1436	Provides technical support for Resource activities by the Executing Agent and at BMDO.
Total	41428	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603874C BMD Technical Operations / PROJECT: 3360

FY 2000 Planned Program:

•	13462	Provides 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; 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.
•	4000	Provides for upgrades to NP-3 aircraft, launch support and instrumentation upgrades at White Sands Missile Range (WSMR), caretaker activities at Fort Wingate, as well as other general range support (A&S/02)
•	4782	Provides for launch site support at Kauai Test Facility (KTF), collection & analysis of data by MIT/LL, as well as other related range support
•	9340	Provide for operation and maintenance at Meck Island, core support of the Kwajalein missile Range Safety System (KMRSS), improvement and modernization of Range Control Safety System (RCSS), and technical support at Wake Island. (A/05)
•	16700	Provides AST core-operating costs to collect optical data of NMD and TMD development flights, target development flights and flight test intercepts. Provides for costs to terminate the program by close of FY00, if necessary.
•	991	Integrates 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 the Medium Extended Air Defense System (MEADS), and Advanced Interceptor Technology. Work also continues on new BMDO requirements as well as on Navy Area, Navy Theater Wide, THAAD and PAC-3 systems.
•	1343	Ensures 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	Provides technical support for Resource activities by the Executing Agent and at BMDO.
Total	51909	

FY 2001 Planned Program:

•	5896	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; and primary IR standards, black body and optical materials, calibrations at the NIST. Provide orbital experiment and satellite operations support at CERES.
•	10229	Provide 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 and analysis of data by MIT/LL.
•	3924	Provide for upgrades to NP-3 aircraft, launch support and instrumentation upgrades at White Sands Missile Range (WSMR), caretaker activities at Fort Wingate, as well as other general range support.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
	PROJECT 3360

- 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 Navy Area, Navy Theater Wide, MEADS, THAAD and PAC-3 systems to meet their requirements.
- 1515 Ensures 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. Supports the design and construction of facilities to test and field ballistic missile defense systems such as NMD, THAAD, PAC-3, Navy Area, and Navy Theater Wide.
- 1171 Provide technical support for Resource activities by the Executing Agent and at BMDO.

Total 23759

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
2257 PATRIOT, PE 0604865C	242690	320342	29141	39119	0	0	0	0	TBD	TBD
2257 PATRIOT, PE 0208865C	316789	245494	300898	367762	400205	379220	366228	266880	TBD	TBD
2260 THAAD, PE 0602218C	0	0	0	0	162136	191272	208120	246902	TBD	TBD
2260 THAAD, PE 0604861C	0	0	577493	556178	417530	293886	205852	0	TBD	TBD
2260 THAAD, PE 0603861C	387260	433172	34133	3519	0	0	0	0	TBD	TBD
2260 THAAD, PE 0208861C	0	0	0	0	0	91729	182628	603924	TBD	TBD
1266 NAVY THEATER WIDE, PE 0603868C	437896	344284	329768	369049	0	0	0	0	TBD	TBD
1266 NAVY THEATER WIDE, PE 0604868C	0	0	0	0	0	92000	323000	406000	TBD	TBD
1266 NAVY THEATER WIDE, PE 0602218C	0	0	0	0	352182	280580	309782	387648	TBD	TBD
2263 NAVY AREA, 0604867C	292063	242347	268389	226772	64208	51548	33596	26665	TBD	TBD
2263 NAVY AREA, PE 0208867C	14859	43189	55002	61066	121035	134379	152319	181381	TBD	TBD
3354 TARGETS, PE 0603874C	0	1962	2320	0	0	0	0	0	TBD	TBD
3354 TARGETS, PE 0603872C	69453	17715	41966	40133	40135	40028	34224	34778	TBD	TBD
3360 TEST RESOURCES, PE 0603872C	61557	46575	13515	14227	13661	13593	11600	11773	Cont.	Cont.
3360 MILCON Planning & Design, PE 0603872C	0	331	0	0	0	0	0	0	Cont.	Cont.
3360 Minor MILCON, PE 0603874C	0	0	1248	294	1409	1409	2455	2478	Cont.	Cont.
3360 MILCON Planning & Design, PE 0603874C	0	0	124	29	140	141	550	550	Cont.	Cont.
2400 NMD, PE 0603871C	837843	1501743	809275	838204	725657	623600	604567	456874	Cont.	Cont.

C. Acquisition Strategy:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
	PROJECT 3360

In using ranges and test facilities and providing technical assistance of facilities, siting, and environmental activities, BMDO implements a Reliance process which:

- maintains perspective of national technical test capabilities relative to BMD
- responds to program requirements
- uses existing test resources where possible
- requires coordination prior to development of new resources
- and consolidates management of existing resources where possible and practicable.

This policy results in 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. 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.

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.

D. Schedule Profile	FY 1998				FY 1999				FY 2000				FY 2001				FY 2002				FY 2003				FY 2004				FY 2005			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
KHILS – AIT										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – DITP (Quantum Well, Integration Tests)					X	X	X	X	X	X	X	X	X	X	X	X																
KHILS – DTRA (Nuclear Requirements)									X	X	X	X	X	X	X	X	X	X	X	X												
KHILS – THAAD (Seeker Entries, Target Modeling & Algorithm Support)					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
KHILS – BPI (System Studies)					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – MEADS (HIL Testing)													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – Theater Wide SM 3 (HIL Testing)												X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
KHILS – GBI (KV Down Select, Flight Test Support)					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
KHILS – Target VV&A					X	X	X	X	X	X																						
7V/10V – GBI: BNA					X	X	X	X	X	X	X	X																				
7V/10V – GBI: Raytheon					X	X	X	X	X	X	X	X																				
Tunnel 9 – THAAD Support											X	X	X	X	X	X	X															

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3360

Tunnel 9 – Arrow Support					X	X	X	X	X	X	X	X																		
Tunnel 9 – Phenomenolgy Support					X	X	X	X	X	X	X	X																		
Tunnel 9 – AIT Support							X	X	X	X	X	X																		
Tunnel 9 – Navy Lower Tier Support							X	X	X	X	X	X																		
Range G – NMD						X	X			X	X																			
Range G – Navy Theater TBMD					X						X																			
Range G – Phenomenology Impact					X	X			X																					
CERES – RCS Programs Support					X	X	X	X																						
CERES – Space Based Laser Ops Concept Development					X	X	X	X																						
RCSS Operational Capability							X																							
NIST – 7V/10V, EKV SM-3, SBIRS (Blackbody Calibration)																X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NIST – SM-2, THAAD, EKV, NraD (Emissisivity)																X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KMR TCMP Launch						X																								
WSMR Navy SM2-Blk IV Testing							X	X	X	X																				
NP-3 RASA FOC						X																								
AST					X	X	X	X	X	X	X	X	X	X	X	X														
Environmental Analysis for Advanced Interceptor Technology					X	X	X	X	X	X																				
Launch Facilities Infrastructure Modernization, USAKA					X	X	X	X	X	X	X	X	X	X	X	X														
Fire Protection System Modernization, USAKA					X	X	X	X	X																					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Army TMD Facility/ Environmental Programs Development	Allot	Army PEO, Huntsville	N/A	0		231	10/1/99	245	10/01/01	Cont.	476	N/A
b. Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TAD, Arlington VA	N/A	0		99	10/1/99	103	10/01/01	Cont.	202	N/A
c. Air Force TMD Facility/Environmental Programs Development	Allot	AF SMC, Los Angeles CA	N/A	0		10	10/1/99	10	10/01/01	Cont.	20	N/A
d. Environmental, Safety & Health Initiatives	MIPR	TBD	N/A	0		18	TBD	149	TBD	Cont.	167	N/A
e. Army SMDC Fac/Envir Prog Development	Allot	Army SMDC, Huntsville, AL	N/A	0		200	10/1/99	204	10/01/01	Cont.	404	N/A
Subtotal Product Development:						558		711			1269	

Remark:

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
a. Facility Acquisition Life-Cycle Management	MIPR	U.S. Army Corps of Engineers, Huntsville AL		0		103	10/1/99	106	10/1/00	Cont.	209	N/A
b. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc Rosslyn, VA		0		1648	08/01/99	1697	8/01/00	Cont.	3345	N/A
c. Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington DC		0		25	TBD	25	TBD	Cont.	50	N/A
Subtotal Support Costs:				0		1776		1828			3604	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 3360

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
Subtotal Test and Evaluation:												

Remark:

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. AST Core Support	Allot	USASMDC		16013	10/01/98	16700	10/01/99	0	10/1/00	TBD	32713	
b. Core Infrastructure Planning Support	Allot	USASMDC		13260	10/1/98	12255	10/1/99	11305	10/1/00	Cont.	36820	N/A
c. Core Infrastructure Planning Support	Allot	USAF		6731	10/1/98	11193	10/1/99	5165	10/1/00	Cont.	23089	N/A
d. Core Infrastructure Planning Support	Allot	JNTF		294	10/1/98	0	10/1/99	375	10/1/00	Cont.	669	N/A
e. Core infrastructure Planning Support	Allot	USN		1161	10/1/98	4782	10/1/99	749	10/1/00	Cont.	6692	N/A
f. Core Infrastructure Planning Support	MIPR	Various		2533	TBD	3354	TBD	2455	TBD	Cont.	8342	N/A
g. T&E Technical Support	CPFF	SRS Technologies, Arlington, VA		878	1 June 98	814	1 June 99	698	TBD		2390	
h. Gov Project Personnel Support	Allot	USASMDC, Huntsville, AL		558	10/01/98	477	10/01/99	473	10/01/00	Cont	1508	
Subtotal Management Services:				41428		49575		21220			112223	

Remark:

Project Total Cost:				41428		51909		23759			117096	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603874C BMD Technical Operations

PROJECT: 4000

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	7014	10626	10944	11175	11346	11820	12088	Continuing	Continuing

A. Mission Description and Budget Item Justification

Justification

This project provides support in three basic areas: personnel and related support costs; funding to meet fluctuation costs and contract terminations; and assistance required to fund support service contracts for the Theater Missile Defense (TMD) program..

Personnel and related support costs common to all TMD projects include support of the Office of the Director, Ballistic Missile Defense Organization and his staff located within the Washington, D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, U.S. Army PEO Missile Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office, and the National Test Facility. This project supports funding for overhead/indirect personnel costs, benefits, and infrastructure costs such as rents, utilities, supplies, etc.

The BMDO prioritizes funding within this project to meet operational, contractual, and statutory fiscal requirements for the TMD program. Operational requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF), such as accounting services provided by the Defense Finance and Accounting Service (DFAS). Contractual requirements include 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. Finally, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

Assistance required to support BMDO overhead management functions for the TMD program is contained in this project. This assistance ranges from operational contracts to fully support functions such as ADP operations, automated tool, Access control offices, and graphics support, to supportive efforts required, as well as to supplement the BMDO government personnel. Typical efforts include cost estimating, security management, contracts management, strategic relations management and information management. These efforts include assessment of technical project design, development and testing, test planning, assessment of technology maturity and technology integration across BMDO projects; and support of design reviews and technology interface meetings. Program control tasks include assessment of schedule, cost, and performance, with attendant documentation of the many related programmatic issues. The requirement for this area is based on most economical and efficient utilization of contractors versus government personnel.

The Fiscal Year 1996 Defense Authorization Act eliminated the management program element effective with the Fiscal Year 1997 President's Budget submission. This overhead management and indirect program support funding has been realigned in accordance with Public Law 104-106.

FY 1998 Accomplishments:

- N/A

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
	PROJECT 4000

Total 0

FY 1999 Planned Program:

- 7014 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 7014

FY 2000 Planned Program:

- 10626 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 10626

FY 2001 Planned Program:

- 10944 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 10944

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

C. Acquisition Strategy:

D. Schedule Profile	FY 1996	FY 1997	FY 1998	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 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	0	58903	36650	36719	0	0	0	0	TBD	TBD
1161 Advanced Sensor Technology	0	12545	0	0	0	0	0	0	TBD	TBD
2259 Israeli Cooperative Project	0	46358	36650	36719	0	0	0	0	0	119727

A. Mission Description and Budget Item Justification

This program is in budget activity 4 - Demonstration and Validation, Research Category 6.3B. A new Program Element (PE) was created in accordance with provisions of H.R. 1119; SEC. 233. Cooperative Ballistic Missile Defense Program. This provision calls for the establishment of a PE to be referred to as the "Cooperative Ballistic Missile Defense Program" . The purpose of this program is to support technical and analytical coopeative efforts between the United States and other nations that contribute to ballistic missile defense capabilities.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	0	50676	37716	37555
Congressional Adjustments		9000		
Appropriated Value		59676		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-413		
b. OSD Reductions		-360		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	0	58903	36650	36719

Change Summary Explanation:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1161

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
1161 Advanced Sensor Technology	0	12545	0	0	0	0	0	0	TBD	TBD

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 a bilateral technoly program that engages Russian early warning satellite developers in the joint definition and execution of 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 developing U.S. and Russian instruments for Flying Infrared Signatures Technology Aircraft (FISTA) proof-of-concept measurements. This program investigated options for future cooperation in the joint definition and execution of space experiments using space based stereo viewing.

FY 1998 Accomplishments:

- 0 Prior to FY 1999, the RAMOS program was in BA3 - Advanced Technology Development, PE 0603173C, Support Technologies - ATD. In FY-1998 there was $11,926 for RAMOS in BA3. Specialized infrared sensors developed by the U.S. and Russia were flown aboard the U.S. Flying Infrared Signature Technology Aircraft (FISTA) with data collected and analyzed. Additional efforts were focused on the modeling and simulation of high altitude cloud sun glint reflection and cloud and background scene structure in the mid-to-longwave infrared band. The concept design review was completed and various program execution approaches were examined.

Total 0

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603875C International Cooperative Programs / PROJECT: 1161

FY 1999 Planned Program:

- 12545 A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001. BMDO has carefully planned the FY 1999 efforts to make a meaningful contribution to U.S. objectives while creating value toward either outcome. The FY 1999 effort will conclude the RAMOS modeling and data analysis efforts to maximize the DoD science returns from previous RAMOS experiments. The plan encourages 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 will continue research into mitigation of Short Wavelength Infrared (SWIR) solar glint effects by developing a prototype design of a space hyperspectral polarimeter for future flight. In the event the decision is to cancel RAMOS, the FY 1999 efforts will still provide utility to both the U.S. and Russia. If the decision is to continue with RAMOS the FY 1999 work is fully supportive of future preliminary design.

Total 12545

FY 2000 Planned Program:

- $0

Total 0

A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001.

FY 2001 Planned Program:

- $0

Total 0

A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001.

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

C. Acquisition Strategy:

The 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. Although possessing moderately strong technical rationale and high-level political support, this program has relied mostly on Congressional plus-ups for execution.

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603875C International Cooperative Programs

PROJECT: 1161

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

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Hardware Development	SS/CPFF	USU/SDL, Logan, UT	0	11800	Jan 99	0		0		TBD	TBD	TBD
Subtotal Product Development:				11800						TBD	TBD	TBD

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

The FY-1999 funding will continue data analysis and concept design efforts in support of the possible future preliminary design process for the 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 U.S. platform and instruments.

A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001.

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
a. Development Support	Allot	AFRL, Hanscom AFB	0	245	Jan 99	0		0		TBD	TBD	TBD
Subtotal Support Costs:				245						TBD	TBD	TBD

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

The FY-1999 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.

A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001.

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
a.												
Subtotal Test and Evaluation:												

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. Program Management Support	C/CPFF	NRC, Arlington, VA	0	500	Jan 99	0		0		TBD	TBD	TBD
Subtotal Management Services:				500						TBD	TBD	TBD

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

A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001.

Project Total Cost:				12545						TBD	TBD	TBD

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

A policy decision has not been made on the continuance of this program and no funding has been allocated for FY-2000 and FY-2001.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603875C International Cooperative Programs / PROJECT: 2259

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2259 Israeli Cooperative Project	0	46358	36650	36719	0	0	0	0	0	119727

A. Mission Description and Budget Item Justification

This project includes the Arrow Deployability Project (ADP), the Israeli Test Bed (ITB), Israeli Cooperative Research & Development (R&D), 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 information that will reduce risks in U.S. TMD development programs. The U.S. also benefits from the eventual presence of an anti-ballistic missile defense system in Israel, which provides deterrence of future tactical ballistic missile (TBM) conflicts in that region. This defensive system also contributes to a more robust defensive response should deterrence fail.

The Arrow program consists of efforts to develop a ballistic missile defense system for Israel. It includes the U.S.-Government of Israel (GOI) initiative to assist the GOI development of an anti-tactical ballistic missile (ATBM) interceptor and launcher. The program also includes an Israeli developed fire control radar (Green Pine), fire control center (Citron tree) and launch control center (Hazelnut Tree). Comprised of three phases, this initiative began with the Arrow Experiments project (Phase I) that developed the preprototype Arrow I interceptor. Followed by the ACES project (Phase II) which is a continuation of Phase I, and consists of critical lethality tests using the upgraded Arrow II interceptor. Arrow provides the basis for an informed GOI engineering and manufacturing decision for an ATBM defense capability. If successful, the Arrow II will satisfy the Israeli requirement for an interceptor for defense of military assets and population centers and will support U.S. technology base requirements for new advanced anti-tactical ballistic missile technologies that could be incorporated into the U.S. theater missile defense (TMD) systems.

The third phase is the ADP, which began in Fiscal Year 1996. This phase of the project will pursue the research and development of technologies associated with the deployment of the Arrow Weapon System (AWS) and will permit the GOI to make a decision regarding deployment (without financial participation by the U.S. beyond the R&D stage). This effort will include system-level flight tests of the total Arrow Weapon System. An interface will be developed for AWS interoperability with U.S. TMD systems. It is planned to use the U.S. Theater Missile Defense System Exerciser (TMDSE) to conduct interactive simulation exercises to test, assess, and validate JTIDS-based interoperability between the AWS and 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 may occur in the future. The International Agreement (IA) between the U.S. and Israel for the ADP was amended in June 1998 and formalizes the U.S. addition of $45M in FY 98 RDT&E from Congressional plus-up funds. As directed by congressional language, this increased the U.S. cost share in the ADP agreement, which permitted the GOI to withdraw an equal amount from the ADP in order to initiate Israeli procurement of additional Arrow Weapon System (AWS) battery components. The amended IA also provides a $1M addition from the ADP to the U.S.'s Arrow Project Office (APO) to provide AWS technical support.

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 International Agreement was signed in March 1996 and Presidential certification was completed in May 1996.

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 trains 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 and interoperability issues. The planned inclusion of the Distributed Interactive Simulation (DIS) will enable joint exercise experiments to be conducted both in Israel and across the water between US TMD and IS TMD systems.

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 to determine Combined Standard Operating Procedures (CSOP) between the US European Command (USEUCOM) and Israel for TMD. Early warfighter activities in developing the CSOP at the ITB were invaluable during U.S contingency operations in late FY 98.

The Israeli Cooperative R&D program supports the advancement of emerging TMD technologies. This support will advance the technology demonstration phase, which will provide for the defense of the State of Israel. It further supports the U.S. technology base needs for these technologies, and furthers the pursuit of interoperability with U.S. TBMD systems. This task supports efforts in developing an interface to allow for interoperability between Israeli TMD systems and U.S. TBMD systems and the implementation of such a system.

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. 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 Israeli anti-tactical ballistic missile (ATBM) programs, including the Arrow missile development activity, the ADP, 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 tactical ballistic missile (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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603875C International Cooperative Programs
	PROJECT: 2259

FY 1998 Accomplishments:

- Accomplished under PE 0603872C

Total 0

FY 1999 Planned Program:

- 42903 Arrow Deployability Project and Support. Continue AWS integrated flight and intercept tests. Evaluate U.S. and Arrow components for electro-magnetic interference. Transfer the results of the AWS tests to U.S. TMD interceptor developers. Continue interoperability, lethality, kill assessment and producibility studies leading to an initial Israeli operational capability. Conduct Arrow Link-16 Upgrade Converter (ALUC) Proof of Concept II (APOC II). Develop and begin testing of a US/Israeli interoperability capability.
- 1869 Continue ITB experiments on near-term improvements to the Israeli TMD system and on deployability. Provide improved threat model and Arrow II enhancements. Continue supporting U.S. EUCOM/IAF CSOP requirements and the potential for ITB II experiments.
- 1449 ISA&I. Analyze results of ITB Interoperability experiments. Continue evaluations of the performance of the near-term TMD system based on ADP system flight tests. Continue analysis of TMD refinements for future threats such as the evolving Iranian MRBM threat.
- 137 Government Personnel and Support

Total 46358

FY 2000 Planned Program:

- 33269 Arrow Deployability Project and Support. Continue AWS integrated flight tests. Evaluate U.S. and Arrow components for electro-magnetic interference. Transfer the results of the AWS tests to U.S. TMD interceptor developers. Continue interoperability, lethality, kill assessment and producibility studies leading to an Israeli operational capability. Conduct Arrow Link-16 Upgrade Converter (ALUC) Proof of Concept I (APOC I). Develop and test US/Israeli interoperability capability using the Theater Missile Defense System Exerciser (TMDSE). Conduct distributed interactive simulation experiments.
- 1827 Continue ITB experiments on near-term improvements to the Arrow TMD system deployability. Provide improved threat model and Arrow II update enhancements. Support U.S. EUCOM/IAF CSOP and CINC EUCOM exercise requirements if feasible within budget.
- 1416 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 threat
- 138 Government Personnel and Support

Total 36650

FY 2001 Planned Program:

- 33333 Arrow Deployability Project and Support. Complete ADP. 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. Complete Arrow Link-16 Upgrade Converter (ALUC) development and test program to fully achieve Arrow interoperability with U.S. TMD systems.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY: 4 - Demonstration and Validation	PE NUMBER AND TITLE: 0603875C International Cooperative Programs / PROJECT: 2259

- 1831 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.
- 1418 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
- 137 Government Personnel and Support

Total 36719

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 - TMDSE Development, PEs 0603872C/0603873C	14920	12850	13426	12164	12119	12074	12340	12611		

C. Acquisition Strategy: This is an ongoing cooperative U.S./GOI development program. By completing the Arrow Deployability Project, U.S. TMD programs will be afforded state-of-the-art technical data for program risk reduction and the GOI will have developed information to make a sound Arrow Weapon System deployment decision. Through the ADP, 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.

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Complete ITB Enhancements	2 Q	3 Q	1 Q						
Initiate Interoperability Requirements	1 Q								
U.S./Israel ADP First Amendment Signed		2 Q							
U.S./Israel ADP Seconded Amendment Signed		3 Q							
Complete Arrow II ACES Flight Test		4 Q							
Arrow Weapon System Flight Tests		4Q	4Q	2Q & 4Q	2Q				
Initiate Interoperability Tests (APOC I)		2 Q							
Conduct APOC II		4 Q							
Interoperability Tests w/ U.S. TMDSE			2 Q	1 Q					
U.S. Benefits Review			4 Q						
Complete ADP, ITB, and ISA&I					4 Q				

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. ADP Development	International Agreement with Israel	Israel Ministry of Defense, Israel		39976		30365		30411			100752	
b. ISA&I	FFP with Cost Share	Wales, Ltd., Israel		1449		1416		1418			4283	
c. ITB	FFP	USA/SMDC Huntsville, AL		1869		1827		1831			5527	
d. Gov Personnel & Spt	Direct Funding	USA/SMDC Huntsville, AL		137		138		137			412	
Subtotal Product Development:				43431		33746		33797			110974	

Remark:

Prior year cost were incurred under PE 060372C

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
a. ADP Arrow Project Office	Direct Funding	PEO/AMD		2927	N/A	2904	N/A	2922	N/A		8753	
Subtotal Support Costs:				2927		2904		2922			8753	

Remark:

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
a. N/A												
Subtotal Test and Evaluation:												

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: **February 1999**

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 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. N/A												
Subtotal Management Services:												

Remark:

Project Total Cost:				46358		36650		36719			119727	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603876C Threat and Countermeasures

PROJECT: 3270

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	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	0	23263	16497	22763	22536	20834	21278	21723	Continuing	Continuing

* Funding in this project was transferred from PEs 0603871C and 0603872C to 0603876C in FY99. See those PE's for FY97-98 data.

A. Mission Description and Budget Item Justification

Threat and Countermeasures Program. The BMDO Threat Program defines potential adversary military forces missile threats. To accomplish this mission, BMDO has a threat development 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 component tasks: Intelligence Threat, Threat Systems Engineering, and Threat Applications.

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 the TMD and NMD "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 BMDO cost and operational effectiveness analyses (COEA). 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 System Threat Scenario Descriptions.
- Produces threat computer digital media and supporting documentation for use by the development and acquisition communities.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
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 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 1998 Accomplishments:

•	0
Total	0

FY 1999 Planned Program:

•	7911	Intelligence Threat Task: Provide Capstone STAR, speciality threats, targets analysis, operational threat environment intelligence assessments, management, and planning support
•	1785	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.
•	13567	Threat Systems Engineering Task: Perform TMD/NMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD/NMD CM technical experiments and evaluations. Support Countermeasures Hands-On Program (CHOP) “Skunkworks” teams in conducting CM concept, design, fabrication, tests. Conduct non-technical analysis, oversight, and database management.
Total	23263	

FY 2000 Planned Program:

•	6905	Intelligence Threat Task: Provide Capstone STAR, speciality threats, targets analysis, operational threat environment intelligence assessments, management, and planning support
•	2152	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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603876C Threat and Countermeasures	3270

- 7440 Threat Systems Engineering Task: Perform TMD/NMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD/NMD CM technical experiments and evaluations. Support Countermeasures Hands-On Program (CHOP) "Skunkworks" teams in conducting CM concept, design, fabrication, tests. Conduct non-technical analysis, oversight, and database management.

Total 16497

FY 2001 Planned Program:

- 7634 Intelligence Threat Task: Provide Capstone STAR, speciality threats, targets analysis, operational threat environment intelligence assessments, management, and planning support
- 2518 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.
- 12611 Threat Systems Engineering Task: Perform TMD/NMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD/NMD CM technical experiments and evaluations. Support Countermeasures Hands-On Program (CHOP) "Skunkworks" teams in conducting CM concept, design, fabrication, tests. Conduct non-technical analysis, oversight, and database management.

Total 22763

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 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	0	22113	17608	23909
Congressional Adjustments		2500		
Appropriated Value		24613		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-1350		
b. OSD Reductions				
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	0	23263	16497	22763

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 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2002	FY 2004	FY 2005	To Compl	Total Cost
3270 Threat & Countermeasures, PE 0603872C	22911	0	0	0	0	0	0	0	0	0
2400 NMD Program, PE 0603871C	5993	0	0	0	0	0	0	0	0	0

(U) D. Schedule Profile

	FY 1998				FY 1999				FY 2000				FY 2001			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Skunkworks Mission #12									X							
Skunkworks Mission #13			X													
Skunkworks Mission #14											X					
Skunkworks Mission #15												X				
NMD STAR								X			X				X	
TMD Capstone STAR							X				X				X	
CM Risk Assessment											X			X		
NEA II Scenario											X					
SWA II Scenario											X					
AGCS Scenario											X					

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603876C Threat and Countermeasures

PROJECT: 3270

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
a.												
b.												
c.												
d.												
e.												
f.												
Subtotal Product Development:												

Remark:

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
a. FFRDC	MIPR	DOE Sandia Labs		1189		698		2379		Cont	4266	
b. Govt Engr Spt	MIPR	JNTF-SPC		2716		2549		2527		Cont	7792	
c. FFRDC	MIPR	MIT-Lincoln Lab		1139		398		1804		Cont	3341	
d. Govt Engr Spt	MIPR	USA-SSDC		593		402		455		Cont	1450	
e. Research	MIPR	JH/APL		50		50		50		Cont	150	
f. Research	MIPR	CHOP/AFRL Phillips		4527		3316		3879		Cont	11722	
g. Research	MIPR	NGIC		245		50		151		Cont	446	
h. Research	MIPR	MSIC		2309		1490		1955		Cont	5754	
i. Research	MIPR	NAIC		2250		1490		1955		Cont	5695	
j. Research	MIPR	ONI		700		352		655		Cont	1707	
f.. Research	MIPR	SMDC		585		352		455		Cont	1392	
Subtotal Management Services:				16303		11147		16265			43715	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 4 - Demonstration and Validation

PE NUMBER AND TITLE: 0603876C Threat and Countermeasures

PROJECT: 3270

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
a. Contr Engr Spt	CPFF – C	SPC-CM		2000		1898		2004		Cont	5902	
b. Research/Mgmt/Spt	CPFF – C	BAH-Threat		1350		1452		1455		Cont	4257	
c. Contr Engr Spt	CPFF – C	BAH-Applications		2299		1202		2018		Cont	5519	
d. FFRDC	MIPR	IDA		100		38		100		Cont	238	
e. Govt Research/Spt	MIPR	TSC		1020		752		866		Cont	2638	
f. Overhead		Miscellaneous		191		8		55		Cont	254	
Subtotal Test and Evaluation:				6960		5350		6498			18808	

Remark:

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.												
b.												
c.												
d.												
e.												
f..												
Subtotal Management Services:												

Remark:

Project Total Cost:				23263		16497		22763			62523	

Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604218C Upper Tier - EMD PROJECT

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Upper Tier	0	0	0	0	514318	471902	517902	634550	Continuing	Continuing

*** For information about these projects FY 1998 – 2001 please consult The R2 exhibits for PEs 0603868C (Navy Theater Wide) and 0603861C (THAAD)**

A. Mission Description and Budget Item Justification

Common Upper Tier- This new program element will create a restructured Upper Tier Theater Missile Defense Program involving Theater High Altitude Area Defense (THAAD) and Navy Theater Wide (NTW) This restructuring involves a new program element for the Upper Tier BMD programs beginning in FY02. Both the THAAD and NTW programs are fully funded to conduct a series of test through 2001. No later than December 2000 (1QFY01), the Department will evaluate the progress of these programs and make a decision for additional funding for one of these systems based on an assessment of the cost, schedule, technical performance and program risk. Once the program determination has been made, the Department will allocate the necessary funds to accelerate one of the programs with the objective of achieving an FUE in FY07. The Upper Tier strategy is designed to reward program success and provide defense against the medium- and long-range threat as soon as practical. The FY00 President's Budget continues THAAD and provides additional funding for NTW to help posture the program for possible acceleration to an FUE in FY07.

1. NTW - 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 descent 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 descent 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.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604218C Upper Tier - EMD

PROJECT

2. ***THAAD*** - The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBM) 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, Control, Communications, Intelligence (BM/C3I) units, THAAD Radars, and support equipment. The THAAD Radar (formerly known as Ground Based Radar) is funded under PE 0603861C through Dem/Val and 0604861C for EMD. It 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/C3I architecture will provide robust protection against the TBM threat spectrum. THAAD is pursuing integration of THAAD BM/C3I with the Project Manager (PM), Air and Missile Defense Command and Control Systems (AMDCCS) to take advantage of previous Army developments that can be incorporated into the THAAD program.

The THAAD System Engineering and Manufacturing Development (EMD) phase will refine and mature the Dem/Val system design to ensure component and system performance, producibility, and supportability.

FY 1998 Accomplishments:

- 0 (See PE 0603868C for NTW accomplishments, and 0603861C and 0604861C for THAAD accomplishments)

Total 0

FY 1999 Planned Program:

- 0 (See PE 0603868C for NTW accomplishments, and 0603861C and 0604861C for THAAD accomplishments)

Total 0

FY 2000 Planned Program:

- 0 (See PE 0603868C for NTW accomplishments, and 0603861C and 0604861C for THAAD accomplishments)

Total 0

FY 2001 Planned Program:

- 0 (See PE 0603868C for NTW accomplishments, and 0603861C and 0604861C for THAAD accomplishments)

Total 0

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001

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

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604218C Upper Tier - EMD

PROJECT

Previous President's Budget (FY 1999 PB)	0	0	0	0
Congressional Adjustments				
Appropriated Value	0	0	0	0
a. Congressional Reductions (FFRDC, Inflation, etc)				
b. OSD Reductions				
c. Emergency Supplemental				
Adjustments to Budget Years Since FY1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	0	0	0	0

Change Summary Explanation: Not Applicable

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 Theater Wide – 0603868C	437,896	344,284	329,768	369,049	0	0	0	0	0	1,480,997
THAAD MILCON – 0604861C	0	0	0	0	0	4,689	17,200	0	0	21,889
THAAD Dem/Val – 0603861C	387,260	433,922	527,871*	3,519	0	0	0	0	0	1,352,572
THAAD EMD – 0604861C	0	0	83,755*	556,178	417,530	289,197	188,652	0	0	1,535,312
THAAD Procurement – 0208861C	0	0	0	0	0	91,729	182,628	603,924	5,186,000	6,064,281

*FY00 THAAD EMD and Dem/Val controls do not match OSD/OMB funding controls due to a requested transfer of THAAD EMD ($493,738) to THAAD Dem/Val not being processed prior to the funding controls database lock. These exhibits reflect the correct allocation of funds and the database realignment will be addressed at the Congressional level prior to funding appropriation.

D. Acquisition Strategy:

1. NTW: The NTW program is proceeding to a Defense Acquisition Board to be baselined and establish the acquisition strategy at that time.

2. THAAD: The EMD phase contract (missile, launcher, BM/C3I, and Radar) will be a sole source award to the Dem/Val contractor team (as approved September 15, 1995 by USD (A&T) 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.

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

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604218C Upper Tier - EMD

PROJECT

E. Schedule Profile - NTW	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Complete Navy TBMD COEA Phase II			1Q							
DAB Review				2Q						
Control Test Vehicle 1A				4Q						
Flight Test Round 1					1Q					
Flight Test Round 2					2Q					
Flight Test Round 3					3Q					
Flight Test Round 4					4Q					
Flight Test Round 5						1Q				
Flight Test Round 6						2Q				
Flight Test Round 7						3Q				

E. Schedule Profile - THAAD	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Dem/Val Radar Integration and Test	1Q									
System Design Review	3Q									
UOES Radar 1 I&T Complete	4Q									
Radar System Test #1		1Q								
UOES Radar 2 I&T Complete		2Q								
Radar System Test #2			2Q							
Software Specification Review				3Q						
Risk Reduction Award				3Q						
Integrated System Tests Complete					1Q					
Milestone II					3Q					

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

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604861C THAAD System - EMD

PROJECT: 2260

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense (THAAD)	0	0	83755	556178	417530	289197	188652	0	0	1535312

Note: FY 00 THAAD EMD and Dem/Val controls do not match OSD/OMB funding controls due to a requested transfer of THAAD EMD ($493,738) to THAAD Dem/Val not being processed prior to the funding controls database lock. These exhibits reflect the correct allocation of funds and database realignment will be addressed at the Congressional level prior to funding appropriation.

An UPPER TIER Program Element has been established for the Missile Development FY02 and beyond. Consult the budget exhibits for PE 0604218C.

A. **Mission Description and Budget Item Justification**

The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBM) 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, Control, Communications, Intelligence (BM/C3I) units, THAAD Radars, and support equipment. The THAAD Radar (formerly known as Ground Based 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/C3I architecture will provide robust protection against the TBM threat spectrum. THAAD is pursuing integration of THAAD BM/C3I with the Project Manager (PM), Air and Missile Defense Command and Control Systems (AMDCCS) to take advantage of previous Army developments that can be incorporated into the THAAD program.

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.

FY 1998 Accomplishments:

-

Total 0

FY 1999 Accomplishments/Planned Program:

-

Total 0

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - Engineering and Manufacturing Development	0604861C THAAD System - EMD	2260

FY 2000 Planned Program:

- Award EMD Contract.
- 54655 - Begin objective system design.
- 12900 - Initiate material purchases for hardware.
- 16200 - Begin software development.

Total 83755

FY 2001 Planned Program:

- 375715 Continue EMD radar, BM/C3I, and launcher hardware and software development.
- Begin preparation for risk reduction flights, including KMR readiness.
- Continue development and procurement of RR/c missiles.
- Continue lethality studies and algorithm development.
- Continue integration of THAAD BM/C3I with PM AMDCCS.
- Prepare the system integration lab (SIL) for system testing.
- 164402 Maintain program management/in-house support
- 16061 Establish targets, lethality, and OT&E support

Total 556178

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	0	323942	596310	574513
Congressional Adjustments		-323942		
Appropriated Value		0		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)				
b. OSD Reductions				
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	0	0	83755	556178

Change Summary Explanation:

FY99: -323,942 Appropriation Conference Mark

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - Engineering and Manufacturing Development	0604861C THAAD System - EMD	2260

FY00: -493,738 Due to program schedule slip, EMD dollars transferred to Dem/Val; −18,817 Due to undistributed reductions/recissions.
FY01: - 18,335 Due to undistributed reductions/recissions.

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
THAAD MILCON – 0604861C	0	0	0	0	0	4689	17200	0	0	21889
THAAD Dem/Val – 0603861C	387260	433922	527871*	3519	0	0	0	0	0	1352572
THAAD Procurement						91729	182628	603924	5186000	6064281
UPPER TIER – 0604218C	0	0	0	0	162136	191272	208120	246902	157500	965930

*FY00 funding does not match OSD controls due to a requested transfer of THAAD EMD ($493,738) to THAAD Dem/Val not being processed prior to the funding controls database lock. These exhibits reflect the correct allocation of funds and the database realignment will be addressed at the Congressional level prior to funding appropriation.

D. Acquisition Strategy: The EMD phase contract (missile, launcher, BM/C3I, and Radar) will be a sole source award to the Dem/Val contractor team (as approved September 15, 1995 by USD (A&T) 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.

E. Schedule Profile	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Milestone II					3Q					
EMD Contract Award					3Q					
EMD MILESTONES:										
Risk Reduction Testing Complete								4Q		
EMD Radar 1 I&T Complete									2Q	
EMD Radar 2 I&T Complete									4Q	
Developmental Tests Begin										2Q

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. LMMS	CPAF/IF			0		83755		375715		1380000	1839470	1842989
Subtotal Product Development:						83755		375715		1380000	1839470	1842989

Remark:

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
a. SETA	CPAF							27446		Cont	27446	
b. Other Spt Cont	Various							82356		Cont	82356	
c. OGAs	MIPR							32300		Cont	32300	
d. Program Mgmt	Various							22300		Cont	22300	
Subtotal Support Costs:								164402			164402	

Remark:

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
a. KMR Range Support	MIPR							1100		Cont	1100	
b. OT&E								1324		5805	7129	7129
c. TARGETS								3227		189519	192746	192746
d. LETHALITY								10410		14991	25401	25401
Subtotal Test and Evaluation:								16061		210315	226376	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604861C THAAD System - EMD

PROJECT: 2260

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.												
b.												
c.												
d.												
e.												
f.												
Subtotal Management Services:												

Remark:

Project Total Cost:						83755		556178		1590315	2230248	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604865C PAC3 - EMD

PROJECT: 2257

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2257 Patriot	242690	320842	29141	39119	0	0	0	0	0	1638473

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.

The PAC-3 program has experienced negative cost and schedule trends and an overall cost increase in the Engineering Manufacturing and Development (EMD) contract. BMDO and the U.S. Army have initiated a cost reduction effort aimed at reduced unit costs, realistic cost estimating, revised scheduling, and establishment of a new Program Management Baseline (PMB). Additionally, the Department has initiated an independent program review with the Defense Contract Management Command.

FY 1998 Accomplishments:

- 173168 Continued PAC-3 missile Engineering and Manufacturing Development (EMD) program; began flight test program.
- 4600 Completed modification development program.
- 25030 Continued PAC-3 EMD target and test support.
- 14892 Continued operational test and evaluation and lethality efforts.
- 25000 1998 Emergency Supplemental Appropriation for Iranian Missile Protection Act (IMPACT 98). Initiated efforts for both the Remote Launch Communication Enhanced Upgrade (RLCEU) and preparations for the PAC-3/Navy Area flight test demonstration.

Total 242690

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE
	February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - Engineering and Manufacturing Development	0604865C PAC3 - EMD	2257

FY 1999 Planned Program:

•	283777	Continue PAC-3 missile Engineering and Manufacturing Development (EMD) program, with increased program funding in FY 99 and FY 00 associated with a program cost growth. Conduct Integrated Baseline Review and establish new program baseline, revised schedule, and estimated cost at complete.
•	16925	Continue PAC-3 EMD target and test support.
•	15376	Continue operational test and evaluation and lethality efforts.
	4764	Air Directed Surface to Air Missile (ADSAM) Testing
Total	320842	

FY 2000 Planned Program:

•	29141	Continue PAC-3 missile Engineering and Manufacturing Development (EMD) program. Continue to address cost reduction initiatives with the U.S. Army and the prime contractor.
Total	29141	

FY 2001 Planned Program:

•	39119	Complete PAC-3 missile Engineering and Manufacturing Development (EMD) program.
Total	39119	

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	198273	137265	0	0
Congressional Adjustments		45000		
Appropriated Value		182265		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-906		
b. OSD Reductions		-517		
c. Emergency Supplemental		140000*		
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	242690	320842	29141	39119

* Of this amount, $80 million will be executed in FY2000

Change Summary Explanation:

Funding: FY 1998 (+36633): Project decremented (-7784) for undistributed Defense-Wide reductions.
Project decremented (-583) for higher priority projects
Project increased (+25000) via Emergency Supplemental Appropriation for IMPACT 98.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE: 0604865C PAC3 - EMD / PROJECT: 2257

Project increased (+20000) via Omnibus Reprogramming to meet program funding requirements and cost growth.
FY 1999 (+138577): Project decremented (-1423) for undistributed Defense-Wide reductions.
Project increased (+140000) via Omnibus Consolidated and Emergency Supplemental Appropriations Act to meet program funding requirements and cost growth.
FY 2000 (+29141): Project increased to meet program funding requirements and cost growth.
FY 2001 (+39119): Project increased to meet program funding requirements and cost growth

Schedule: PAC-3 Missile flight test program extended into FY 00. FUE delayed to FY01.

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
2257, PAC3 Procurement, PE 0208865C	316789	245494	300898	367762	400205	379220	366228	266880	191000	3809878

D. Acquisition Strategy: The design objective of the PATRIOT system was to provide a system capable of being modified to cope with the evolving threat. This alternative 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 will be 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 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Configuration 1 First Unit Equipped (FUE)	1st Qtr									
PAC-3 Missile CDR	2nd Qtr									
Configuration 2 Contractor Development Test & Evaluation (CDT&E)	1st Qtr									
Configuration 2 Follow-On Test & Evaluation (FOT&E)	3rd Qtr									
PDB-4 Software Release		1st Qtr								
Configuration 2 FUE		1st Qtr								
Controlled Test Flight 1		4th Qtr								
Controlled Test Flight 2			1st Qtr							
Guidance Test Flight 1				2nd Qtr						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)									DATE February 1999	
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development			PE NUMBER AND TITLE 0604865C PAC3 - EMD							PROJECT 2257
PAC-3 Missile Low Rate Initial Production (LRIP)				3rd Qtr						
Configuration 3 CDT&E				1st Qtr						
Configuration 3 Initial Operational Test & Evaluation (IOT&E)					4th Qtr					
PDB-5 Software Release					1st Qtr					
PAC-3 FUE						2nd Qtr				
Milestone III						2nd Qtr				

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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. PAC-3 Missile EMD	SS-CPIF	LMVS/TX	707639	173286	Oct 98	9714	Oct 99	10000	Oct 00		900639	900639
b. PAC-3 Missile Integration	SS-CPIF	Raytheon/MA	118863	32727	Dec 98	5828	Nov 99	5756	Nov 00		163174	163174
c. RDEC		MRDEC/AL	47417	16958	Apr 99	971	Dec 99	543	Nov 00		65889	65889
Subtotal Product Development:			873919	222971		16513		16299			1129702	1129702

Remark:

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
a. SETA	C-CPAF	CAS/AL	24437	9763	Jan 99	971	Oct 99	1000	Oct 00		36171	35671
b. OGA/In-House	PO		47522	14516	Apr 99	3857	Nov 99	500	Nov 00		66395	66395
c. Engineering Support	SS-CPIF	Raytheon/MA	51779	11660	Jan 99						63439	63439
Subtotal Support Costs:			123738	35939		4828		1500			166005	165505

Remark:

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
a. White Sands Missile Range	MIPR	WSMR/NM	55248	24867	Apr 99	7800	Oct 99	13813	Oct 00		101728	101728
b. ADSAM				4764							4764	4764
c. Operational Test Support	MIPR		15163	12150	Nov 98			5362	Nov 00		32675	32675
d. Targets	MIPR	SMDC/AL	66932	16925	Nov 98			2145	Nov 00		86002	86002
e. Lethality	MIPR	SMDC/AL	34402	3226	Nov 98						37628	37628
Subtotal Test and Evaluation:			171745	61932		7800		21320			262797	262797

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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.												
b.												
c.												
d.												
e.												
f.												
Subtotal Management Services:												

Remark:

Project Total Cost:			1169402	320842		29141		39119			1558504	1558004

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604867C Navy Area - EMD

PROJECT: 2263

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2263 Navy Area	292063	242597	268389	226772	64208	51548	33596	26665	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 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 1998 Accomplishments:

- 264834 Continued Engineering and Manufacturing Development (EMD) of the missile. Began delivery of Inert Operational Missile (IOM)/Engineering Design Model (EDM) test rounds. Initiated fabrication of White Sands Missile Range (WSMR) Flight Test and Linebacker missiles. Continued Baseline 6 Phase III full capability development; delivered AEGIS Linebacker initial capability computer program; conducted Baseline 6 Phase III program preliminary design review (PDR) and In-Process Review (IPR). Initiated follow-on AWS computer program development. Continued implementation of Joint Maritime Command Information System (JMCIS) TBMD segments and TBMD messages in Command and Control Processor (C2P).
- 6549 Completed Phase I of Live Fire Test and Evaluation (LFT&E) Arena Tests and successfully initiated Phase I of Warhead Sled Tests. Continued required lethality analyses and lethality model refinements.
- 6680 Continued building and delivery of targets to support Navy TBMD flights tests. Maintained infrastructure to support TMD targets.
- 14000 Began interceptor and target development required by Iranian Missile Protection Act of 98 (IMPACT 98).

Total 292063

FY 1999 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE: 0604867C Navy Area - EMD / PROJECT: 2263

•	199397	Continue EMD of the missile. Complete delivery of IOM/EDM test rounds. Initiate delivery of WSMR flight test missiles. Begin missile Developmental Testing (DT) at WSMR. Continue Baseline 6 Phase III full capability development and conduct Critical Design Review (CDR). Integrate EMD Inert Operational Missile (IOM) round into AEGIS Linebacker initial capability computer program. Continue follow-on AWS computer program development. Continue implementation of JMCIS TBMD segments and TBMD messages in C2P. Complete exit criteria to support and conduct Long Lead Material (LLM) Decision for Low Rate Initial Production (LRIP).
•	5625	Complete Phase I of LFT&E Arena and Warhead Sled Test Program. Continue required lethality analyses and lethality model refinements.
•	32075	Continue building and delivery of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets.
•	5500	Perform characterization testing for IMPACT 98.
Total	242597	

FY 2000 Planned Program:

•	239162	Continue WSMR missile flight testing. Complete preparations and conduct missile LRIP review. Deliver Linebacker/EMD missiles. Continue AWS Baseline 6 Phase III full capability development and initiate computer program testing at Combat Systems Engineering Development Site (CSEDS**)**. Continue follow-on AWS computer program development. Continue implementation of modifications to Navy Command and Control systems to maintain consistency with the Joint Planning Network, Joint Data Network, and Joint Composite Tracking Network. Complete exit criteria to support and conduct Low Rate Initial Production (LRIP).
•	1343	Continue LFT&E activities. Complete required lethality analyses and lethality model refinements.
•	27204	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	268389	

FY 2001 Planned Program:

•	146452	Complete WSMR missile flight testing. Conduct, Linebacker Developmental Testing at sea to provide an early deployment capability of Navy TBMD. Continue AWS Baseline 6 Phase III full capability development, and computer program testing at CSEDS. Continue follow-on AWS computer program development. Continue implementation of modifications to Navy Command and Control systems to maintain consistency with the Joint Planning Network, Joint Data Network, and Joint Composite Tracking Network.
•	79220	Continue building and delivery of targets to support Navy TBMD flight tests and maintain infrastructure to support TMD targets.
•	1100	Provide testing support for IMPACT 98.
Total	226772	

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	278790	245796	231592	160193

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)			DATE: February 1999
BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE: 0604867C Navy Area - EMD		PROJECT: 2263

Congressional Adjustments				
Appropriated Value		245796		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-1716		
b. OSD Reductions		-1483		
c. Emergency Supplemental				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	292063	242597	268389	226772

Change Summary Explanation:

Funding: FY98 increase of $14.0M represents Congressional Emergency Supplement Appropriation Act funding for IMPACT 98. FY99 decrease of $3.199M was due to Congressional General Reductions.

FY00/01 funding was increased a total of $103.376M. However, the changes to those years included a decrease (~$59M) to reflect an 18 month slip in the planned DT/OT series. At the same time funding increases were required to: Support changes in test plans and to address technical issues in FY00/01, including a missile dome cooling system upgrade (~$2.5M); Qualification of a new target detection device vendor (~$4.7M); Fund additional IMPACT 98 test preparations (~$1.7M); Support cost increases in the Vertical Launch System contract (~$2M); Expand WSMR schedule and add one additional flight test (~$12.7M); Support revised estimates of AWS computer program development consistent with latest Program Life Cycle Cost Estimate and schedule extensions based on recommendations from the Welch Report on Reducing Risk in Ballistic Missile Defense Flight Test Programs (~$15.5M); Support additional test and evaluation range upgrades (~$29.8M). In addition, the program has experienced substantial cost growth in the Standard Missile Block IVA EMD contract (~$68.2M) and cost growth in the AEGIS Weapons System since the FY99 President's Budget due to both estimating changes and software increases (~$24.3M). The details of the rephased DT/OT plans and dates are still under review and, therefore, the costs in FY2002 and beyond due to program extension and additional testing have not been resolved. Adjustments to accommodate the revised plans will be incorporated into the next budget cycle in conjunction with the program rebaseline effort.

Schedule: To reduce risk in the missile development testing at WSMR, the missile developmental testing timeframe will be expanded. To reduce AWS risk, the Tactical First Unit Equipped has been delayed by 18 months and Acquisition Milestone III has been delayed by 20 months to allow for additional of AWS land based integration testing prior to the at-sea Developmental Testing/Operational Testing (DT/OT).

Technical: An additional missile developmental flight event has been added at WSMR to reduce risk prior to the first TBM intercept attempt. Rigor has been increased to reduce risk in the development of the AWS computer program through additional land based integration testing at Lockheed Martin/Government Electronic Systems (LM/GES) and Naval Surface Weapons Center, Dahlgren Division (NSWC/DD) prior to the at-sea DT/OT.

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

DATE: February 1999

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	36489	20418	45556	60469	58730	71108	74823	279361	700000
Navy Area TBMD – SM-2 Blk IVA Procurement		6700	34584	15510	60566	75649	81211	106558	TBD	TBD
WPN BLI: 223400 Standard Missile SM-2 BLK IVA	0	7200	87838	69460	135255	209045	253893	263292	TBD	TBD
WPN 2290 Other Missile Support Mk 21 Mod 1 VLS Canisters for SM-2 BLK IVA	0	0	2451	2704	7130	12645	17838	19752	TBD	TBD

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			3Q							
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				3Q						
Low Rate Initial Production Decision					3Q					
AEGIS Linebacker DT At-Sea Tests Complete						1Q				
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 1999

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 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	Standard Missile Co.	276861	99725		96950		32343		TBD	505879	
b.	CPAF	Lockheed Martin	56296	50272		63395		45518		TBD	215481	
c.	WR	NSWC Dahlgren	13558	6418		6770		6298		TBD	33044	
d.	RCP	JHU/APL	14445	6838		7213		6579		TBD	35075	
e.	CPAF	Motorola	6000	2840		2996		1902		TBD	13738	
f.	RCP	SPAWAR	7426	3515		3708		2354		TBD	17003	
g.	CPFF	United Defense	4236	2005		2115		1343		TBD	9699	
h.	MIPR	Hanscom / MIT/LL	3000	1420		1498		951		TBD	6869	
i.		Misc	4176	1977		2085		1324		TBD	9562	
Subtotal Product Development:			385998	175010		186730		98612			846350	

Remark:

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
a.	CPFF	Vitro	6686	3165		3339		2119		TBD	15309	
b.	CPFF	SPA	1658	785		828		526		TBD	3797	
c.	CPFF	TSC	1500	710		749		475		TBD	3434	
d.	CPFF	SYSCON	990	469		494		314		TBD	2267	
e.		Misc	2105	996		1051		667		TBD	4819	
Subtotal Support Costs:			12939	6125		6461		4101			29626	

Remark:

BMDO RDT&E COST ANALYSIS (R-3)

DATE: February 1999

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 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.	WR	NAWC Point Mugu	1885	1892		1941		1581		TBD	7299	
b.	WR	NSWC Port Hueneme	2686	2271		2341		1851		TBD	9149	
c.	WR	NSWC Dahlgren	10468	6955		7689		6818		TBD	31930	
d.		SMDC Army	8695	32075		27204		79220		TBD	147194	
e.	WR	WSMR	1884	8492		24641		15598		TBD	50615	
f.	MIPR	Holloman AFB	1000	1473		1466		1817		TBD	5756	
g.	WR	COMOPTEVFOR	250	125		122		7131		TBD	7628	
h.		Misc	1517	2352		3758		5481		TBD	13108	
Subtotal Test and Evaluation:			28385	55635		69162		119497			272679	

Remark:

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.	PD	NAVSEA	5000	2000		2000		2000		TBD	11000	
b.	WR	NSWC Dahlgren	5566	2635		2779		1764		TBD	12744	
c.	PD	JHU/APL	2301	1089		1149		729		TBD	5268	
d.		Misc	217	103		108		69		TBD	497	
Subtotal Management Services:			13084	5827		6036		4562			29509	

Remark:

Project Total Cost:			440406	242597		268389		226772			1178164	

Remark:

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

DATE: February 1999

BUDGET ACTIVITY: 6 - Management and Support

PE NUMBER AND TITLE: 0908612C ACQ PGM RESERVE

PROJECT: 6001

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
6001 Program Stability Reserve	0	0	0	9821	17656	23515	35238	35205	Continuing	Continuing

A. Mission Description and Budget Item Justification

Acquisition Program Managers were directed to build flexibility into their acquisition accounts by programming resource reserves to offset reasonable growth in costs associated with complex, technologically advanced systems which may not achieve anticipated cost reductions. The reserve fund is to offset cost growth associated with technical risk and uncertainty in acquisition programs. These reserve funds are to be pooled, held and managed by BMDO's Acquisition executive and liquidated before the budget is submitted to Congress. The long-term goals intended to achieve substantial annual cost reductions should be integral to agreements between government and Industry. These agreements should provide contractors financial incentives to achieve aggressive cost reduction goals. Agreements should be structured to "deincenivize" cost growth through reduced financial gain if the cost reduction goals are not reached.

OUSD direction: Beginning in FY 2001 the BMDO will explicitly program funds into a risk reserve, at levels directed by the Deputy Secretary in the fiscal guidance. The liquidation of these reserves prior to submission of the budget as risks materialize will be managed by the Military Departments or Defense Agencies and overseen by the USD(A&T). The kinds of problems for which this reserve could be used include: labor rate changes, threat uncertainty, unforeseeable facilities and equipment problems and unexpected technical problems. Components are cautioned that this reserve is not intended to increase program scope or to be used as a source for other program bills in the year of execution.

FY 1998 Accomplishments:

- This project has no funding in FY 1998 under this PE.

Total 0

FY 1999 Planned Program:

- This project has no funding in FY 1999 under this PE.

Total 0

FY 2000 Planned Program:

- This project has no funding in FY 2000 under this PE.

Total 0

FY 2001 Planned Program:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY: 6 - Management and Support	PE NUMBER AND TITLE: 0908612C ACQ PGM RESERVE / PROJECT: 6001

•	9821	OUSD direction: Beginning in FY 2001the BMDO will explicitly program funds into a risk reserve, at levels directed by the Deputy Secretary in the fiscal guidance. The liquidation of these reserves prior to submission of the budget as risks materialize will be managed by the Military Departments and overseen by the USD(A&T). The kinds of problems for which this reserve could be used include: labor rate changes, threat uncertainty, unforeseeable facilities and equipment problems and unexpected technical problems
Total	9821	

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	0	0	6347	12651
Appropriated Value				
Adjustments to Appropriated Value				
a. General Reductions				
Adjustments to Budget Years Since FY 1999 PB				
Current Budget Submit (FY 2000 / 2001 PB)	0	0	0	9821

Change Summary Explanation: