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**Department of Defense FY 2002 Amended Budget Estimates
June 2001**



**RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE
Volume 2 - Ballistic Missile Defense Organization**

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TABLE OF CONTENTS FOR VOLUME 2

Summary Table of Contents for All Volumes	Inside Front Cover
Table of Contents for Volume 2 by R1 Order	i
Table of Contents for Volume 2 by Title	ii
Table of Contents for Volume 2 DD 1391 Projects	iii
Summary R1 Exhibit for BMDO	iv

Ballistic Missile Defense Organization

R-1 Number	Program Element	Title	Page
<u>Table of Contents by R1 Order</u>			
10	0602173C	Support Technologies - Applied Research	1
30	0603173C	Support and Follow on Technologies - Advanced Technology Development	5
31	0603174C	Space Based Laser (SBL)	10
32	0603175C	Ballistic Missile Defense Technology	14
65	0603868C	Navy Theater Wide - Dem/Val	19
66	0603869C	Medium Extended Air Defense System (MEADS) Concepts - Dem/Val	26
68	0603871C	National Missile Defense - Dem/Val	33
70	0603873C	Family of Systems Engineering and Integration (FoS E&I) - Dem/Val	50
71	0603874C	BMD Technical Operations - Dem/Val	87
72	0603875C	International Cooperative Programs	144
73	0603876C	Threat and Countermeasures	159
74	0603880C	Ballistic Missile Defense System Segment	167
75	0603881C	Ballistic Missile Defense Terminal Defense Segment	206

Note: This Administration has not addressed FY 2003 - 2007 requirements. All FY 2003 - 2007 budget estimates included in this book are notional only and subject to change.

Ballistic Missile Defense Organization

R-1 Number	Program Element	Title	Page
<u>Table of Contents by R1 Order (continued)</u>			
76	0603882C	Ballistic Missile Defense Midcourse Segment	217
77	0603883C	Ballistic Missile Defense Boost Defense Segment	241
79	0603884C	Ballistic Missile Defense Sensors	258
84	0901585C	Pentagon Reservation	280
90	0604861C	Theater High Altitude Area Defense System (THAAD) - EMD	281
91	0604865C	Patriot PAC-3 Theater Missile Defense Acquisition - EMD	286
92	0604867C	Navy Area Theater Missile Defense - EMD	291
127	0901585C	Pentagon Reservation	296
128	0901598C	Management Headquarters - BMDO	297
<u>Table of Contents by Title</u>			
77	0603883C	Ballistic Missile Defense Boost Defense Segment	241
76	0603882C	Ballistic Missile Defense Midcourse Segment	217
79	0603884C	Ballistic Missile Defense Sensors	259
74	0603880C	Ballistic Missile Defense System Segment	167
32	0603175C	Ballistic Missile Defense Technology	14
75	0603881C	Ballistic Missile Defense Terminal Defense Segment	206
71	0603874C	BMD Technical Operations - Dem/Val	87
70	0603873C	Family of Systems Engineering and Integration (FoS E&I) - Dem/Val	50
72	0603875C	International Cooperative Programs	144
128	0901598C	Management Headquarters - BMDO	297
66	0603869C	Medium Extended Air Defense System (MEADS) Concepts - Dem/Val	26
68	0603871C	National Missile Defense - Dem/Val	33
65	0603868C	Navy Area Theater Missile Defense - Dem/Val	19

Ballistic Missile Defense Organization

R-1 Number	Program Element	Title	Page
<u>Table of Contents by Title (continued)</u>			
92	0604867C	Navy Area Theater Missile Defense - EMD	291
91	0604865C	Patriot PAC-3 Theater Missile Defense Acquisition - EMD	286
84	0901585C	Pentagon Reservation	280
127	0901585C	Pentagon Reservation	296
31	0603174C	Space Based Laser (SBL)	10
30	0603173C	Support and Follow on Technologies - Advanced Technology Development	5
10	0602173C	Support Technologies - Applied Research	1
90	0604861C	Theater High Altitude Area Defense System (THAAD) - EMD	281
73	0603876C	Threat and Countermeasures	159
<u>DD 1391 Construction Projects</u>			
76	0603882C	USA Kodiak Island	299
76	0603882C	Various Alaska Locations	302
76	0603882C	USA Kwajalein Atoll Marshall Islands	305
77	0603883C	NASA John C. Stennis Space Center	307

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602173C Support Tech - Applied Research						
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	89290	55731								
1180 Surveillance Technologies	3590	0								
1280 Interceptor Technologies	0	0								
1461 BMC4I	10486	16273								
1651 Innovative Science and Technology (IS&T)	13736	11271								
1660 Statutory and Mandated Programs	61478	28187								

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603175C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

A. Mission Description and Budget Item Justification

This program element provides the only applied research projects in the Department of Defense which focus specifically on future Ballistic Missile Defense Organization (BMDO) technical requirements. To prepare to meet critical future active defense needs, the program element invests in an aggressive program of high-leverage technologies that yield markedly improved capabilities across a selected range of boost phase methods and terminal defense interceptors, advanced target sensors, and innovative science. Program investments are to provide 1) component technologies that offer improved performance or reduced costs for BMDO acquisition programs, 2) better understanding of the material characteristics and physics for processes that form the basis of technologies, and 3) technical solution options to mitigate far-term and unpredicted threats.

The Innovative Science and Technology (IS&T) project invests seed money in high-risk technologies that could significantly change how BMDO develops future systems. Specific technology areas include: 1) sensing, imaging, ranging, and discrimination, 2) phenomenology studies and boost phase intercept handover, 3) electronic and photonic materials and devices and wide band gap technology, 4) information processing and computing technologies, 5) directed energy, non-linear optical devices and processes, 6) Miniature Interceptor Technology (MIT) propulsion and kill enhancement and, 7) power generation and conditioning and thermal management. This project conducts proof-of-concept research and matures novel technologies for transition to advanced development. Other Applied Research projects more closely aligned with existing BMDO Surveillance, and Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I) technology efforts are managed under these projects respectively.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research	
<p>Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs are managed under project 1660. Pursuant to PL 102-564, a two-phased competition for small businesses with innovative technologies is conducted, focusing on relevant BMDO technologies with an emphasis on technologies with commercial application potential. Per OSD Program Budget Decision implemented in the FY01 President's Budget Submission, mandatory SBIR/STTR programs are not budgeted (FY02-07). Required SBIR/STTR programs are funded during the year of execution from internal BMDO resources.</p> <p>The program objective of the Technology Applications (TA) Program (managed under project 1660), established in 1986, is to develop and support the transfer of BMD-derived technology to other Department of Defense agencies as well as other federal, state, and local government institutions, laboratories, universities, and industry. Incorporation of technology applications by the private sector and other government agencies can result in reduced unit costs and further improvements to future BMDO applications.</p> <p>The Historically Black Colleges and Universities/Minority Institutions (HBCU/MI) program is also managed in project 1660 under this program element. The HBCU/MI program increases and improves the participation of minority colleges and institutions in BMDO programs. The program responds to Section 832 of Public Law (PL) 101-510, which establishes a specific goal for HBCUs and MIs within the overall five percent goal for minority research grants. The program introduces HBCUs and MIs to BMDO technology areas and the BMDO procurement process.</p> <p>Many of today's baseline technologies incorporated into BMDO systems like Theater High Altitude Area Defense (THAAD), Patriot Advanced Capability (PAC3), and Ground Based Radar (GBR) are viable due to the wise investment in innovative technologies some ten or more years ago. Examples include: indium antimonide and mercury cadmium telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight satellite structures; interferometric fiber-optic gyroscopes for miniaturized guidance and control systems; and solid-state gallium arsenide transmitter/receivers for advanced BMDO radars; and dual wave passive imaging for BMD test missions.</p> <p><u>Acquisition Strategy:</u> The IS&T program solicits proposals by an annual Broad Agency Announcement (BAA) of research opportunities. Proposals received are competitively judged according to BMD innovation, relevance, cost, and capabilities of the offeror. The HBCU/MI program also receives proposals in response to a biannual BAA. For the SBIR and STTR programs, strong emphasis is placed on the commercial nature of the proposed effort. BMDO conducts an annual SBIR/STTR solicitation and competition, and the executing agents award and manage the contracts. BMDO employs government executing agents, called Science and Technology Agents (STAs) from the Army, Navy, Air Force, and NASA, with each STA responsible for a specific technical area.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 3590 Surveillance Technologies (1180): Under the High Frequency Short Wave Radar (HFSWR) demonstration program, initiated implementation of the real-time radar operating system; examined reconstruction issues regarding the wideband Meander Line Array (MLA) elements; completed preparations to install the completed radar for shore-based air and missile target tracking exercises and demonstrations; and investigated issues concerning a partial installation of the conformal array elements on board the USS Coronado (AGF-11) for the conduct of limited shipboard target tracking trials. 		
<i>Page 2 of 4 Pages</i>		Exhibit R-2 (PE 0602173C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY 2 - Applied Research		June 2001
PE NUMBER AND TITLE 0602173C Support Tech - Applied Research		
<ul style="list-style-type: none"> • 13736 IS&T (1651): Continued innovative applied research tasks. Prepared for the flight of the Dual Mode Experiment on Bowshock Interactions (DEBI) to compare results to existing phenomenology model. Continued plume phenomenology investigations for discrimination, typing, and hardbody handover. Continued development of innovative sensor technology including the computer tomographic spectrometer, antenna-coupled bolometers, and multiwavelength imagers. Developed ultrafast switches and wavelength multiplexed transmitters for advanced communications systems. Continued development of advanced algorithms for guidance and control. Continued development of advanced neural networks and other technologies for on-board autonomous navigation and control. Initiated innovative ultra wide band radar development effort. Continued development of advanced miniature interceptor technology, propellant technology, and kill enhancement technologies. Continued development of active sensing technology and phenomenology for hypersonic interceptors. Continued to provide test bed for advanced sensor demonstrations and to provide coverage for national missions. • 1352 Technology Applications (1660): TA Database: Maintained up-to-date information on potential BMD programs that have commercial applications. Updated graphics and interactive modes into national information infrastructure on BMD sponsored technologies. Panel Reviews: Provided assistance to large, medium, and small businesses wishing to bring BMD supported technology to the commercial market. Outreach: Developed assistance publications, brochures and target articles for journals and newspapers, quarterly newsletters, conference exhibits, and advertisements in reports on BMDO technology. Networking: Expanded results of technology transfer by working with other Federal technology transfer organizations and activities such as the OSD Director, Defense Research and Engineering (DDR&E) Office of Technology Transition, National Aeronautics and Space Administration (NASA), and Department of Energy (DOE). Interacted with professional/technical associations and societies involved with technology transfer and commercialization. • 10486 Battle Management Command, Control, Communications, Computers and Intelligence (BMC4I) (1461): Continued development of multi-spectral image sensors to enhance capabilities for detection of ballistic and cruise missiles. Began 2Q/FY00 ground-to-space laser communications test at 1.2 Gigabytes per second. • 55836 SBIR/STTR (1660): Awarded 213 Phase I SBIR Awards to 158 firms and 56 Phase II SBIR awards to 51 firms. • 1305 HBCU/MI (1660): Incrementally funded 10 contracts in the areas of electronics, sensors, materials, and Battle Management Command, Control, and Communications (BMC3). • 2985 Civilian Salaries (1660): Executing Agents for management of SBIR/STTR programs. 		
Total	89290	
FY 2001 Planned Program:		
<ul style="list-style-type: none"> • 11271 IS&T (1651): Continue innovative applied research tasks. Prepare for the flight (4th Quarter) of the Dual Mode Experiment on Bowshock Interactions (DEBI) to compare results to existing phenomenology model. Continue plume phenomenology investigations for discrimination, typing, and hardbody handover. Continue development of innovative sensor technology including the computer tomographic spectrometer, antenna-coupled bolometers, and multiwavelength imagers. Continue development of ultrafast switches and wavelength multiplexed transmitters for advanced communications systems. Continue development of advanced neural networks and other technologies for on-board autonomous navigation and control. Continue development of advanced miniature interceptor technology, propellant technology, and kill enhancement technologies. Continue development of active sensing technology and phenomenology for hypersonic interceptors. Continue to provide test bed for advanced sensor demonstrations and to provide coverage for national missions. 		

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Tech - Applied Research
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- 987 Technology Applications (1660): TA Database: Maintain up-to-date information on potential BMD programs that have commercial applications. Update graphics and interactive modes into national information infrastructure on BMD sponsored technologies. Panel Reviews: Provide assistance to large, medium, and small businesses wishing to bring BMD supported technology to the commercial market. Outreach: Develop assistance publications, brochures and target articles for journals and newspapers, quarterly newsletters, conference exhibits, and advertisements in reports on BMDO technology. Networking: Expand results of technology transfer by working with other Federal technology transfer organizations and activities such as the OSD DDR&E Director, Office of Technology Transition, NASA and DOE. Interact with professional/technical associations and societies involved with technology transfer and commercialization.
 - 16273 BMC4I (1461): Investigate photoconduction on active pixel sensors; initiate and begin joint effort with US Air Force (USAF) and NASA in laser communications networking between platforms of the Unmanned Aerial Vehicle, Low Earth Orbit satellite and ground station; initiate shipboard high precision Lidar system work with U.S. Navy at Pacific Missile Range Facility. Continue Bottom Anti-Reflective Coatings research based on successful SBIR efforts.
 - 23105 SBIR/STTR (1660): Award an estimated 200 Phase 1 SBIR Awards to 150 firms and 70 Phase II SBIR awards to 65 firms.
 - 1285 HBCU/MI (1660): Conduct competition and incrementally fund an estimated 10 contracts in the areas of electronics, sensors, materials, and BMC3.
 - 2810 Civilian Salaries (1660): Executing Agents for management of SBIR/STTR programs.
- Total 55731

B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001PB)	88365	37747		
Congressional Adjustments		18500		
Appropriated Value		56247		
Adjustments to Appropriated Value				
a. Congressional General Reductions		-516		
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming	925			
e. Rescissions				
Adjustments to Budget Years Since FY 2001 PB	925	17984		
Current Budget Submit (FY 2002) PB	89290	55731		

Change Summary Explanation:
 Significant FY01 increase due to Congressional Action. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603175C.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev
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COST (<i>In Thousands</i>)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	212281	130837								
1180 Surveillance Technologies	44167	32590								
1280 Interceptor Technologies	59459	46865								
1360 Directed Energy Programs *	69689	0								
1461 BMC4I	5348	11321								
1651 Innovative Science and Technology (IS&T)	0	9820								
1660 Statutory and Mandated Programs	2930	2905								
3354 Targets	8917	9433								
3360 Test Resources	0	2780								
4000 Operational Support	21771	15123								

* Program was continued under BMDO PE 0603174C.

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603175C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

A. Mission Description and Budget Item Justification

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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev	
<p>The BMD technology program is designed to resolve many key Research & Development (R&D) issues for future Theater and National Missile Defense (TMD/NMD) systems. BMDO crafts the program as a component of the overall Department technology plan. Efforts include:</p> <ul style="list-style-type: none"> • Advanced active and passive sensor technology development, which is needed to detect, track, discriminate, and intercept advanced BMD threats. This includes the detection and tracking of low observable targets and other high-leverage sensor technologies. Force and systems level planning and analysis to identify promising technology for insertion into MDAP technical roadmaps and to assess their utility in meeting the ballistic missile defense future architecture vision (Project 1180). • Development and integration of critical technologies for performing hypervelocity hit-to-kill intercepts of ballistic missiles within and outside the atmosphere. Development and demonstration of advanced interceptor sensor processing and power components; interceptor guidance and divert subsystems, multifunctional materials and structures; low-cost interceptor composite manufacturing processes; and low-cost flight test demonstrations (Project 1280). • BMD Battle Management Command, Control, Communications, Computers and Intelligence (BMC4I) advanced technology programs to develop kill assessment, high-speed computing, secure & reliable communications, sensor fusion, and interoperability technologies for NMD and TMD programs (Project 1461). • Continued development of low-cost ballistic missile launch vehicle alternatives (Project 3354). • Use of the new Infrared (IR) data collection capabilities provided by the High Altitude Observatory (HALO) upgrade and fuse IR data with Radio Frequency (RF) data collected on targets (Project 3360). • Required manpower aligned with the performance of these programs (Project 4000). <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 44167 Surveillance Technologies (1180): Continued intermediate level analysis of Midcourse Space Experiment (MSX) data in support of Space Based Infrared System (SBIRS) and NMD Ground-Based Interceptor (GBI). Supported the final year of the Space Based Space Surveillance Operations (SBSSO) Advanced Concept Technology Demonstration (ACTD) in conjunction with the Air Force Space Command. Continued to provide research and development of radar technologies in the areas of Transmitter/Waveform Generators, Antennas, Threats/Environments, Receiver/Signal Processors, Controller/Data Processors, and Electro-Mechanical Support used by MDAP systems. Launched SpaceTechnology Research Vehicle (STRV)-2 experiment 3Q/00. Continued development of advanced technologies for space surveillance systems. Completed data analysis of the Solar Concentrator Arrays with Refractive Linear Element Technology (SCARLET) flight experiment. Conducted engineering analysis including updates of the Technology Master Plan. Conducted study to address the threat posed to the United States by land attack cruise missiles, the existing and potential defenses against such a threat, and the acquisition roadmap that would permit the development of an effective defensive system. Under Project Hercules, initiated identification of algorithm needs through interface with MDAPs, developed plan for functional algorithm development, developed process for generation of threat data packages, and established plan for digital and live-fire algorithm testing. • 59459 Interceptor Technologies (1280): Completed Jet Interaction testing and initial model validation, Special Compartmented Information Isolation Segment (SIS) prototype design, and Secondary Divert and Altitude Control System (SDACS) prototype design. Conducted Preliminary Design Review (PDR) and Critical Design Review (CDR) of Multi-Frequency Generator (MFG) for PAC-3. Delivered and tested Discriminating Interceptor Technology Program (DITP) sensor subsystems. Began integration of DITP sensor subsystems. Ground tested DITP fused-sensor brassboard system. Began trade studies for design of multi-functional interceptor structure. Continued development of advanced technology components for future interceptor systems. 		
<i>Page 2 of 5 Pages</i>		Exhibit R-2 (PE 0603173C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY		June 2001
3 - Advanced Technology Development		0603173C Support Tech - Adv Tech Dev
•	5348 BMC4I (1461): Continued Advanced Phase Conjunction Experiment (APEX) data reduction and intercept debris model development from kill assessment experiments; conducted satellite laser communications experiments; continued development of a high fidelity geographically distributed virtual computing test bed to connect BMDO simulation and Hardware-in-the-Loop (HWIL) assets. Continued development and research for NMD and TMD Kill Assessment modeling and simulation. Leveraged communications infrastructure to extend range and bandwidth of missile defense nodes. Initiated development of advanced metric tracking and discrimination, correlation, fusion processing and networking technology to improve Situational Awareness and Engagement (SAE).	
•	69689 Directed Energy Programs (1360): Created a project baseline in an Integrated Program Execution Plan (IPEP) outlining the design, development, test, and risk reduction activities leading to an integrated ground demonstration known as an Integrated Payload Technology Demonstration (IPTD) on the path to an Integrated Flight Experiment (IFX). Completed phase II of the High Energy Laser (HEL) Affordability and Architecture Study (A&AS). Published environmental assessment report for candidate sites of the new test facility. Conducted risk reduction activities such as: high power laser optimization for flow conditions, alignment, and reverse wave suppression; beam control system improvements; high power autonomous alignment tests; uncooled resonator and gain generator ring fabrication; and Acquisition Tracking and Pointing (ATP) tests at White Sands Missile Range (WSMR) against full scale boosting targets. Defined Space Based Laser (SBL) operational concept from operational and architectural perspectives.	
•	2930 Civilian Salaries for BMDO (1660).	
•	4354 Targets – EXCALIBUR (3354): Continued development of low-cost ballistic missile launch vehicle alternatives. Funding provided for award of the follow-on Phase III Small Business Innovation Research (SBIR) contract in late FY00.	
•	4563 Targets – SCORPIUS (3354): Continued development of a low-cost expendable space-launch vehicle. Funding provided for technology demonstration vehicles that will have application as Theater Ballistic Missile (TBM) targets.	
•	21771 Operational Support (4000): Continued providing management and support for BMDO overhead/indirect fixed costs, and continue to provide management and analysis support to the technology program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, and contract management.	
Total	212281	
FY 2001 Planned Program:		
•	32590 Surveillance Technologies (1180): Complete analysis of MSX data in support of SBIRS and NMD/GBI programs. Continue research development and evaluation of radar technologies in the areas of Transmitter/Waveform Generators, Antennas, Threats/Environments, Receiver/Signal Processors, Controller/Data Processors, and Electro-Mechanical Support used by MDAPs. Refine the MDAP technology transition framework for sufficiently matured radar technologies. Launch STRV 1c/d experiments 1Q01. Complete STRV-2 on-orbit space experiments and continue analysis of experiment data.	
•	46865 Interceptor Technologies (1280): Complete Jet Interaction model validation. Deliver prototypes for SIS and SDACS. Deliver MFG to PAC-3. Deliver test equipment and fused-sensor system for DITP. Reinstate work on range resolved Doppler radar. Ground test DITP flight hardware. Begin design of advanced multi-functional interceptor structure. Continue development of advanced technology components for future interceptor systems.	

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev
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- 11321 BMC4I (1461): Investigate development of advanced interoperability messaging and translation protocols to improve communications. Investigate development of pre-planning and adaptive battle management tools to improve real-time battle status assessment. Complete demonstration of satellite-to-ground laser communications experiment. Continue development in low temperature deposition processes for thick silicon coatings on various substrates for optics; especially on large mirror surfaces needed in directed-energy weapon systems.
 - 9820 Innovative Science and Technology (1651): Initiate Wide Band Gap (WBG) semiconductor effort to integrate material and device development of gallium-indium-aluminum-nitride quaternary compound.
 - 9433 Targets – EXCALIBUR (335 4): Continue development of low-cost ballistic missile launch vehicle alternatives. Funding supports the Phase III SBIR effort to build a liquid fueled target based on the EXCALIBUR design engine for a short duration test firing and to conduct additional design studies/prototype development for vehicle subsystems.
 - 2905 Civilian Salaries for BMDO (1660).
 - 2780 Test Resources (3360): RF/IR Data Fusion Testbed activity will provide a hardware development test bed matched to the real-time signal processor developed for the HALO upgrade. Test bed will exploit the HALO upgrade, Optical Data Analysis activity, Radar Data Analysis activity, and the Missile Defense Data Center for historical data sets. Hardware test bed will serve multiple purposes including a software development role for surveillance asset development and advanced algorithm development.
 - 15123 Operational Support (4000): Continue providing management and support for BMDO overhead/indirect fixed costs, and continue to provide management and analysis support to the technology program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, and contract management.
- Total 130837

<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)	212837	93249		
Congressional Adjustments		38800		
Appropriated Value		132049		
Adjustments to Appropriated Value				
a. Congressional General Reductions		-1212		
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming	-556			
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB	-556	37588		
Current Budget Submit (<u>FY 2002</u> PB)	212281	130837		

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Tech - Adv Tech Dev	
<p>Change Summary Explanation: Significant FY01 increase due to Congressional action.</p> <p>Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603175C.</p>		
<i>Page 5 of 5 Pages</i>		Exhibit R-2 (PE 0603173C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603174C Space Based Laser	PROJECT 1360
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1360 Directed Energy Program	0	73712								

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603883C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

A. Mission Description and Budget Item Justification

Introduction:

- This program element (0603174C, formerly part of PE 0603173C), the Space Based Laser (SBL) project, project number 1360, and the companion AF program element (0603876F) fund technology development efforts for the boost phase intercept concept that can provide national missile defense and operate in all theaters, regardless of size, geometry, or weather conditions.
- FY01 will be the first year under the new PE 0603174C. FY2000 funding for the SBL project from BMDO PE 0603173C and from AF PE 0603876F are identified in Section C.
- A constellation of 20 to 40 SBL platforms would provide overlapping continuous, global coverage against missile threats. An SBL system could defend against missiles without putting the lives of US military personnel at risk. With its long range and speed-of-light engagement capability, it accomplishes boost phase intercept at the earliest possible moment, offering the highest probability that intercepted missile fragments (possibly containing active chemical/biological or nuclear materials) will fall within the attackers territory, not on defended assets. Each SBL platform would be capable of destroying on the order of 00 missiles with the initial fuel load. Capability for on-orbit refueling would be provided.
- The SBL project was structured to address the key critical technical issues:
 1. Can a chemical laser be built powerful enough to destroy a missile at militarily useful ranges? (Alpha program)
 2. Can mirrors and optics be built large enough and easily enough? (Large Advanced Mirror Program (LAMP) and Large Optical Segment (LOS))
 3. Can the high power beam be controlled adequately? (Large Optics Demonstration Experiment, (LODE))
 4. Can the high power components of a Space Based Laser be integrated on the ground and operated as a system? (Alpha LAMP Integration (ALI))
 5. Can missile targets be acquired and tracked from space and can a laser be pointed and fired accurately enough? (Acquisition, Tracking, Pointing, and Fire Control (ATP/FC))
 6. Can these key components be integrated into a functional unit suitable for space flight and remote operation? (Space Based Laser integrated ground demonstration known as the Integrated Test Unit (ITU))
 7. Can the fully integrated system operate adequately on-orbit? (SBL Integrated Flight Experiment (IFX)).

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY		June 2001
3 - Advanced Technology Development	PE NUMBER AND TITLE	PROJECT
	0603174C Space Based Laser	1360
<p>Progress To Date:</p> <ul style="list-style-type: none"> • The Project demonstrated the answers to questions 1 through 4 (and partially 5) and has built devices to perform the respective functions. <ol style="list-style-type: none"> 1. The Alpha program high energy chemical laser achieved weapons-class power in 1991. 2. LAMP and LOS demonstrated the ability to build optics of the required dimensions with the successful fabrication of a 4-meter segmented mirror in 1989 and a key segment of an 11 meter mirror in 1993. 3. The Large Optics Demonstration Experiment (LODE) demonstrated the ability to control the projected (or outgoing) beam in low power laser experiments in 1987. 4. The Alpha LAMP Integration (ALI) experiment demonstrated integrated open loop and closed loop fast steering mirror (FSM) and deformable mirror (DM) system operation in 1997. 5. The basic technologies of acquiring and tracking missiles and pointing a high power laser beam from ground and space were demonstrated by a number of programs. The necessary ATP/FC technologies (sensors, optics, processors, etc.) were demonstrated at or near performance levels required for the SBL system. Stable low power laser beam pointing from a space platform was demonstrated at the precision level required for an operational SBL in 1991 during the flight of the Relay Mirror Experiment (RME). • The high power components of an SBL payload were integrated at the Capistrano Test Site (CTS) and successfully achieved project objectives, thereby validating the SBL beam generation and control concepts. The ALI experiment successfully achieved all of its objectives: <ol style="list-style-type: none"> 6. The integration of the Alpha high power laser with a LODE-derived beam control system and a beam expanded using the LAMP 4 meter mirror 7. The use of uncooled optics in a high power beam train; and 3) the high power operation of the integrated hardware (LAMP with Holographic Optical Elements (HOEs), Outgoing Wavefront Sensor (OWS) behind the secondary mirror, and FSM and DM control optics). On 20 Feb 1997, the first integrated high power test of SBL technologies was successfully conducted at CTS. The second high power test was completed on 16 Jul 1997, with the OWS controlling the steering of the high power beam through the 4-meter LAMP mirror. The third, and final, high power test of the ALI experiment was completed on 22 October 1997, with the OWS controlling the steering and wavefront error of the high power beam through the 4 meter LAMP mirror. The water-cooled deformable mirror was replaced by an uncooled deformable mirror, and it performed successfully during a high power test on 9 June 1998. • By previous guidance in PBD 224C (28 Dec 1998) the BMDO and USAF SBL project is pursuing an integrated ground demonstration. It is known as the ITU. Additional guidance was provided by the Undersecretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)) memorandum to BMDO Director dated 25 Feb 1999) to structure a project plan leading to an SBL IFX in FY12/13. Furthermore, the SBL project has been designated as a Pre-MDAP by the Undersecretary of Defense for Acquisition and Technology. A contract was awarded 8 February 1999 conveying total system authority (TSA) on a Joint Venture (JV) Team comprised of Lockheed Martin, TRW, and Boeing. Under TSA the government specifies broad objectives, and the JV is responsible for the content of the SBL IFX, including the ITU. • Stennis Space Center was selected as the site for the Performance Test Facility in January 2001. • Testing of a linear array of hypersonic low temperature (HYLTE) gain generator nozzles with the potential for more efficient laser operation was successful. Testing continues, and fabrication techniques for a cylindrical gain generator are being demonstrated. Phase conjugation is being explored for application to an advanced, possibly upgraded, operational system. <p>Current Status:</p>		
Project 1360	Page 2 of 4 Pages	Exhibit R-2 (PE 0603174C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603174C Space Based Laser	PROJECT 1360
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- In FY99-00, a space high energy laser (HEL) affordability and architecture study (A&AS) was conducted to determine if technically- or mission-derived constraints have changed sufficiently such that the SBL concept is no longer the most cost effective solution as determined by similar studies in the past.

FY 2000 Accomplishments:

- 0 See Section C for FY 2000 Funding
- Total 0

FY 2001 Planned Program:

- 61034 SBL Integrated Flight Experiment – Conduct ITU/IFX SRR; Continue fabrication, risk reduction, and design validation efforts for the laser, beam control system, beam expander, and ATP/FC.
 - 5923 Mission Definition and Requirements Analysis – Continue operational system concept definition and alternate technology roadmap development; Update the operational system baseline minimum technical data set; Continue operations concept and objectives development with AF Space Command; Continue lethality and system effectiveness assessments.
 - 6755 Government IFX Support-provides programmatic support. Interface with IFX contractors, AF Space Command, and other participants in the SBL program.
- Total 73712

B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)	0	74537		
Appropriated Value		74537		
Adjustments to Appropriated Value				
a. Congressional General Reductions		-825		

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603174C Space Based Laser	PROJECT 1360
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b. SBIR / STTR					
c. Omnibus or Other Above Threshold Reductions					
d. Below Threshold Reprogramming					
e. Rescissions					
Adjustments to Budget Years Since <u>FY 2001</u> PB			-825		
Current Budget Submit (<u>FY 2002</u> PB)	0		73712		

Change Summary Explanation:
 BMDO funded its half of the joint AF / BMDO SBL Project from PE 0603174C "Space Based Laser" during FY01. BMDO transferred all SBL Project funding from PE 0603174C to BMDO PE 0603883C "Boost Defense Segment" beginning in FY02.

C. Other Program Funding Summary (\$ in Thousands)

	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	<u>Cost to Complete</u>	<u>Total Cost</u>
1360 Directed Energy, PE 0603173C	69689	0								
Space Based Laser, AF PE 0603876F	68926	67414								

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603175C BMD Technology
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	112890						Continuing	Continuing
6010 Advanced Technology Development	0	0	110111						Continuing	Continuing
6090 Program Operations	0	0	2779						Continuing	Continuing

THIS FY02 AMENDED PB REQUEST FOR PE 0603175C, BMD TECHNOLOGY, IS \$20M LESS THAN THE FY02 AMENDED PB R-1 BMD TECHNOLOGY PE AMOUNT OF \$132,890K. THIS IS DUE TO THE TRANSFER OF \$20M TO THE PE 0603881C, TERMINAL DEFENSE, IN SUPPORT OF THE FY02 CONTINUED ISRAELI COOPERATIVE PROGRAM.

A. Mission Description and Budget Item Justification

Beginning in FY2002, the Ballistic Missile Defense Organization (BMDO) is consolidating the activities of its Science and Technology Program into one Program Element (PE), 0603175C. The new PE structure will facilitate a more efficient and effective integration of missile defense related applied research and advanced technology development.

The Ballistic Missile Defense (BMD) Technology program is established to develop components, subprojects and new concepts needed to keep pace with the constantly evolving ballistic missile threat. Investments maintain a balance between providing improvements in current acquisition programs and demonstrating the enabling technology for new concepts.

Many of today's baseline BMD projects are viable due to the wise investment in technology research, development and maturation. Examples include: the Lightweight Exoatmospheric Projectile (LEAP), indium antimonide and mercury cadmium telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight satellite structures; interferometric fiber-optic gyroscopes for miniaturized guidance and control projects; and solid-state gallium arsenide transmitter/receivers for advanced BMDO radars; and dual wave passive imaging for BMD test missions.

The Advanced Technology Development project is organized around four thrusts. The thrusts cluster technology efforts that have a synergistic effect in the three phases of a ballistic missile's flight as well as pushing for an ever-greater geographic coverage of the BMD system for maximum military utility and cost optimization. The first thrust, Terminal Missile Defense, continues investment in atmospheric interceptor technology needs for terminal missile defenses and introduces a novel concept for long range atmospheric defense. The second thrust, Midcourse Counter-Countermeasures, builds on the previous program of developing an interceptor seeker using fused active and passive sensors for defeating sophisticated penetration aids anticipated in future threats. It adds new projects to discriminate between pen aids and targets by improved ground-based radar projects, directly perturbing the objects and attacking multiple objects in midcourse by using miniature kill vehicles. The Boost-Phase Intercept (BPI) thrust provides a modest investment in novel early launch detection concepts and advanced high energy laser projects as risk reduction to the technical challenges of detecting and engaging a missile launch as early in its trajectory as possible. The final thrust, Global Defense seeks to enhance the ability to provide continuous, global

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603175C BMD Technology	June 2001
<p>surveillance and precise tracking over very long ranges. Passive surveillance from space that can quickly detect launches under all conditions and establish precise tracking are crucial for boost phase and early midcourse intercepts.</p> <p>A number of technology activities, grouped as Enabling Technology Support, provide technology outputs that are applicable across multiple technology thrust areas. These activities are essential for robust, effective missile defense projects. Enabling Technology Support includes advanced technology development efforts in the multi-application areas of radar; focal plane arrays; materials, structures and power; space experiments; and engineering analysis. Enabling Technology Support also provides the only applied research efforts in the DoD which focus specifically on future BMD technical requirements. To prepare to meet critical future active defense needs, the efforts include an aggressive program of high-leverage technologies that yield markedly improved capabilities across a selected range of boost, midcourse, and terminal defense interceptors, advanced sensors, and innovative science. The Innovative Science and Technology (IS&T) activity invests seed money in high-risk technologies that could significantly change BMD development. Specific technology areas include: 1) sensing, imaging, ranging, and discrimination, 2) phenomenology studies and boost phase intercept handover, 3) electronic and photonic materials and devices and wide band gap technology, 4) information processing and computing technologies, 5) directed energy, non-linear optical devices and processes, 6) kill enhancement devices and, 7) power generation and conditioning and thermal management. This activity conducts proof-of-concept research and matures novel technologies for transition to advanced technology development. The objective of the Technology Applications (TA) Program is to develop and support the transfer of BMD-derived technology to other DOD agencies as well as other federal, state, and local government institutions, laboratories, universities, and industry. Incorporation of technology applications by the private sector and other government agencies can result in reduced unit costs and further improvements to future BMDO applications.</p> <p>Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs are also managed under this project. Under this program, awards are made to small business firms to develop technology capabilities for both military and commercial applications.</p> <p>Program Operations:</p> <p>This project covers personnel and related facility support costs, statutory and fiscal requirements, support service contracts and the BMDO Data Centers Programs.</p> <p>Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Missile Defense Command, US Army PEO Air and Missile Defense, US Navy PEO for Theater Surface Combatants, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.</p> <p>Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.</p>		

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603175C BMD Technology	June 2001
<p>Assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.</p> <p>This project also includes the BMDO Data Centers Programs. The BMDO Data Centers Information System Program Manager provides management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. The BMDO Data Centers Program archives, manages, and develops data products, distributes and provides remote access to all relevant BMD data. Operation and management of Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments for technical/programmatic issues and data center performance, coordinating segment customer program/data management requirements, and cooperative partnership requirements.</p>		
<i>Page 3 of 5 Pages</i>		Exhibit R-2 (PE 0603175C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603175C BMD Technology
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B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)	0	0	0	0
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. Small Business Innovation Research (SBIR) / Small Business Technology Transfer (STTR)				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB				
Current Budget Submit (<u>FY 2002</u> PB)	0	0	112890	0

Change Summary Explanation:

FY 2000 Accomplishments:

- 0 Technology projects were funded under Program Element Number 0603173 (Advanced Technology Development) and 0602173 (Applied Research). Previous projects included: 1180 Surveillance Technologies, 1280 Interceptor Technologies, 1461 BMC4I, 1651 Innovative Science and Technology 1660 Statutory and Mandated Programs, 3354 Targets, 3360 Test Resources, 4000 Operational Support.
- Total 0

FY 2001 Planned Program:

- 0 Technology projects were funded under Program Elements: 0603173 (Advanced Technology Development) and 0602173 (Applied Research). Previous projects included: 1180 Surveillance Technologies, 1280 Interceptor Technologies, 1461 BMC4I, 1651 Innovative Science and Technology 1660 Statutory and Mandated Programs, 3354 Targets, 3360 Test Resources, 4000 Operational Support.
- Total 0

FY 2002 Planned Program:

- 8631 Terminal Missile Defense: Initiate advanced development of advanced technology interceptor components addressing maneuvering threat counter-countermeasures, extending the footprint for upper-tier BMD projects, and long range atmospheric defense concepts.
- 55646 Midcourse Counter-Countermeasures: Initiate advanced development of discriminating seeker components including multicolor focal plane arrays and laser radars. Initiate advanced development of transportable discriminating radar, miniature kill vehicle, and interactive discrimination concepts.
- 4914 Boost-Phase Intercept: Initiate advanced development of early launch detection concepts and enhanced boost phase high energy laser projects.
- 16082 Global Defense: Initiate advanced development of space-based passive surveillance technologies.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603175C BMD Technology
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- 21293 Enabling Technology Support: Initiate advanced development and applied research of radar, focal plane arrays, analysis; and other enabling technologies, concepts and processes to be used by BMD projects.
 - 3545 Incrementally fund an estimated 10 Historically Black Colleges and Universities / Minority Institutions (HBCU/MI) contracts in the areas of electronics, sensors, materials, and BMC3 selected in FY01 competition. Continue to provide assistance to large, medium, and small businesses wishing to bring BMD supported technology to the commercial market through the TA program.
 - 2779 Program Operations: Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, supplies and the data centers programs.
- Total 112890

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
0603173C – Advanced Technology Development	212281	130837	0						CONT	CONT
0602173C – Applied Research	89290	55731	0						CONT	CONT
0603880C - BMD System	0	0	779584						CONT	CONT
0603881C - Terminal Defense System	0	0	988180						CONT	CONT
0603882C - Midcourse Defense System	0	0	3940534						CONT	CONT
0603883C - Boost Defense System	0	0	685363						CONT	CONT
0603884C - Sensors	0	0	495600						CONT	CONT

C. Acquisition Strategy:

BMDO tasks the Services through Program Management Directives (PMDs) to perform the required tasks in support of the BMD Technology Project and performs quarterly reviews to verify and validate completed tasks. The IS&T activity solicits proposals by an annual Broad Agency Announcement (BAA) of research opportunities. Proposals received are competitively judged according to BMD innovation, relevance, cost, and capabilities of the offeror. The HBCU/MI activity also receives proposals in response to a biannual BAA.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Terminal Missile Defense			1Q – 4Q	CONT	CONT	CONT	CONT	CONT
Midcourse Counter-Countermeasures			1Q – 4Q	CONT	CONT	CONT	CONT	CONT
Boost-Phase Intercept			1Q – 4Q	CONT	CONT	CONT	CONT	CONT
Global Defense			1Q – 4Q	CONT	CONT	CONT	CONT	CONT
Enabling Technology Support			1Q – 4Q	CONT	CONT	CONT	CONT	CONT

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL				PROJECT 1266		
COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	368769	456372								
1266 Navy Theater Wide	368769	456372								
A. <u>Mission Description and Budget Item Justification</u>										
In FY02 the Navy Theater Wide Program will be transferred to Program Element (PE) 0603882C, Mid-Course Defense System. This budget is prepared accordingly.										
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 TBM engagements. The Navy SM-2 Block IV has been modified to accommodate a new third stage propulsion system, a fourth stage kinetic warhead (KW), and associated exoatmospheric guidance. The new variant of the SM is the SM-3. The NTW AEGIS LEAP Intercept (ALI) Flight Demonstration Program (FDP) consists of a series of near-term flight tests with the primary objective of demonstrating that Lightweight Exoatmospheric Projectile (LEAP) technologies can be integrated with a modified SM-2 Block IV and AWS to hit a TBM target in the exoatmosphere.										
In April 1999, the NTW Program was reviewed by the Defense Acquisition Board (DAB) and on 4 May 1999 the Department issued an Acquisition Decision Memorandum (ADM). As part of the revised Upper Tier strategy, the Department directed the Navy to expand the ADM approved evolutionary acquisition approach to incrementally deliver Block I capabilities. From an acquisition viewpoint, the Department has directed the Navy to continue this evolutionary Block approach, through an initial system flight test program (AEGIS LEAP Intercept (ALI)), followed by three developmental increments of the Block I system. These increments, Block IA, IB, and IC, provide the warfighter with the only ascent-phase TMD FoS capability and provide the basis to evolve to the objective Block II system using a spiral evolution acquisition strategy. The NTW program can deliver a warfighting capability by delivering first a contingency capability followed by successive capability deliveries leading to a full ORD compliant NTW Block I system.										
In August 2000 Program Decision Memorandum (PDM) directed BMDO, in coordination with PA&E and the Navy, to conduct a comprehensive study of the NTW program, including the radar, funding requirements, and missile procurement. The study was directed to reevaluate the Block I requirements; define Block II, including requirements and schedule; develop potential alternative solutions to fulfill NTW requirements; and, assess the implications of its findings on the appropriate course for Block I and II for										
Project 1266			Page 1 of 7				Exhibit R-2 (PE 0603868C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL	PROJECT 1266
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the on-going U.S./Japan cooperative effort. Based on PDM study results that recommend skipping Block I development after ALI testing and progressing directly to Block II.

NOTE: In FY01 \$15,790K of the funding for NTW is for cooperative development efforts with the Government of Japan for NTW Block II technologies.

B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)	375764	382671		
Adjustments to Appropriated Value		+80000		
Appropriated Value		462671		
a. Congressional General Reductions	-2018	-5296		
b. SBIR / STTR	-1690			
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions		-1003		
Adjustments to Budget Years Since <u>FY 2001</u> PB	-3287			
Current Budget Submit (<u>FY 2002</u> PB)	368769	456372		

Change Summary Explanation:

FY2000: Congressional General Reductions (\$2.018M); internal adjustments (\$3.287M)

FY2001: Increase \$80M Congressional add for NTW acceleration and advanced radar competition. Congressional General Reductions and Section 8126 reduction (\$5.296M). Recission (\$1.003M)

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL	PROJECT 1266
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
1266 Navy Theater Wide	368769	456372								

A. Mission Description and Budget Item Justification
 The mission description for the NTW TBMD system was previously provided on page 1 of this exhibit.

FY 2000 Accomplishments:

- 343356 Continued execution of the ALI FDP, ALI and Block I associated risk reduction activities, Block II associated radar improvements competition, and NTW Block I TBMD system engineering and planning. Conducted successful rocket motor firings and Attitude Control System (ACS) testing of the Third Stage Rocket Motor (TSRM). In June 2000 the TSRM was fully qualified deeming it safe for shipboard use. Flight Test Round (FTR)-1 was executed in July 2000; however, it did not meet its primary objective to demonstrate third stage stability, and control of the third stage through KW separation due to a mission sequence anomaly. Continued the design, development, manufacturing integration, and testing of ALI FTRs, and associated ground hardware and test equipment. Performed AWS development engineering to support the ALI program. Two independent assessment teams initiated reviews of the Solid Divert and Attitude Control System (SDACS) design. Continued the NTW test and evaluation process to include participation in Pacific Blitz which verified ALI seeker performance in Infrared (IR) acquisition tracking, and evaluated Radio Frequency (RF)/IR NTW prototype correlation algorithms, and SM-3 missile Computer-in-the-Loop (CIL) guidance performance. The Japan/U.S. Cooperative Project prepared results of the NTW Block II system engineering and program plan definition under Task 1.
 - 2188 Continued lethality requirement definition support and lethality performance testing of NTW KW in support of upcoming direct hit sled tests.
 - 13975 Continued targets procurement to support NTW test and evaluation, and provided test facilities support.
 - 3000 Provided support for TMD Special Studies – Naval NMD Concept Definition Study.
 - 6250 Provided support for continued development of adaptive algorithms with BMDO.
- Total 368769

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL	PROJECT 1266
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FY 2001 Planned Program:

- 427790 Continue execution of the ALI FDP, FTR-1A, FM-2 and FM-3, and planning for FM-4 test events. Perform SM-3 SDACS qualification activities, including hover test. Continue the development and manufacturing of ALI FTRs and associated ground hardware and test equipment. Continue AWS development engineering to support the ALI program. Continue and conclude studies of alternate DACS. Continue work on Avanced Kill Vehicle pump-propulsion technology development and perform a liquid fuel handling and safety assessment. Continue Block II associated radar improvements competition. Participate in Matching Ballistic Reentry Vehicle (MBRV-2) and Theater Missile Defense Critical Measurements Program (TCMP)-3B test events. Continue design, development, and manufacturing of Block 1A FTRs. Continue Block 1A AWS development engineering. Continue Block 1B AWS development engineering, including common signal processor prototyping. Continue Block IA and Block IB systems engineering and program planning efforts.
- 6573 Continue lethality requirement definition support and lethality performance testing of NTW KW.
- 6219 Continue targets procurement to support NTW test and evaluation.
- 15790 Continue Requirements, Analysis and Design (RA&D) cooperative development efforts with the Government of Japan on selected NTW Block II technologies.

Total 456372

FY 2002 Planned Program: In FY02 the NTW program will be transferred to PE 0603882C, Mid-Course Defense System

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Complete	Total Cost
Navy Area – 0604867C	303479	271052								
Navy Area Procurement – 0208867C	17908	0								
NTW – 0603868C (Project 2266)	0	0								
NTW – 0603868C (Project 2268)	0	0								

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

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Flight Test Round 1	4Q							
Flight Test Round 1A		2Q						
Flight Mission 2		4Q						
Flight Mission 3		4Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL	PROJECT 1266
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Missile Development	CPAF	Raytheon	874264	184295	CONT							
b. AWS & VLS Dev	CPAF	Lockheed Martin	246486	94812	CONT							
c. Radar Development	845	Lockheed Martin	24750	17500	CONT							
d. Radar Development	CPAF	Raytheon	24750	17500	CONT							
e. VLS Development	CPAF	United Defense	15090	4401	CONT							
f. Missile Dev / System Engineering	CPFF	JHU/APL	90376	22391	CONT							
g. System Engineering	CPFF	TSC	8100	2909	CONT							
h. AWS & Missile Dev / System Engineering	WR	NSWC Dahlgren	113352	19204								
i. AWS & Missile Dev / System Engineering	WR	NAWC China Lake	18100	6911								
j. System Engineering / RRA	MIPR	MIT/LL	26142	12391								
k. Alternate DACS Dev	MIPR	LLNL	0	8500								
l. Alternate DACS Dev	CPFF	Aerojet	0	3000								
m. Alternate DACS Dev		BMDO	0	500								
n. Alternate DACS Dev		Various	0	2000								
o. Various		BMDO	111266	0								
p. Various		Misc	20355	8775								
Subtotal Product Development:			1573031	405089								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Engineering Support	CPFF	Anteon	6419	1208	CONT							
b. Engineering Support	CPAF	Marconi	4272	1144	CONT							
c. Engineering Support	CPFF	SSI/PSI	2318	962	CONT							
d. Engineering Support	CPFF	SPA	1681	0	CONT							

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BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL					PROJECT 1266		
e. Mgmt & Prof Supt Svcs		Misc	608	516								
Subtotal Support Costs:			15298	3830								
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. DT&E	CPAF	Lockheed Martin	2535	519	CONT							
b. DT&E	CPAF	Raytheon	2421	660	CONT							
c. DT&E	CPFF	JHU/APL	7968	1450	CONT							
d. DT&E	WR	NAWC Point Mugu	3072	1162								
e. Lethality / DT&E	WR	NSWC Dahlgren	21782	4588								
f. DT&E	WR	NSWC Port Hueneme	7018	1612								
g. DT&E	MIPR	NAIC	6618	536								
h. DT&E	MIPR	Natl Assess Group	1357	727								
i. DT&E	WR	PMRF	16257	3492								
j. Targets	MIPR	SMDC Army	55436	6219								
k. DT&E	MIPR	SMDC Army	1724	1100								
l. DT&E		Misc	16714	3678								
m. Facilities	MIPR	NHTF	2501	0								
Subtotal Test and Evaluation:			145403	25743								
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Internal Operating	WR	NAVSEA	7145	3035								
b. Program Management	CPFF	Anteon	12428	6500	CONT							
c. Program Management	CPAF	Marconi	2975	960	CONT							
d. Program Management	CPFF	SSI/PSI	2712	1235	CONT							
e. Program Management	WR	NSWC Dahlgren	25832	4375								
f. Program Management	WR	NRL	4489	865								
g. Program Management	WR	NAWC China Lake	13549	2450								
h. Program Management	WR	NWAD	3536	900								
i. Program Management	WR	NSWC Indian Head	3961	650								
j. Program Management		Misc	3371	325								
Project 1266												
Page 6 of 7												
Exhibit R-3 (PE 0603868C)												

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603868C Navy Theater Wide - DEM/VAL	PROJECT 1266
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k. Internal Operating		Misc	3350	415							
Subtotal Management Services:			83348	21710							

Remark:

Project Total Cost:			1817080	456372							
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603869C MEADS - DEM/VAL (PD-V)				PROJECT 1262		
COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
1262 Medium Extended Air Defense System (MEADS)	49476	52643								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>The MEADS program (PE0603869C) to include programmatic and funding is being transferred to the Army beginning in FY02. The Medium Extended Air Defense System (MEADS) is an objective force system. It is an international cooperative program essential to fulfill the requirements of the U.S. Army and the U.S. Marine Corps for a low-medium air defense system in the 21st century. MEADS will offer a significant improvement in tactical mobility and strategic deployability over comparable missile systems. It will defend the maneuver force and other critical forward-deployed assets against short and medium range Theater Ballistic Missiles (TBMs), cruise missiles and other air-breathing threats throughout all phases of tactical operations. MEADS will operate both in an enclave with upper-tier systems in areas of debarkation and assembly and provide continuous coverage alone or with Short-Range Air Defense Systems (SHORAD) in the division area of the battlefield during movement to contact and decisive operations. MEADS will be interoperable with other airborne and ground-based sensors and utilize a netted and distributed architecture and modularly-configurable battle elements to provide a robust, 360-degree defense against short and medium range TBMs, cruise-missiles, unmanned-aerial-vehicles, tactical air to surface missiles, rotary-wing and fixed-wing threats.</p> <p>The MEADS program has been restructured to leverage the interceptor from the PATRIOT Advanced Capability – 3 (PAC-3) program and to extend the Program Definition/Validation (PD/V) phase with a three-year Risk Reduction Effort (RRE) that focuses on developing the critical technologies required for maneuver force protection and overall risk reduction. Pending formal approval of the International Memorandum of Understanding (MOU), a U.S. funded bridging effort commenced on 14 August 2000 to begin work on the highest risk and long-lead items in the RRE Scope of Work.</p> <p>There remains a critical void in maneuver force defense against short and medium range TBMs, cruise missiles, and low-to-medium altitude advanced air-breathing threats. This program will meet this challenge by integrating the PAC-3 missile and developing the critical technologies required for maneuver force protection, including development of a prototype lightweight launcher, 360-degree radar and tactical operation center. Concepts will be validated through proof-of-principle testing capitalizing on the already programmed Air-Directed Surface-to-Air Missile (ADSAM) demonstration efforts. The PAC-3 missile is the baseline interceptor for MEADS. Sensor and battle management software technology from both U.S. and international programs will be examined to enhance and augment organic-equipment functions, reducing development cost and risk. Improvements will be balanced against costs and the projected threat to develop a U.S. and allied capability to counter the maneuver force threat. This approach emphasizes prototyping of system-specific and surrogate hardware in key areas of Battle Management/Command, Control, Communications, Computers, and Intelligence (BM/C4I), fire control radar, and light weight launcher to satisfy mobility, strategic deployability and interoperability requirements. Cost as an Independent Variable (CAIV) analysis will be applied to the currently defined requirements. The Ballistic Missile Defense Organization (BMDO) is responsible for overall program management and direction. The U.S. Army Program Executive Officer for Air and Missile Defense and the MEADS National Product Office execute the program for BMDO.</p>										
Project 1262			Page 1 of 7 Pages				Exhibit R-2 (PE 0603869C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C MEADS - DEM/VAL (PD-V)	PROJECT 1262
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B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)	48594	63175		
Appropriated Value	48594	53475		
Adjustments to Appropriated Value				
a. Congressional General Reductions		-832		
b. SBIR / STTR	-118			
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming	1000			
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB				
Current Budget Submit (<u>FY 2002</u> PB)	49476	52643		

Change Summary Explanation:

Funding:

FY00 +\$882K : +\$1.0M reprogrammed for common missile requirements;
-\$118K SBIR/STTR reduction.

FY01 -\$832K: -\$372K for .7% general reduction;
-\$344K for section 8116 reduction;
-\$116K FY01 congressional recission.

Schedule: None

Technical: None

BMDO RDT&E COST ANALYSIS (R-2A Exhibit)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603869C MEADS - DEM/VAL (PD-V)	1262
A. <u>Mission Description and Budget Item Justification</u>		
<p>The MEADS is an objective force system. It is an international cooperative program essential to fulfill the requirements of the U.S. Army and the U.S. Marine Corps for a low-medium air defense system in the 21st century. MEADS will offer a significant improvement in tactical mobility and strategic deployability over comparable missile systems. It will defend the maneuver force and other critical forward-deployed assets against short and medium range TBMs, cruise missiles and other air-breathing threats throughout all phases of tactical operations. MEADS will operate both in an enclave with upper-tier systems in areas of debarkation and assembly and provide continuous coverage alone or with SHORAD systems in the division area of the battlefield during movement to contact and decisive operations. MEADS will be interoperable with other airborne and ground-based sensors and utilize a netted and distributed architecture and modularly-configurable battle elements to provide a robust, 360-degree defense against short and medium range TBMs, cruise-missiles, unmanned-aerial-vehicles, tactical air to surface missiles, rotary-wing and fixed-wing threats.</p> <p>The MEADS program has been restructured to leverage the interceptor from the PAC-3 program and to extend the PD/V phase with a three-year RRE that focuses on developing the critical technologies required for maneuver force protection and overall risk reduction. Pending formal approval of the International MOU, a U.S. funded bridging effort commenced on 14 August 2000 to begin work on the highest risk and long-lead items in the RRE Scope of Work.</p> <p>There remains a critical void in maneuver force defense against short and medium range TBMs, cruise missiles, and low-to-medium altitude advanced air-breathing threats. This program will meet this challenge by integrating the PAC-3 missile and developing the critical technologies required for maneuver force protection, including development of a prototype lightweight launcher, 360-degree radar and tactical operation center. Concepts will be validated through proof-of-principle testing capitalizing on the already programmed ADSAM demonstration efforts. The PAC-3 missile is the baseline interceptor for MEADS. Sensor and battle management software technology from both U.S. and international programs will be examined to enhance and augment organic-equipment functions, reducing development cost and risk. Improvements will be balanced against costs and the projected threat to develop a U.S. and allied capability to counter the maneuver force threat. This approach emphasizes prototyping of system-specific and surrogate hardware in key areas of BM/C4I, fire control radar, and light weight launcher to satisfy mobility, strategic deployability and interoperability requirements. The CAIV analysis will be applied to the currently defined requirements. The BMDO is responsible for overall program management and direction. The U.S. Army Program Executive Officer for Air and Missile Defense and the MEADS National Product Office execute the program for BMDO.</p>		
Project 1262	Page 3 of 7 Pages	Exhibit R-3 (PE 0603869C)

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C MEADS - DEM/VAL (PD-V)	PROJECT 1262
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FY 2000 Accomplishments:

- 26688 U.S. continued contribution to the NATO MEADS Management Agency (NAMEADSMA) International Program Office operational and administrative budgets for transition to and conduct of the MEADS RRE contract for initial development of digital end-to-end simulation and initial development of prototype launcher, fire control and BMC4I hardware and associated software.
 - 12000 Conducted international bridging effort and associated termination liability. This effort began to address high risk and long-lead items within the RRE scope. The participant nations agree that in future consideration of RRE cost share the value of this effort should be recognized as applicable services.
 - 3000 Conducted U.S. only effort to implement the Time-Phased Release Plan (TPRP). This included the preparation required to meet the variety of security and disclosure restrictions applied to the TPRP. It will also fund establishment of a U.S.-sponsored, U.S.-only simulation cell tasked with maintaining oversight and configuration control of the transferred PAC3SIM simulation.
 - 4210 Continued government agency and support contracts to provide technical analysis and tools in specialty areas of lethality, BMC4I, and system simulations, as well as support of conducting independent evaluations of contractor trades and analysis.
 - 3578 Continued MEADS program management, support and salaries for both the national and international program offices. Included U.S. efforts tied to national support of executing the replanned program.
- Total 49476

FY 2001 Planned Program:

- 36442 Continue U.S. contribution to the NAMEADSMA International Program Office operational and administrative budgets for the MEADS RRE contract and continued development of digital end-to-end simulation, development of prototype launcher, fire control and BMC4I hardware and associated software and test planning.
 - 4565 Conduct program integration efforts that will examine Department of Defense (DOD) Joint Vision and Army transformation objective force mix and integration issues; support MEADS in the test and evaluation of Air and Missile Defense (AMD) task force interoperability and BMDO family-of-system requirements; support development and maintenance of Joint Data Network interface requirements and planning and appropriate planning of MEADS manpower, training, human factors and safety issues.
 - 6703 Continue funding for government agencies and support contracts to provide technical analysis and tools in specialty areas of lethality, BMC4I and system simulations, as well as support of conducting independent evaluations of contractor trades and analysis.
 - 4933 Continue MEADS program management, support and salaries for both the national and international program offices. Includes U.S. efforts tied to national support of executing the replanned program and OSD directed documentation plan.
- Total 52643

B. <u>Other Program Funding Summary</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To</u>	<u>Total</u>
N/A								<u>Compl</u>	<u>Cost</u>

BMDO RDT&E COST ANALYSIS (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C MEADS - DEM/VAL (PD-V)	PROJECT 1262
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C. Acquisition Strategy:

The MEADS acquisition strategy included competition between two transatlantic industrial teams in the PD-V phase. These two international entities prepared and competed for the PD/V phases. As the Department of Defense and partner nations restructured the program, the PD/V phase was extended with the selection of a single contractor team to conduct a three-year RRE. In August 2000, the Defense Acquisition Executive (DAE) approved entry in the RRE. In this phase, technology from Germany, Italy and the United States, including the PAC-3 missile, will be leveraged to define the most cost-effective solution to meet the MEADS operational requirements. The MEADS Product Office is also pursuing integration of MEADS BMC4I with the Project Manager, Air & Missile Defense Command and Control Systems (AMDCCS), to take advantage of other Army developments that can be incorporated into the MEADS program.

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Three-year risk reduction effort contract signed	2 nd Qtr							
Program Review	3 rd Qtr	3 rd Qtr						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C MEADS - DEM/VAL (PD-V)	PROJECT 1262
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. International Teaming	FFP	LM/H&R Teams	9605									
b. Proj Def-Val (PD/V)	FFP	NAMEADSMA	101672									
c. Risk Reduction (RRE)	CPFF	LMMC	6612									
d. Bridging Effort	CPFF	NAMEADSMA	12000									
e. Implement TPRP	CPFF	LMMC	3000									
f. Risk Reduction	CPFF	NAMEADSMA	18380	34942								
Subtotal Product Development:			151269	34942								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Int'l Program Office	LOE	NAMEADSMA	4728	1500								
b. Program Integration	LOE	PEO AMD/BMDO		4565								
c. U.S. Anal of Alternatives	LOE/MIPR	MEADS Product Ofc	2298									
d. U.S. Contracts	LOE	MEADS Product Ofc	5640	2760								
e. U.S. OGAs	MIPR	MEADS Product Ofc	6738	3943								
f.												
Subtotal Support Costs:			19404	12768								

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Redstone Tech Test Ctr	MIPR	Huntsville, AL	253									
b. ADSAM		SMDC	9915									
Subtotal Test and Evaluation:			10168									

Remark:

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C MEADS - DEM/VAL (PD-V)	PROJECT 1262
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Internal Operating	In-House	MEADS Prod Ofc/ NAMEADSMA	10606	4933								
Subtotal Management Services:			10606	4933								

Remark:

Project Total Cost:			191447	52643								
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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2400 National Missile Defense	944922	1853527								

THE FY2000 AND FY2001 PROGRAM REPRESENTED IN THIS R-2 HAS BEEN RESTRUCTURED FOR FY2002 AND IS CAPTURED IN PE 0603882C, MIDCOURSE DEFENSE SEGMENT.

A. Mission Description and Budget Item Justification

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

The Program has three objectives: (1) to develop and demonstrate an integrated system that has the capability to counter known or expected threats; (2) to complete system development and field an Initial Capability (IC) by the end of FY 2006 and an expanded capability by the end of FY 2008 (if directed to do so); and (3) to assess the technical feasibility, schedule, and cost associated with maintaining a system development path which allows evolutionary upgrading of system capabilities to counter more complex threats. Department of Defense (DoD) conducted a Deployment Readiness Review (DRR) in August 2000. On 1 September 2000, the President decided to continue development and testing and defer the deployment decision.

To execute the program, Boeing North America was competitively awarded the Lead System Integrator (LSI) contract in April 1998. The LSI was contractually accountable for meeting NMD system performance requirements, while the PM implemented and managed an accelerated and evolutionary acquisition strategy to design, develop, integrate, and test the entire system. The original contract was closed out in December 2000 and the Boeing Company was awarded a new contract, as the NMD Prime, to continue program development with options to support deployment.

The NMD system elements comprise a Ground Based Interceptor (GBI) (consisting of a kill vehicle and booster, and GBI support equipment including Command and Launch Equipment (CLE), ground and space-based sensors, and a Battle Management, Command, Control, and Communication (BM/C3) system. The ground-based sensors include development of an X-Band Radar (XBR) and the upgrade of existing Early Warning Radars (EWR). The BM/C3 system includes command and control and engagement planning capabilities, integration with existing national command and control systems, a communication network, and a communication system to transmit data to and from the interceptor while in flight. The NMD system will also use space-based assets for threat detection and tracking, such as the Air Force’s Defense Support Program (DSP), and eventually the Air Force’s Space Based Infrared System (SBIRS). SBIRS is an integral part of enhancing future NMD capabilities.

NMD DEVELOPMENT/INTEGRATION provides for the Prime Contractor to develop and integrate the individual NMD elements into a cohesive system. In FY 1998, the BM/C3 contract transitioned to Boeing, under the LSI contract. In FY 1999, the Exoatmospheric Kill Vehicle (EKV), Payload Launch Vehicle (PLV) and Integrated System Test Capability (ISTC) contracts were assumed by Boeing. At the end of FY 2000, the last of the NMD legacy contracts, the Ground Based Radar –

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
<p>Prototype (GBR-P) contract transitioned to Boeing. Boeing, now the Prime Contractor, will develop, test, and demonstrate prototype software upgrades and hardware changes to existing EWRs required to support the NMD mission. The Prime Contractor will integrate system hardware and software to demonstrate the ability to achieve the Initial System Requirements and to provide the flexibility and robustness for growth in capability to counter known and future threats. The IC will include up to 20 ground-based interceptors at a single site, a ground-based XBR, Upgraded Early Warning Radars (UEWR) and DSP deployed by the end of FY 2006. To meet a larger and more realistic threat, the IC will be expanded to 100 ground based interceptors by the end of FY 2008, provide an upgraded XBR, and support the upgrading of 5 EWRs. The Prime Contractor will validate system performance and perform the necessary system-level trade studies to appropriately allocate element requirements with full consideration of Cost as an Independent Variable (CAIV). The Prime Contractor will operate and maintain NMD models and simulations to include ISTC, system Hardware in the Loop (HWIL), and Prime Contractor Integrated Development Systems (LIDS). Until booster development is complete, EKV flight tests will be flown on the PLV, which is a booster, comprised of a Minuteman (MM) II second and third stages. Development of the Commercial Off-the-Shelf (COTS) booster consists of integrating a Gemini-40 first stage and Orbus-1A second and third stages. The booster will be tested during two verification flights in 3Q and 4Q, FY 2001. 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. Government leads/PM provide oversight of Prime Contractor counterpart Integrated Product Team (IPT).</p> <p>SENSOR TECHNOLOGY includes research and development efforts for critical sensor components which support infrared surveillance, acquisition, tracking, and discrimination functions for use in the SBIRS Low system. Projects in radiation hardened electronics and spacecraft computers, focal plane arrays (FPAs), long-life cryogenic coolers, signal/data processing and optics are developing state-of-the-art technologies essential to operating in a space environment and viewing targets against the earth limb and space backgrounds. The projects provide mission enabling, risk and production cost reduction technologies for SBIRS Low.</p> <p>THE GBI contracts (EKV and PLV) transitioned to the Prime Contractor in FY 1999. EKV sensor flight tests were successfully accomplished in 3Q, FY 1997 and 2Q, FY 1999. COTS booster development began in FY 1998. The PM GBI performs oversight of NMD Prime Contractor GBI development, integration and test, and deployment planning activities, manages and provides specific Government Furnished Equipment (GFE) to include transportation, testing, and facilities maintenance. Additionally, this office will conduct Independent Verification and Validation (IV&V) of Prime Contractor GBI hardware and software efforts and other required Independent Performance Assessments. The Prime Contractor is responsible for the booster, test facilities, primary production facilities, Peculiar Support Equipment (PSE), Command Launch Equipment (CLE), EKV subcontractors and the integration and test of the GBI element.</p> <p>THE BM/C3 functional area will provide technical oversight of all BM/C3 development activities of the NMD Prime Contractor, BM/C3 software models and simulations, IV&V and Verification, Validation and Accreditation (VV&A), provision of the Joint National Test Facility (JNTF) BM/C3 Element Support Center and BM/C3 Element Laboratory to support BM/C3 development and system test, and technical oversight of the procurement of the NMD Communications Network (NCN).</p> <p>THE XBR is the NMD sensor responsible for acquisition, tracking, discrimination, fire control support, and kill assessment. The Shemya XBR design is being executed by the NMD Prime Contractor. An XBR testbed that leveraged off the Theater Missile Defense Ground Based Radar (TMD-GBR) program (designated GBR-P) has been developed and installed at USAKA, Kwajalein Missile Range (KMR). The GBR-P participates in NMD Risk Reduction Flights (RRF) and Integrated Flight Tests (IFT). Beginning in FY 2001, GBR-P management and upgrades will be combined with the XBR efforts of the Prime Contractor.</p>		
Project 2400	Page 2 of 17 Pages	Exhibit R-2 (PE 0603871C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
<p>THE UPGRADED EWR (UEWR) hardware efforts and software upgrades were transitioned to Boeing, under the LSI contract in FY 1998. The UEWRs will detect, count and track the individual objects in a ballistic missile attack early in their trajectory. The data will be used for interceptor commit and XBR cueing. Efforts include IV&V and VV&A along with independent discrimination analysis.</p> <p>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. The System Engineer identifies and mitigates system risk and institutes CAIV and other initiatives to facilitate system affordability. In addition, the System Engineer plans and directs Command and Control Simulations (C2Sims) in which analyses, simulations, and tests are performed. C2Sims evaluates system effectiveness, proposed NMD system architectures, and Concept of Operations (CONOPS) against near and far-term ballistic missile threats. The System Engineer develops functional definitions for the candidate deployment options needed to meet user requirements, and in this capacity, manages all interactions with the user in areas relating to requirements. In addition, the System Engineer focuses on system-level balancing, verification, and validation of the integrated NMD system. At the request of the Ballistic Missile Defense Organization (BMDO), as well as the Office of the Secretary of Defense (OSD) and other external agencies, the System Engineer conducts Ad Hoc studies in support of treaty analysis, policy guidance, and other NMD derived missions.</p> <p>DEPLOYMENT & SUSTAINMENT (D&S) comprises development of plans and analysis to support system production, deployment and sustainment to include: Manpower Personnel Training (MPT) analysis; maintenance and supply support planning; site activation/deployment planning; Government Furnished Property/Government Furnished System/Government Furnished Facilities (GFP/GFS/GFF); and Environmental Safety and Health (ESH) activities. The effort includes conducting siting analyses and supporting site selection; preparing statutory National Environmental Protection Agency (NEPA) and other ESH compliance analyses and documentation; establishing facilities requirements, assessing existing facilities, and developing MILCON programming and budget documentation. The D&S activity also includes the development of the Site Activation Command (SAC) organization, missions and functions, and operating procedures. The SAC will be activated to proceed with the NMD system deployment. The SAC will deploy site manager support personnel, resolve site activation priorities and conflicts, manage activation of deployment sites, and coordinate and oversee system installation, acceptance and turnover activities.</p>		
Project 2400	Page 3 of 17 Pages	Exhibit R-2 (PE 0603871C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
<p>SYSTEM TEST AND EVALUATION activities involve managing and overseeing the NMD test and evaluation program, including execution of the lethality ground and flight test programs, and development of program test documentation such as the Test and Evaluation Master Plan (TEMP). Managerial oversight and execution responsibilities ensure the following are available: (1) test infrastructure (including test ranges and instrumentation); (2) oversight of Prime Contractor Ground-Based Test Models & Simulations; (3) target development for sensor and intercept tests; (4) sensor technology enhancements; (5) revised program strategy changes that include multiple engagements, test range upgrades, and the development of the new target booster; and (6) upgrades to government test facilities for the Prime Contractor. Management activities include 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. Included in this area is the Discrimination program which 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 analysis 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.</p> <p>TEST TRAINING AND EXERCISE CAPABILITY (TTEC) will develop and implement through the Prime Contractor the hardware and software to meet the program management, technical and administrative support requirements of testing, training and conducting exercises. The Operational Support Group (OSG) will over see and facilitate the development of the NMD training program through its interface with the User community. TTEC also provides training development and reviews and assesses NMD System Training Plan.</p> <p>THE TECHNICAL DIRECTOR ensures a totally integrated effort of system engineering, test and evaluation, and production and logistics support over the system life cycle. Includes the process of system definition/baseline development; design engineering; systems engineering; software management; developmental and operational test and evaluation; reliability, availability and maintainability (RAM); standardization and specifications; countermeasures mitigation; and product improvement. Represents the Program Executive Officer in OSD, Joint Staff, congressional staff and international forums.</p> <p>MANAGEMENT AND OPERATIONAL SUPPORT provides personnel and related support 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 JNTF. This project supports funding for overhead/indirect personnel costs, benefits and infrastructure costs such as rents, utilities and supplies. Additionally, this project maintains NMD Joint Project Office (JPO) operations as well as JPO scientific, engineering and technical assistance contractor support.</p> <p>This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing DoD policy.</p>		
Project 2400	Page 4 of 17 Pages	Exhibit R-2 (PE 0603871C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
<p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 491097 NMD Development/Integration: Conducted three IFTs-3, 4, and 5. IFT-3 was the first intercept demonstration. IFT-5 was the first Integrated System Flight Test, and demonstrated the potential system capability to meet the threat requirement. Completed Integration Assembly Test and Checkout (IAT&C) facility at Redstone Arsenal. Completed GBI Development Integration Lab/System Integration Lab (GDIL/SIL). Continued COTS booster development. Initiated and completed one Integrated Ground Test (IGT-5) utilizing the ISTC. Conducted LIDS builds 5 and 6. Released BM/C3 Build Increment (BI)-1 software build. Prepared and completed documentation in preparation for the DRR. Conducted GBI Critical Design Review (CDR). Conducted RRFs-7, 8, 9 and 10. Conducted In Flight Interceptor Communication System (IFICS) hardware CDR. • 5675 Sensor Technology: Continued development of Infrared Radar (IR) Focal Plane, cryogenic, rad hard electronics and rad hard filters effort. Achieved a break through in cutoff wave lengths for Mercury Cadmium Telluride (MCT) focal planes. Continued development of a rad hard readout for focal planes. Continued development of an improved high efficiency cryocooler. Progress in fabricating rad hard memories, analog to digital converters and filters continued. • 26421 GBI: Conducted IFT-3 and provided support for the NMD IFT-4 and IFT-5. Supported IGT-5. Developed tactical CLE Build 1 and Build 2. Supported pre-mission testing. Completed silo upgrade at KMR. Conducted IV&V and VV&A assessments. Supported assessment GBI CDR. Conducted production planning. • 23705 BM/C3: Conducted BM/C3 engineering and integration activities to support BM/C3 development by the NMD Prime Contractor. Provided technical oversight for capability increment-3A to support IFTs-4 and 5 in 2Q and 4Q, FY 2000, and BI-1 to support the NMD DRR. Supported IGT-5 and IFTs-4 and 5. Completed IFICS Prototype integration at KMR. Supported and coordinated Cheyenne Mountain Operations Center (CMOC) integration planning. Provided technical oversight of the procurement of the NCN. Conducted IV&V and VV&A assessments. Initiated support for production, fielding and deployment of the BM/C3 Element including integration with Cheyenne Mountain Operations Center (CMOC) and Integrated Tactical Warning and Attack Assessment (ITW/AA). • 28060 XBR: Participated in IFT-4 and IFT-5 with GBR-P on-line, and the Radar Credible Target-2 mission (RCT2) and IFT-5 with GBR-P in-line. Completed system segment specification test and evaluation for government acceptance of GBR-P. Completed necessary requirements to provide GBR-P as Government Furnished Property to Prime Contractor. Transitioned GBR-P contract management from the XBR Program Office to the Prime Contractor. Conducted Preliminary Design Review (PDR) and Intermediate Design Review (IDR) for Capability 1 (C1) XBR. Conducted IV&V and VV&A assessments. • 10355 UEWR: Continued to support UEWR development activities and preparation for the critical NMD milestones, including the Integrated System Test (IST) and DRR. Continued to participate in and support the Real Time Defense Information Infrastructure – Common Operating Environment (DII-COE) Technical Working Group/Integrated Product Team (TWG/IPT). Supported system flight and ground test planning, execution and limited post-test independent analysis. Supported evaluation of algorithms and integration into the deployable system. Supported discussion of issues with radars located on foreign soil. Supported integration of legacy systems with existing missions. 		
Project 2400	Page 5 of 17 Pages	Exhibit R-2 (PE 0603871C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
• 28008	System Engineering: Continued engineering and integration activities at the system level. Assessed and refined user requirements (CRD, ORD and CONOPs). Transitioned to C1 Expanded program and continued requirements refinement (NMD System Requirements Document (SRD)) for C1 Expanded and Long Term, Capability 2 (C2) and Capability 3 (C3) Program. Continued identification and mitigation of system risk and implementation of CAIV and other initiatives to facilitate system affordability. Developed single integrated C1/C2 NMD System Cost Analysis Requirements Document (CARD) and C1 Expanded addendum consistent with system technical requirements. Conducted NMD System Engineering IDR in 3Q, FY 2000 and supported the DRR. Updated the NMD System Threat Assessment Report (STAR). Developed/updated detailed threat “design-to” and “analyze-to” parameters and scenarios. Conducted C2Sim exercise and tabletops. Continued integration with the SBIRS Program Office to ensure the satisfaction of NMD program requirements. Performed nuclear environment calculations/requirements verification. Conducted data fusion/system discrimination development. Coordinated system VV&A and continued to maintain IV&V capability to perform system VV&A. Conducted follow-on NMD architecture studies.	
• 28417	Deployment & Sustainment: Implemented the system level acquisition logistics strategy and analysis process that enabled the Government to properly oversee and assess the Prime Contractor’s planning and execution of its acquisition logistics program. Continued development of the initial NMD System sustainment program planning. Published the NMD Integrated Development Plan (IDP) and the NMD Capstone Site Activation Plan (CSAP) with changes driven by the program evolution to the C1 Expanded architecture. Updated the Operational and Suitability (O&S) Assessment Report. Updated the Joint Manpower Estimate (JME) with C1 Expanded manpower impacts. Continued facility design based on impacts of C1 Expanded. Supported design reviews of XBR and GBI weapons Sites. Issued request for proposal for construction contract for XBR. Initiated design of IFICS Data Terminals (IDTs) and supported standard design process. Prepared advance planning/pre-award documentation for future award of NMD System deployment construction contracts. Conducted public hearings on the EIS at the candidate interceptor and radar sites. Continued NEPA environmental compliance process, including additional actions necessary for C1 Expanded deployment. Completed NMD Deployment EIS and continued preparation of other ESH documents required for system development and deployment. Completed Alaska Siting Study and North Dakota and IFICS Data Terminal (IDT) Addenda. Initiated the Site Activation Command (SAC) planning. Evaluated the Industrial Base’s ability to achieve C1 Expanded Deployment. Developed and issued System Producibility and Manufacturing (P&M) Plans updated for the C1 system architecture and subsequently updated them for C1 Expanded. Implemented a System Safety Program Plan. Provided and managed GFP, GFF and GFS. This included the EKV Checkout Facility and the GBI IATC. Implemented an approach to meeting TTEC requirements. Reviewed MPT issues and ensured MPT is on track and ready to support IC. Developed SAC missions and functions, organization, staffing, equipment, and administrative communications requirements, funding profiles, operations manual, and initiated the manning process.	
• 144846	System Test and Evaluation: Supported IGT-5 at the ISTC. Updated TEMP with support of the NMD System Test and Evaluation (T&E) IPT. Completed program documentation, pre-mission flight tests for IFT-4 and IFT-5, pre-launch preparations and oversee execution of IFTs-3, 4, and 5, RRFs-7, 8, 9, and 10, and a target of opportunity at Kodiak. Evaluated post-test results to support DRR data gathering. Completed VV&A of IFT 6 targets and accredited the ISTC. Implemented lethality and live fire testing plan. Coordinated test range infrastructure and upgrades to support EKV flight test from KMR. Coordinated test range instrumentation upgrades and provide data collection and analysis for NMD testing. Conducted target launches for IFTs-3, 4, and 5 from Vandenberg AFB (VAFB). Conducted Orbital Sub-Orbital Program (OSP) demonstration flight of new targets launch program. Developed and procured backup target Multi Service Launch System (MSLS).	
• 163338	Management and Operational Support: Continued providing management analysis and support for overhead/indirect fixed costs.	
Total	944922	

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
<p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 1439920 NMD Development/Integration: Prepare for Defense Acquisition Board (DAB) review. Conduct NMD System CDR. Conduct C2 System Readiness Review (SRR). Conduct IFT-6. UEWR software releases 5 & 6 will be implemented. A BI-2 (BM/C3) Readiness Review will be conducted. Participate in the NMD integrated system test IFT-6 with GBR-P in-line. Continue COTS booster development. Conduct Booster Verification (BV) Flight Test 2. Continue XBR and EKV algorithm upgrade. Continue to work integration with legacy systems and other missions. Accomplish close out of the LSI contract and initiate new NMD Prime contract with Boeing. Restructure NMD development program to a capabilities based block/increment upgrade effort incorporating spiral development concept. Plan for an increased flight test tempo and add multiple engagements. • 5900 Sensor Technology: Deliver Lot 3 (final) FPAs of LWIR focal plane program. Initiate a focal plane producibility effort to support fabrication of flight units and reduce manufacturing costs. Continue Silicon FPA program for SBIRS Low. Continue visible array rad hard star tracker program; continue FPA performance testing. Complete cryocooler efforts through life and performance testing. Continue development of cryogenic integration technologies in cooperation with SBIRS Low contractual designs. Continue performance and life testing of cryocoolers. Continue development of cryocooler prototype. Continue development of rad hard electronics components/devices. Flight test a space optics cleaner prototype and finalize the design. Support continued development of adaptive algorithms. • 30500 GBI: Continue oversight of GBI design development, integration and test, test planning, and deployment planning. Monitor EKV flight unit integration for IFT-6, and pre-mission flight tests. Support IFT-6, including post test data reduction. Conduct IV&V and VV&A assessments. Oversee Alternate Boost Vehicle development activities. Support BV Flight Test 2, and post test data reduction. • 20900 BM/C3: Oversee provision of BI-1 to support Integrated System tests. Support IFT-6, and IGT-6. Continue technical oversight of engineering and acquisition activities for NCN. Conduct IV&V and VV&A assessments. Support initiation of Cheyenne Mountain integration and provide user interaction with United States Space Command (USSPACECOM). Support BM/C3 participation in C2 Simulations and Battle Planning Exercises. Continue support for production, fielding and deployment of the BM/C3 Element • 22800 XBR: Validate XBR hardware and software design. Support system flight and ground test planning, execution, and post-test independent analysis. Support evaluation of algorithms and integration into the deployable system. Conduct SW IV&V and VV&A assessments. Complete CDR and DAB Review. Provide Government oversight of the Prime Contractor XBR final design and preliminary software development. • 9700 UEWR: Continue Real Time DII-COE evaluation for UEWR. Support system flight and ground test planning, execution, and limited post-test independent analysis. Support evaluation of tracking and object classification algorithms and their integration into the deployable systems software and hardware. Support discussion of issues with radars located on foreign soil as well as activities associated with EWR's Environmental Impact Statement (EIS), Radio Frequency Interference (RFI), and Ionospheric Data Collections (IDC). 		
Project 2400	Page 7 of 17 Pages	Exhibit R-2 (PE 0603871C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
• 28800	System Engineering: Continue JPO level system engineering and integration activities. Assess and refine user CRD, ORD, and CONOPs. Continue requirement refinement for NMD SRD. Support DAB review. The System Engineering Team will continue to provide comprehensive support for major NMD program milestones, NMD system requirements and design reviews, internal and external interface development/implementation cost assessment support, elevation of deployment readiness, and system deployment. Continue mitigation of system risk and implementation of CAIV and other initiatives to facilitate system affordability. Develop and update Initial Block and Block 1 Increment 1 NMD System CARD and develop Long Term capability annex against technical requirements. Conduct System CDR and C2 SRR. Update the NMD STAR. Develop/update detailed threat "design-to" and "analyze-to" parameters and scenarios. Conduct C2Sim exercise and tabletops. Continue integration with the SBIRS Program Office to ensure satisfaction of NMD system requirements. Perform nuclear environment calculations/requirements verification. Conduct data fusion/system discrimination development. Coordinate system VV&A and maintain IV&V capability to perform system VV&A.	
• 45700	Deployment & Sustainment: Implement the acquisition logistics strategy and analysis process which enables the Government to properly assess the Prime Contractor's acquisition logistics program. Continue development of the initial NMD System sustainment program planning to include maintenance and supply support for the C1 Expanded architecture. Complete XBR and GBI facility designs. Issue Request for Proposal (RFP) for Construction contracts for XBR and GBI. Complete site-specific designs of IDT. Begin design of non-tactical facilities at GBI site. Continue ESH documentation. Complete element RAM and supportability testability data and issue analysis reports. Provide Human System Integration (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. Develop and issue System Producibility and Manufacturing (P&M) Plans updated for C1 expanded architecture. Implement the baseline approach to meeting TTEC requirements. Ensure MPT is on track and ready for IC. If so directed, activate and staff the SAC and oversee the site preparation for the missile field at Ft. Greely.	
• 115100	System Test and Evaluation: Support IGT-6. Update TEMP with support of the NMD System T&E IPT. Complete program documentation, pre-mission flight for IFT-6, pre-launch preparations and oversee execution of IFT-6. Evaluate post-test results. Oversee RRFs. Conduct pre and post-mission work. Complete VV&A of IFT-8 target. Continue 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 launch for IFT-6 from VAFB. Oversee BV Flight Test 2. Provide ground facility infrastructure and upgrades for NMD testing including: aerothermal testing at Tunnel 9, lethality testing at the Arnold Experimentation and Development Center (AEDC) Range G, and Infra-Red (IR) sensor testing at the 7V/10V Chamber at AEDC and Portable Optical Sensor Tester (POST).	
• 134207	Management and Operational Support: Continue providing management and support for overhead/indirect fixed costs.	
Total	1853527	

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)	950248	1740238		
Adjustments to Appropriated Value				
Appropriated Value				
a. Congressional General Reductions		-21361		
b. STTR				
c. Internal Reprogramming	-5326			
d. Omnibus or Other Above Threshold Reductions				
e. Congressional Add		135000		
f. Adjustments to Budget Years Since FY 2001 PB		-350		
Current Budget Submit (FY 2002 PB)	944922	1853527		

Change Summary Explanation:

This program has been restructured and transitioned to Program Element 0603882C starting in FY 2002.

Funding: FY 2000 – BMDO Internal Reprogramming.

FY 2001 – Congressional Add and Congressional reductions (\$-13098 General Reduction, \$-4188 Section 8186, and \$-4075 Section 1403).

Schedule: IFT-3 moved from 3Q FY 1999 to 1Q FY 2000

IFT-4 moved from 4Q FY 1999 to 2Q FY 2000

IFT-5 moved from 3Q FY 2000 to 4Q FY 2000

IFT-6 moved from 4Q FY 2001 to 3Q FY 2001

C. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
PE 0603871C NMD MILCON Design	16000	14500								
PE0603871C NMD MINOR MILCON		2000								
PE 0603871C NMD MILCON Construction		84880								
PE 0208871C NMD Procurement		73845								

D. Acquisition Strategy: The NMD program is adopting an evolutionary acquisition strategy using a capability based program process. This involves transitioning the program to a more robust development and test program with the capability for a threat based block upgrade development that can deliver specific levels of system performance. To accomplish this, the program will adopt a spiral development methodology in the development of the NMD system. This methodology has been selected in recognition of the rapidly changing technology environment and the need to satisfy Government requirements that are defined in general terms within an evolving technology base. This process will (1) allow early implementation of a capability while supporting an evolving requirement/threat definition process, (2) minimize the risks of obsolescence posed by the rapid pace of technology development, (3) provide opportunities to update a system to a changing set of standards, and (4) allow informed

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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trades between cost, schedule, and performance while exploring operational possibilities. The development program is structured with several new initiatives to address some of the issues raised prior, and subsequent to the DRR. These include (1) initiating a countermeasures mitigation program and developing capabilities to resolve issues with likely countermeasures, (2) adding test infrastructure and improving test management to allow more operationally challenging representative flight tests and providing for more testing against more challenging targets, and (3) increasing the fidelity of the system simulations. The program's spiral development acquisition approach calls for continuous architecture development through incremental block upgrades that support update cycles of approximately four years for system hardware and two years for software.

E. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
<u>Engineering Milestones</u>								
a. NMD DRR	3Q							
b. GBI CDR	4Q							
c. BM/C3 IFICS H/W CDR	4Q							
d. Site Environmental Impact Study Complete	4Q							
e. Site Design Complete	3Q							
<u>Test and Evaluation Milestones</u>								
f. C2Sim 99	1Q							
g. C2Sim 00		1Q						
h. IFT-3	1Q							
i. IFT-4	2Q							
j. IFT-5	4Q							
k. IFT-6		3Q						
l. IGT-5	1Q							
m. IGT-6		3Q						
n. BV-1 Pathfinder		3Q						
o. BV-2		4Q						
p. BM/C3 Build Increment 1	2Q							
q. BM/C3 Build Increment 2		2Q						
r. RRF-11		2Q						
<u>Contract Milestones</u>								
s. GBR-P Contract Transition	4Q							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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* This project this program has been restructured and transitioned to Program Element 060xxxxC starting in FY 2002.

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Prime Contractor												
	CPAF	Boeing*	1853139	1439920	N/A							
GBI												
	CPFF	Raytheon	277490		N/A							
	CPFF	Boeing	292994	200	N/A							
	CPIF	Lockheed	239144		N/A							
	TM	NRC	16926	6910	N/A							
	CPFF	Sparta	8765	1989	N/A							
	TM	Mevatec	9264	7128	N/A							
	CPFF	SY TECH	6448	424	N/A							
	TM	TBE	22945	3299	N/A							
	CPFF	Stone Engineer	4398	1726	N/A							
	CPFF	Tybrin	100		N/A							
	CPFF	COLSA	5	5	N/A							
	CPFF	Various	214	0	N/A							
	MITRE	Eng/Tech Spt	240	243	N/A							
	MIPR	OGA'S	33932	1866	N/A							
	N/A	GBI IOB	0	6363	N/A							
	N/A	Misc Contracts	20344	347	N/A							
BM/C3												
	N/A	NWSC	10344	1900	N/A							
	CPAF	TRW	16612	4090	N/A							
	FFRDC	MITRE Corp.	11790	1610	N/A							
	BPA (ITSP)	Sencom (ITSP)	7114	532	N/A							
	CPFF	Sparta	8857	3840	N/A							
	TM	NRC	6310	1700	N/A							
	MIPR	GFE	1288	1800	N/A							
	N/A	Misc Contracts	7639	1086	N/A							
	CPAF	CST-HSV	798	520	N/A							
	MIPR	QRI-HSV	942	962	N/A							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)

DATE
June 2001

BUDGET ACTIVITY

4 - Demonstration and Validation

PE NUMBER AND TITLE

0603871C NMD

	CPAF	CSC-HSV	174	984	N/A							
	MIPR	AMCOM	1313	380	N/A							
	MIPR	USASMDC	2717	680	N/A							
	CPFF	GBS	650	30	N/A							
	CPFF	COLSA		65	N/A							
	CPAF	Vanguard Res.	1180	236	N/A							
	BPA	TECOLOTE	290	170	N/A							
	MIPR	USAF ESC		65	N/A							
	MIPR	ARL	1000	250	N/A							
XBR												
	CPFF	Raytheon	164361		N/A							
	CPAF	TBE	13747	3100	N/A							
	CPAF	COLSA	17311	1351	N/A							
	CPAF	NRC	7264	1580	N/A							
	MIPR	MIT LLNL	13750	1630	N/A							
	TM	Ga Tech	3641	1903	N/A							
	TM	Mevatec	3002	5000	N/A							
	N/A	Misc OGA/IOB	15081	6525	N/A							
	N/A	Other Spt	5736	1711	N/A							
UEWR												
	PR	MITRE Corp.	16530	4231	N/A							
	BPA (ITSP)	SENCOM	6288	2751	N/A							
	BPA (ITSP)	TECOLOTE	1481	0	N/A							
	MIPR	GSA (FEDSIM (STA))	497	0	N/A							
	BPA (ITSP)	STA	156	0	N/A							
	CPR/PR	MIT LLNL	2284	350	N/A							
	CPAF/MIPR	TRW @ JNTF	833	600	N/A							
	MIPR	GSA (PRC)	900	0	N/A							
	MIPR	GSA (AFRL)	200	140	N/A							
	N/A	Misc Contracts	4867	778	N/A							
	MIPR	GSA (Xontech)	0	400	N/A							
	TBD	IV&V	0	450	N/A							
SENSOR TECHNOLOGY												
	N/A	Cubic	365		N/A							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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	CPAF	Ball	50		N/A							
	CPFF	Raytheon	1309	262	N/A							
	N/A	Phillips	1687		N/A							
	MIPR	AFRL	6483	1736	N/A							
	CPFF	TRW	116		N/A							
	CPAF	Dynacs	317	63	N/A							
	CPFF	Swales	977	195	N/A							
	CPAF	Ball	3654	731	N/A							
	CPAF	Ball	255	51	N/A							
	CPFF	Raytheon	3964	793	N/A							
	CPAF	Rockwell	4320	864	N/A							
	N/A	USASMDC	4618	924	N/A							
	CPFF	NRC	220	44	N/A							
	N/A	MRC	1186	237	N/A							
	MIPR	SPAWAR	410		N/A							
	N/A	TBE	95		N/A							
	N/A	ADI	400		N/A							
	N/A	Raytheon	280		N/A							
	Subtotal Product Development:		3174872	1529320								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING												
	CPFF	BMD/CSC	107438	15500	N/A							
	N/A	SMDC	7574		N/A							
	N/A	JNTF	18188	1110	N/A							
	N/A	DTRA	6415	1520	N/A							
	N/A	USAF/SMC/SBIRS	4640	4800	N/A							
	N/A	NSWC	5817	2800	N/A							
	N/A	Threat and CM	3797	0	N/A							
	MIPR	MIT LLNL	8200	3000	N/A							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)							DATE	
BUDGET ACTIVITY							June 2001	
4 - Demonstration and Validation				PE NUMBER AND TITLE			PROJECT	
				0603871C NMD			2400	
	MIPR	Misc/POET	1567	70	N/A			
DEPLOYMENT & SUSTAINMENT PLANNING (R&D)								
	MIPR	NIST	7263		N/A			
	N/A	USAF/SMC	21215		N/A			
	CPFF	CSC	22430	12405	N/A			
	CPFF	TBD	2610		N/A			
	TBD	Mis Contracts	11112					
	CPFF	Nichols		4937	N/A			
	CPFF	COLSA		20	N/A			
	CPFF	MEVATEC		1310	N/A			
	MIPR	AMCOM		4434	N/A			
	MIPR	USAC	3292	9657	N/A			
	MIPR	USA War College		1384	N/A			
	MIPR	USASMDC	4000	3192	N/A			
	MIPR	Schreiver AFB	0	500	N/A			
	MIPR	HQ AFCEE		1062	N/A			
	MIPR	DOD Joint Spectrum C.		412	N/A			
	MIPR	Hill AFB		200	N/A			
	MIPR	NSA		400	N/A			
	MIPR	USACECOM		50	N/A			
	MIPR	ARSPACE		783	N/A			
	MIPR	Alaskan Air Comm.		454	N/A			
	MIPR	611 th ASG/FMA		4500	N/A			
MANAGEMENT AND OPERATIONAL SUPPORT								
	CPAF/CPFF	CSC	142725	40224	N/A			
	N/A	SFAE-MD/NMD ANAL	88580	4768	N/A			
	N/A	GOVT PERS	14100	6000	N/A			
	N/A	Misc RES.	9331		N/A			
	N/A	USSPACECOM	4946		N/A			
	N/A	TSM (SMDC)	11774	12400	N/A			

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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	N/A	Operational accounts	165760	43207	N/A							
	N/A	GOVT PERS (HSV)	5710	21608	N/A							
	TBD	CS Radar	0	6000	N/A							
DISCRIMINATION												
	CPFF via NRL	PRA	18332	0	N/A							
SYSTEM ARCH AND ENGINEERING												
	N/A	Misc Contracts	13269									
THREAT AND COUNTERMEASURE												
	N/A	Misc Contracts	4194	0	N/A							
Subtotal Support Costs:			714279	208707								

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
TEST AND EVALUATION												
	CPAF/TM	TBE	44912	0	N/A							
	CPFF	COLSA	49883	6016	N/A							
	N/A	Dynetics		486	N/A							
	CPFF	Boeing	10000	841	N/A							
	CPFF	Raytheon	7400	0	N/A							
	CPAF	TRW	246	0	N/A							
	CPFF	Raytheon	2900	0	N/A							
	CPAF	SAIC	2331	0	N/A							
	CPAF	Nichols	5126	1954	N/A							
	MIPR	USAKA	36839	8713	N/A							
	FFRDC/MIPR	Sandia	4147	47	N/A							
	OGA/MIPR	USASMDC	4383	841	N/A							
	OGA/MIPR	JNTF	1999	308	N/A							
	OGA/MIPR	NRL	1971	0	N/A							
	N/A	Misc Contracts	71851	0	N/A							
	MIPR	VAFB	2208	785	N/A							
	TM	MEVATEC	5396	3823	N/A							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)						DATE	
4 - Demonstration and Validation						June 2001	
BUDGET ACTIVITY				PE NUMBER AND TITLE		PROJECT	
4 - Demonstration and Validation				0603871C NMD		2400	
MIPR	Space&Msl Cmd	327	0	N/A			
CPFF	Lockheed MMS	3020	0	N/A			
CPFF	CAS	748	1358	N/A			
CPFF	SY TECH	965	280	N/A			
OGA/MIPR	SBIRS SPO	2831	202	N/A			
MIPR	AMCOM	2914	831	N/A			
MIPR	USARSPACE	1020	420	N/A			
MIPR	Eglin AFB	1922	1214	N/A			
N/A	SATCOM	960	402	N/A			
OGA/MIPR	OGAs	2868	19	N/A			
N/A	RTTC		428	N/A			
N/A	VRC	3320	2083	N/A			
N/A	EAC	500	327	N/A			
N/A	TEXCOM	780	364	N/A			
N/A	HRED	240	336	N/A			
N/A	SLAD	870	224	N/A			
N/A	CEI	3000	1690	N/A			
N/A	COLSA	680	243	N/A			
N/A	TRW	3540	1690	N/A			
N/A	Various OGA'S	1516	196	N/A			
N/A	SAIC	1324	749	N/A			
N/A	MIT LLNL	4480	2279	N/A			
N/A	ITT	1659	872	N/A			
N/A	AEDC	3675	518	N/A			
N/A	SANDIA	5935	2900	N/A			
N/A	MEVATEC	135	70	N/A			
N/A	TBE	876	879	N/A			
N/A	SMDC	123	87	N/A			
N/A	Nichols	10		N/A			
NMD TARGETS							
FFRDC/MIPR	Sandia	97702	40828	N/A			
OGA/MIPR	USASMDC	11824	5110	N/A			
OGA/MIPR	SMC	68910		N/A			

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C NMD	PROJECT 2400
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	OGA/MIPR	SY TECH		2083	N/A							
	MIPR	MIT LLNL		2335	N/A							
	N/A	USASMDC	1454	5291	N/A							
	N/A	Various OGA'S	3675	14978	N/A							
MODELLING AND SIMULATION												
	N/A	USASMDC	3890		N/A							
TEST RESOURCES												
	N/A	Misc Contracts	15474		N/A							
Subtotal Test and Evaluation:			504759	115100								

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.				0		0		0				
Subtotal Management Services:												

Remark:

Project Total Cost:			4393910	1853527								
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	145499	225944								
3153 Systems Architecture and Engineering	0	4615								
3155 Systems Engineering and Integration	60700	47789								
3261 TMD BM/C3I (BM/C3I Concepts)	47593	0								
3265 Joint TMD Warfighter Support	0	11492								
3352 Modeling & Simulation	0	25133								
3354 Targets	5886	0								
3359 Test, Evaluation and Assessment	22252	64827								
4000 Operational Support	9068	72088								

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603880C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

A. Mission Description and Budget Item Justification

In FY00 the Theater Missile Defense (TMD) program's goal was to develop, maintain and deploy a cost-effective, Anti-Ballistic Missile (ABM) Treaty compliant interoperable system designed to protect deployed forces and areas of operations against the immediate and growing threat from shorter range theater ballistic missiles. The TMD core programs are PATRIOT Advanced Capability (PAC-3), Theater High Altitude Area Defense (THAAD) System, Navy Area Theater Ballistic Missile Defense (TBMD) (formerly Lower Tier), and Navy Theater-Wide TBMD (formally Upper Tier).

Family of Systems Engineering and Interoperability (FoS E&I) sought to link the TMD core programs so that they fight as one system and obtain a force multiplier advantage. The projects in the Program Element built FoS interoperability by conducting assessments of joint interoperability to identify weaknesses, defining architectural/engineering

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY

4 - Demonstration and Validation

PE NUMBER AND TITLE

0603873C Family of Systems E & I

solutions to correct the weaknesses, integrating solutions, and testing the FoS fixes. The FoS interoperability effort was focused on near term Joint Data Network interoperability. However, a continuing R&D investment in Joint Composite Tracking Network was maintained to achieve a future single integrated air picture.

This PE continued to provide the resources for BMDO's CINC's assessments and FoS Assessment Program along with the Modeling and Simulations tools necessary to support engineering validation.

In FY01 this Program Element transitions, within the constraints of the POM, to reflect BMDO's reorganization and mission execution improvements that capitalize on economy of force and optimization of resources allowing more efficient management of activities. The projects have been realigned within the PE to reflect their new functional tasks and funding levels. This PE funds the BMD architecture and engineering efforts needed to provide a seamless integrated Global Air and Missile Defense capability, which will meet the current and evolving threats of the 21st century. These efforts include: providing an interface with the warfighting community in order to identify their requirements to defend against the threat; to develop architectures to defeat the threat; and to assess and ensure systems integration interoperability; and to provide capabilities and expertise in the modeling and simulation, and test and evaluation fields.

<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)	145657	231248		
Congressional Adjustments		0		
Appropriated Value		231248		
Adjustments to Appropriated Value		-3304		
a. Congressional Reductions (FFRDC, Inflation, etc)				
b. SIAP Reprogramming		-1500		
c. Emergency Supplemental				
d. Below Threshold				
e. Rescissions		-500		
Adjustments to Budget Years Since <u>FY 2001 PB</u>	-158	-5304		
Current Budget Submit (FY 2002 PB)	145499	225944		

Change Summary Explanation:

Starting in FY 01, all Family of Systems efforts from the Joint Theater Missile Defense program element (060387C2) will transfer to this program element to maintain adequate visibility into Theater Missile Defense efforts. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603880C.

C. Acquisition Strategy: See Individual R2a summaries.

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3153	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3153 Systems Architecture and Engineering	0	4615								
A. <u>Mission Description and Budget Item Justification</u>										
<p>Beginning in FY 01, Project 3153 funds activities associated with the BMDO Chief Architect. Tasks within this project had funded the Deputy, Theater Air and Missile Defense (BMDO/AQ) activities prior to FY 01. The purpose of this project is to provide analysis and support for the development of a joint Theater Air and Missile Defense (TAMD) architecture. Joint Theater Air and Missile Defense (JTAMD) is the integrated capability to detect, classify, intercept, and destroy or negate the effectiveness of enemy aircraft and missiles prior to launch or while in flight, to protect U.S. and coalition forces, selected assets, and population centers within an assigned theater of operations. The TAMD architecture will focus on the integration of theater ballistic missile defense, cruise missile defense, air defense, and attack operations. This program provides funds to support the BMDO role in the Joint Theater Air and Missile Defense (JTAMD) process in the development of the TAMD Master Plan and assessment of associated system architectures and integration. In addition, the Chief Architect conducts quick reaction studies in response to immediate senior decision maker requests and decision support studies for resource allocation and long term planning. This program also supports international studies that explore Coalition interoperability concepts, architectures, and engineering requirements with major allies and coalition partners.</p>										
FY 2000 Accomplishments:										
<ul style="list-style-type: none"> • In FY 00 funding for this project was in Project 3155 (Family of Systems Program Element (0603873C)) 										
Total	0									
FY 2001 Planned Program:										
<ul style="list-style-type: none"> • 1273 Quick Reaction Analysis. Provide analysis to answer architectural questions raised by Senior DoD officials. Provide analysis support for the Summer Issues activities. • 885 International Studies. Continue the US Joint Battle Management Architecture analysis using Extended Air Defense Testbed (EADTB). Continue major studies with NATO and Germany that focus on architectural considerations for developing US/NATO and US/Germany cooperative TMD architectures. Conduct NATO Feasibility Study and Israeli Architecture Study. Begin US/Turkey BMD Architecture Initiative. • 2457 JTAMD Integration. Continue to refine JTAMD systems architecture, which fully incorporates Theater Ballistic Missile Defense, Cruise Missile Defense, and Attack Operations throughout the theater area of operations. Further refine acquisition and investment strategies for TAMD architectures. 										
Total	4615									
Project 3153			Page 3 of 37 Pages				Exhibit R-2A (PE 0603873C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3153
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B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
3153, Sys Arch & Engineering, PE 0603874C	15569	4416								
3153, Sys Arch & Engineering, PE 0603877C										

C. Acquisition Strategy: The Theater Air and Missile Defense (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 and CMD/TBMD capability. The Systems Architecture development process 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 the Joint Theater Air and Missile Defense Organization (JTAMDO). Scientific Engineering and Technical Assistance (SETA) and analysis work in this project is contracted . Funding is provided for Service support to the JTAMD process.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
TAMD Master Plan 00		1Q						
TAMD Master Plan 01 (draft)		4Q						
US/Turkey BMD Architecture Initiative – NC3A Meeting and Brief		4Q						
Joint Acquisition Roadmap (JAR) update		1-3Q						
Joint US/Israel BMD Architecture Study IPR		2,3Q						
US/German Study IPR		1,2Q						
US/NATO TMD BMC3 Analysis CY 00 Final Review		2Q						
US/NATO TMD BMC3 Analysis IPR		3Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3153		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001 Cost</u>	<u>FY 2001 Award Date</u>	<u>FY 2002 Cost</u>	<u>FY 2002 Award Date</u>	<u>FY 2003 Cost</u>	<u>FY 2003 Award Date</u>	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	<u>FY 2001 Cost</u>	<u>FY 2001 Award Date</u>	<u>FY 2002 Cost</u>	<u>FY 2002 Award Date</u>	<u>FY 2003 Cost</u>	<u>FY 2003 Award Date</u>	Cost To Complete	Total Cost	Target Value of Contract
a. Army Analysis Support	Suballocation	DAMO / FDE		246	1Q01							
b. Navy Analysis Support	Suballocation	PMS / 456		1130	1Q01							
c. Air Force Analysis Support	Suballocation	SAF / AQPT		246	1Q01							
d. Marine Corps Analysis Support	Suballocation	MARCORSYSCOM		98	1Q01							
e. JNTF Website Support	Suballocation	JNTF		98	1Q01							
f. WEP Team	CPFF	Vanguard / VA		49	1Q01							
Subtotal Support Costs:				1867								
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001 Cost</u>	<u>FY 2001 Award Date</u>	<u>FY 2002 Cost</u>	<u>FY 2002 Award Date</u>	<u>FY 2003 Cost</u>	<u>FY 2003 Award Date</u>	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Test and Evaluation:												
Remark:												

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3153
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TAMD Integration Analysis	CPAF	SPARTA (various) / VA		2748	1Q01							
Subtotal Management Services:				2748								

Remark:

Project Total Cost:				4615								
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Remark:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3155	
<i>COST (In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3155 Systems Engineering and Integration	60700	47789								
A. <u>Mission Description and Budget Item Justification:</u>										
<p>This project is part of a Program Element (PE) currently in a transition phase after BMDO's reorganization. BMDO has realigned its Systems Engineering functional tasks, which had previously been accomplished as a part of a number of projects under this PE and consolidated them under this project (3155).</p> <p>The Systems Engineer is responsible for producing the BMD Functional Baseline (Systems Architecture Allocated Functional Requirements Document (SAAFRD)), which ensures the technical viability, integrity, and interoperability of the BMD program, to include TAMD, NMD and cruise missile options. Working in conjunction with the Chief Architect, Systems Engineering provides the core engineering capability to assess operational requirements and translates them into system requirements that are allocated to: legacy systems, modifications of legacy systems, and/or new system concepts necessary to meet user needs. This includes the development and allocation of systems requirements necessary to ensure that the Major Defense Acquisition Program (MDAP) systems are fully interoperable and provide maximum flexibility to the warfighter. Battle Management Command, Control, Communication (BM/C3) Systems Engineering provides the warfighter with timely, early warning information through development of a theater missile defense architecture that fosters interoperability and system integration. These activities also develop data standards, conduct studies and analyses, and formulate and implement policy and procedures to ensure that DoD and BMD interoperability requirements support the Services, allied and coalition partners. Working closely with the intelligence community, Systems Engineering establishes and maintains the design-to-threat requirements, funded via PE 0603876C, to ensure consistent threat parameters across the MDAPs.</p> <p>To ensure the technical viability of BMDO programs, Systems Engineering conducts continuous assessments of systems development to assess progress, determine capability, and identify and mitigate risks, including risks incurred due to the evolving threat environment. Mitigation activities include the generation of technology requirements and identification of opportunities for technology insertion. Systems Engineering maintains an ongoing Corporate Lethality Program to characterize the effectiveness of the BMD architecture, understand post-intercept effects, establish methodologies to allow warhead typing based on impact response, and provide a common end-to-end lethality assessment capability across the MDAPs. Working in conjunction with the test and evaluation community, Systems Engineering develops test requirements and conducts post test analyses to ensure the MDAP systems meet requirements and satisfy warfighter needs. Finally, Systems Engineering executes the BMDO Configuration Control Process and maintains configuration control of TMD and NMD architecture baselines.</p> <p>Systems Engineering is executed in a collaborative environment. BMDO maintains a close working relationship with the MDAP Program Managers, PEOs and the PEO Systems Engineers, and the BM/C3 Community. Additionally, BMDO continues to work with the Military Services, U.S. Space Command, U.S. Joint Organization to ensure full integration of other systems, sensors, and command and control centers that contribute to BMD.</p>										
FY 2000 Accomplishments:										
Project 3155										

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3155
• 10192	Single Integrated Air Platform (SIAP) – Continued SIAP definition analysis, addressed how the union of Joint Data Network (JDN) and Joint Composite Tracking Network (JCTN) met SIAP requirements. Established JCTN benchmarking to identify best data fusion and composite tracking algorithm for SIAP. Continued efforts to migrate Cooperative Engagement Capability (CEC) to a Joint CEC/JCTN. Began acquisition activities for JCTN program planning and CEC cost reduction activities. Began JCTN/JDN gateway prototype efforts with JLENS office.	
• 14741	Theater Air & Missile Defense (TAMD) Integration – Continued to refine JTAMD systems architecture, which fully incorporated Theater Ballistic Missile Defense, Cruise Missile Defense, Attack Operations and Passive Defense. Further refined acquisition and investment strategies for JTAMD architecture.	
• 6881	Modeling and Simulation Development - Continued to develop TAMD System Specific Representations and advanced modeling and simulation capabilities to support TAMD requirements.	
• 1831	System Effectiveness – Continued to refine analysis of the effectiveness of JTAMD architecture to include end-game analysis, lethality analysis and support the planning of demonstration events.	
• 16900	TMD Systems Engineering – 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; development of specifications and program documentation for JDN fixes and enhancements; engineering and technical support for international programs and BM/C3 efforts; conducted Extended Air Defense Test Bed (EADTB) distributed analyses and operations; developed and maintained technical and programmatic databases; and prepared technical reports, briefings, and programmatic documentation.	
• 1080	Test Planning and Support – Supported development of TMD inter-service test planning documentation. Conducted TMD Consolidated Evaluation Plan / Integrated Test Plan review. Produced final draft of TMD Capstone TEMP. Developed JDN test plan working draft. Coordinated and participated in Joint Test Planning Teams and Test and Evaluation IPTs.	
• 9075	BMD Impact Analysis and Engineering – Delivered short notice engineering and analytical recommendations and proposed solutions associated with broad ballistic missile defense issues. Provided congressional, OSD, and BMDO leadership with a range of options for dealing with threat, architectural and system elements influencing the design and composition of US ballistic missile defenses. Included resources to foster improvements in BMD command and control leading towards a coordinated engagement capability and single integrated air picture.	
Total	60700	

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603873C Family of Systems E & I	3155
FY 2001 Planned Program:		
• 26237	General Engineering - Initiate development of the BMD Functional Baseline (SAAFRD). Conduct system engineering assessments of BMD programs to identify performance/cost/schedule issues within these programs and assess potential solutions. Develop and implement the BMD Corporate risk management process. Develop and track Technical Performance Measures for the BMD System Architecture. Baseline the items for Configuration Control of the BMD Systems Architecture. Assemble and prioritize technology needs (including manufacturing technologies) for input to the BMDO S&T program. Lead migration of BMD systems and architectures toward Open Systems implementations. Perform cost benefit analysis of alternatives for BMDO MDAP high cost items and cost drivers. Perform independent technical and engineering assessments of BMD system architectures including trade-off studies using Federally Funded Research and Development Centers (FFRDC)/National Laboratories/University Affiliated Research Centers resources.	
• 10482	BM/C3 – Initiate development of a TBMD BMC3 System Requirements Document (SRD) to support the overarching Systems Architecture Allocated Functional Requirements Document (SAAFRD) document; develop a Family of Systems (FoS) Integrated System Specification (ISS) to baseline current TBMD performance capabilities; develop an FoS System Performance Specification (SPS) focused on meeting near-term BMC3 interoperability requirements. Develop TBMD Link-16 and Global Command and Control System (GCCS) interoperability enhancements (e.g. Coalition/Ally tactical TBM message exchanges, Joint Range Extension, and integration of joint service force planners such as the Joint Defensive Planner). Develop and maintain a list of BM/C4I risks; monitor and assess BM/C4I CARDS; develop TMD Interface Exchange Requirements (IER); develop a TMD/NMD Interoperability Program Plan and Interoperability Roadmap; and define interoperability test and tool requirements. Conduct interoperability studies and experiments; Missile Defense Interoperability Plan; BMDO annual interoperability and capability report, allied/coalition BM/C3 Analysis (NATO, UK, Israel, etc.); Interoperability Analysis of Service's Joint Planning Network, Joint Data Network and Joint Composite Tracking Network. Provide support to the Ballistic Missile Defense System Architecture Study (BMDSAS) with regard to C4ISR, and DUSD C3I efforts; support Joint Mission Area Analysis (JMAA) and development of Ballistic Missile Information Architecture. Support JTA Compliance and Missile Defense (MD) Annex development, Migration Plans and waivers as required; Data Element Dictionary (DED) for MD; development of BMDO Technical Architecture, and BMDO C4ISR Support Plans.	
• 4782	Impact 98 - This task is a continuation of the Theater Air & Missile Defense Initiative (TAMDI) ACTD, which began in FY98 and continues through FY03. Impact 98 addresses the value added of the PAC-3/THAAD/CEC/AEGIS composite track, associated identification process and the Engage-On-Remote kill assessment to a common air picture. Efforts concentrate on the interoperability between land and sea based Theater Missile Defenses' BMC3 system platforms.	
• 6288	Support the BMDO administration effort; monies to be expended on SMDC salaries.	
Total	47789	
Project 3155		
Page 9 of 37 Pages		
Exhibit R-2A (PE 0603873C)		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3155
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
3155 SYS ENG & INTEGRATION, PE 0208864C		3938								
3155 SYS ENG & INTEGRATION, PE 0603877C										
3155 SYS ENG & INTEGRATION, PE 0603872C	47144									
3155 SYS ENG & INTEGRATION, PE 0603874C		23574								
3155 SYS ENG & INTEGRATION, PE 0603876C		9692								

C. Acquisition Strategy: The 3155 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy Systems Engineering performance requirements. A portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Identify BMC4I Risks		1Q						
Develop./Maintain Risk Mitigation Plans		1Q						
Develop/Maintain Software Engineering		1Q 4Q						
Revise BMDO Dir. 3405		2Q						
Coordinate BMDO Software Policy		3Q						
Develop/Revise MD Interop. Plan		1Q						
Develop/Revise Security Architecture		1Q						
Publish BMC4I Analysis Results		4Q						
Publish NATO BMC4 Analysis Final Report		4Q						
Publish US/GE Analysis Final Report		4Q						
Develop MD Technology Roadmap		1Q						
Standards Compliance Lessons Learned Data Base		3Q						
Publish JTA Annual Report		4Q						
Develop Processes JTA MD Subdomain		4Q						
Investigate Joint Tactical Radio System (JTRS)		2Q						
Maintain Control Over Sys. Interf.		Quarterly						
BMC4I Standards Compliance		Quarterly						
Enforce BMDO JTA		Quarterly						

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUMBER AND TITLE 0603873C Family of Systems E & I				PROJECT 3155	
Direct Processes BMC4I Sensor System Engineering		Quarterly						
Final development/fielding of JDP V.2x into GCCS V4.0		3Q						
Final development/fielding of JDP V.2x into TBMCS V2.0		3Q						
TAMD-I ACTD		3Q						
TBMD Enhancements		1Q						
Develop TBMD BMC3 Systems Requirements Document (SRD)		3Q						
Integrated System Specification (ISS) Draft/Final		Quarterly						
System Performance Specification Draft/Final		Quarterly						
Joint Range Extension (JRE) Prototype Gateway Development	3Q							
Operational DEMO @ Roving Sands	3Q							
Develop JRE Interim Capability		1Q						
Assemble tech viable analysis team to audit technical health of each BMD program		1Q						
Complete initial BMD level TPM's		1Q						
Develop Security Architecture		1Q						
Collect TPM Data to validate selected measures, establish control thresholds		2Q						
Start operational vs system requirements synergies vs disconnect analysis		2Q						
Stand-up CCB and BMD Configuration Management process – Run DTT through the process		2Q						
Develop M&S and Test Tool Strategy		3Q						
Complete initial technical viability assessments for BMD program		3Q						
Establish Configuration Control or BMD Baselines to be Managed, Complete Analysis of 1 st Iteration of System Architecture Baseline		4Q						
Assess TPM Utility, Relate Requirements to M&S and T&E Activities		4Q						
Operational/System requirements integration		4Q						
JRE Application Protocol		4Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3155
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Complete expansion of SE World Class Engineering Process briefing into a training manual for new BMDO and contractor engineers			4Q						
Obtain Approval for Initial NMD/TBMD SAAFRS			4Q						
Complete initial integration of operational vs systems requirements			4Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3155
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Single Integrated Air Picture	Various	Multiple	13897								13897	
b. TAMD Integration	Various	Multiple	23838								23838	
c. Modeling & Simulation Development	Various	Multiple	11872								11872	
d. System Effectiveness	Various	Multiple	3131								3131	
e. TMD Systems Engineering	Various	Multiple	17770								17770	
f. Test Planning & Support	Various	Multiple	180								180	
g. BMD Impact Analysis & Engineering	Various	Multiple	9155								9155	
h. System Engineering	Various	POET, Multiple		9346							9346	
i. System Engineering & Integration (SE&I)	CPFF	TRW		9671							9671	
j. System Engineering	CPAF	Sparta, Arlington, VA		5979							5979	
k. System Engineering	CPFF	CSC, Arlington, VA		3505							3505	
l. System Engineering	CPFF	VRI, Arlington, VA		698							698	
m. ABL PB	Allotment	Services, Various		2444							2444	
n. TMDSE	Allotment	Services, Various		140							140	
o. BMD Functional Baseline & SAAFRS	Allotment	Services, Various		837							837	
p. TPM Development & Tracking	Allotment	Services, Various		280							280	
q. BMD Risk Management	Allotment	Services, Various		140							140	
r. Test Requirements	Allotment	Services, Various		280							280	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3155
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s. Configuration Baseline Tracking & Analysis	Allotment	Services, Various		697								697	
t. MDAP Baseline / TIM / ISS	Allotment	Services, Various		1047								1047	
u. JREAP & Interim Capability	Allotment	Services, Various		1047								1047	
v. JDP	Allotment	Services, Various		145								145	
w. BMC4I Standards Compliance	Allotment	Services, Various		463								463	
x. ACTD	Allotment	Services, Various		4782								4782	
Subtotal Product Development				79843	41501							121344	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Personnel Costs	Allotment	SMDC		6288							6288	
Subtotal Mgmt Services				6288							6288	

Remark:

Project Total Cost:			79843	47789							127632	
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3261	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3261 TMD BM/C3I (BM/C3I Concepts)	47593	0								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>The objective of this project was to provide the warfighter with Theater Air and Missile Defense (TAMD) Battle Management/Command, Control and Intelligence (BM/C3I) that is flexible, responsive, and interoperable. TAMD is based on a Family-of-Systems (FoS) concept where the Services' air and ballistic missile defense and command and control (C2) systems are integrated together using various existing and developing communications capabilities and systems. The resulting FoS provides the CINC with TAMD systems 'plug and fight' capability to address a wide variety of air and missile threats that can be tailored for the theater of operations.</p> <p>To achieve the objective of providing the warfighter with flexible, responsive, and interoperable BM/C3I for TAMD, the Ballistic Missile Defense Organization (BMDO) used this project to provide oversight, leadership, guidance, and support to the Services' TAMD BM/C3I programs. The focus was on Joint approaches to integrate and synergize the Services' programs to include: (1) early warning and dissemination of theater ballistic missile launch information, (2) communication, and (3) command and control upgrades. In concert with this successful approach, BMDO developed the TAMD BM/C3I Architecture to enable further interoperability improvements. By focusing project efforts on this architecture, the integration of individual activities was enhanced while continuing to support earlier objectives.</p> <p>The TAMD BM/C3I Architecture can be viewed as a set of FoS connectivities and common mission functions integrated via three networks: (1) the Joint Data Network (JDN): a near-real-time network based primarily on the Tactical Digital Information Link [TADIL-J / LINK-16] to provide overall FoS situational awareness, command and control, and weapon coordination; (2) The Joint Planning Network (JPN): a non-real-time/near-real-time network building upon the Global Command and Control System (GCCS) to support centralized planning and guidance. The JPN will complement the JDN by enabling consistent TAMD plan development and dissemination across command levels, Services, and the CINCs; (3) The Joint Composite Tracking Network (JCTN): a real-time network based on the Navy's Cooperative Engagement Capability (CEC) to directly link sensors and shooters within a theater to provide fire-quality information to maximize the effectiveness of multiple systems.</p> <p>To achieve the TAMD BM/C3I Architecture, project efforts addressed 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 was to ensure the integration of Service systems so that they are both affordable and jointly interoperable.</p> <p>Recent emphasis focused on the "FoS Interoperability" project. This project contained Link-16 fixes and enhanced Communication Information Management (CIM) efforts. These tasks contributed vertical and horizontal integration of the JPN, JDN and JCTN in support of joint and coalition TAMD operations, such as: Joint Range Extension (JRE), Time Slot Reallocation (TSR) and Joint Interface Control Officer (JICO) enhancements. The project further provided 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</p>										
Project 3261			Page 15 of 37 Pages				Exhibit R-2A (PE 0603873C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3261
<p>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.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 6252 BM/C3I Integration – Army: Air and Missile Defense Planning and Control System (AMDPCS) with JTAMD: Continued to integrate Common Tactical Picture and interface with TBMCS and COMPASS; began discussions with the Area Air Defense Commander (AADC) on future interface and software reuse per Chairman Joint Chiefs of Staff Memorandum and Memorandum of Agreement; hosted PATRIOT Defense Planner for first step in “plug and fight” capability; and integrated AMD common database; • 8300 BM/C3I Integration – Air Force: JDN Program Support identified System Engineering Authorities; participated in JDN conceptual design and development, provided current platform status in support of OPFAC baselining; supported System Engineering staff visits to OPFACs supported FY 02 POM Process; participated in planning meetings, reviews, ICWGs; and provided OPFAC baselining support; JDN Modeling and Simulation (M&S): Provided critical ongoing M&S support to joint working groups standardizing Link 16 (e.g., Joint Message Standards Working Group, Theater Missile Defense SubGroup, and Ad Hoc Time Slot Reallocation Working Group). TSR: Analyzed merger of NPG7 with NPG8 using ESC’s Link 16 modeling and simulation capability at Modeling & Analysis Simulation Center and investigated speed-of-service requirements for TSR receipt compliance messages without donated time slots. JCTN Benchmark Development: Provided Air Force support and expertise to JCTN Benchmark development, e.g., JCTN Benchmark code review and software testing and improved JCTN Benchmark functionality (e.g., improved coordinate conversion techniques). • 7522 BM/C3I Integration – Navy and United States Marine Corps. Continued JRE IPT support; continued efforts to finalize and implement JRE Application Protocol along with test and demonstration. Participated in the Joint Defensive Planner (JDP) User’s Group; delivered Navy Area System representation; continued delivery of MIDs and Common Operational Picture import functionality for JDP2.0; continued participation in JTAMD data standardization and development efforts; continued participation in JDP Technical Interchange Meetings (TIMs) relative to GCCS, TMBCS and AADC Capability. JDN Message Development Support: Supported the following events: 00-1 US/UK Bilateral, TMDSG 00-2, JMSWG 00-2, TADIL CCB 00-2, VMFSG 00-2, 22nd DLWG, 00-2 TISG-TADIL, VMFSG 00-3, TMDSG 00-3, and JMSWG 00-3. Time Slot Reallocation: Completed the Detailed Design Review; Consolidated Software Support Activity delivered NICP 4.03; and completed the Test Readiness Review (TRR). FoS JDN Program Support: Completed review/comments for BMDO Capstone FoS TEMP; completed review/comments for JDN Performance Specification (SPS) Analysis Plan; provided POM 02 budget input; completed OPFAC Baseline Configuration Surveys and site visits/TIMs of GCCS-M and ATDLs, continued the ACDS Configuration Survey; and continued the AEGIS Configuration Survey. Single Integrated Air Platform (SIAP) – Continued SIAP Analysis using MSCT. Engineered interfaces for multi-sensor input to MSCT and demonstrated SIAP development during ASCIET ’00; followed on data analysis near completion; delivered Outcome Report to BMDO; demonstrated Joint Composite Tracking Network functionality over Enhanced Position Location Reporting System communication using Tracking Composite Network technology. 		
Project 3261	Page 16 of 37 Pages	Exhibit R-2A (PE 0603873C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3261
• 2625	BM/C3I Integration- Joint/Combined: Supported joint testing for TAMD messages; developed theater forwarding rules for JDN message development; supported integration of multiple intel broadcasts into the integrated architecture based on common format and migration to unified joint DEDs; Athena participated in SIT '00 developed a draft interface change proposal for a joint method of geodetic alignment and sensor registration.	
• 5316	CEC Demonstration -IMPACT 98 – This Advanced Concept Technology Demonstration (ACTD) program provides data to extend the evaluation of enhanced warfighting capabilities and provides engineering data to enable an assessment of the potential for PATRIOT, THAAD, and CEC contributions in: increasing Theater Air and Missile Defense defended area, initiating a U.S. Army/U.S. Navy SIAP, and increasing contingency operation capability. FY 2000 efforts included: 1) Demonstrating the capability to engage a low altitude surrogate cruise missile with a PATRIOT PAC-3 missile at Over-The-Horizon ranges using AEGIS/CEC data. 2) Conducting a THAAD/CEC data collect and analysis and integration investigation.	
• 342	BM/C3I Integration – Joint National Test Facility: Developed Air taskings orders to support TAMD exercises; performed DII COE standards compliance validation on TAMD GCCS developed software; built out the BMC3 test center; documented testing for TAMD BMC3; provided exercise support for rapid prototype testing of TAMD BMC3 concepts.	
• 5113	FoS Interoperability - This task contributed to vertical and horizontal integration of the JPN, JDN and JCTN in support of joint and coalition TAMD operations, such as: JRE, TSR and JICO enhancements. The Army, Navy, Marine Corps, Air Force and Joint National Test Facility will provide support to Inter-Service integration, interoperability, identification and resolution of interface issues. Provide support to the JTAMD Process and its associated JTAMD Master Plan development, JTAMDO sponsored WIPTs, JTAMD Systems Architecture development, and the Systems Engineering and Integration (SE&I) process. Perform special studies as assigned and provide support to AQ Systems Interoperability and Integration (SI&I) efforts.	
• 12123	TMD Systems Engineering – Provide scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; development of specifications and program documentation for JDN fixes and enhancements; engineering and technical support for international programs and BM/C3 efforts; conduct EADTB distributed analyses and operations; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation.	
Total	47593	
FY 2001 Planned Program:		
•	0	
Total	0	

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3261
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B. <u>Other Program Funding Summary</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To <u>Compl</u>	Total <u>Cost</u>

C. Acquisition Strategy: The 3261 Project acquisition strategy leveraged 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 entailed systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.

D. <u>Schedule Profile</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Final development and fielding of JDP V 2.0 into GCCS V4.0	X							
Initial version of JDP V 3.0	X							
Coordinate documentation, issues, suggested correction, and resolution plans concerning the JTAMDO/BMDO Family of Systems Architecture	X							
Install Area Limitation prototype at the CUBE or JNTF	X							
Support and incorporate WIPT analysis as results into the FoS management plan	X							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3261
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TMDSE - JNTF	Allotment	Multiple	12203									
b. Army PEO-AMD	Allotment	Multiple	12665									
c. Air Force ESC	Allotment	Multiple	16305									
d. USMC Sys Com	Allotment	Multiple	6378									
e. Navy PEO-TAD	Allotment	Multiple	12016									
f. BMDO	Allotment	Multiple	3744									
g. CEC/Impact '98	Allotment	Multiple	6719									
h. JNTF	Allotment	Multiple	1363									
i. FoS Interoperability	Allotment	Multiple	9529									
Subtotal Product Development:			80922									

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army PEO-AMD	Allotment	Multiple	989									
b. Air Force ESC	Allotment	Multiple	898									
c. USMC Sys Com	Allotment	Multiple	296									
d. Navy PEO-TAD	Allotment	Multiple	989									
e. BMDO	Allotment	Multiple	750									
f. JNTF	Allotment	Multiple	494									
Subtotal Support Costs:			4416									

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3261
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Subtotal Test and Evaluation:												
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Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation:												

Remark:

Project Total Cost:			85338									
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I				PROJECT 3265		
<i>COST (In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3265 Joint TMD Warfighter Support	0	11492								
A. <u>Mission Description and Budget Item Justification</u>										
<p><u>CINCs Experiments:</u> This effort funds BMDO's Commanders In Chiefs (CINCs') Assessment Program. This program uses experiments, technology demonstrations, and theater-level exercises to help ensure the joint interoperability and successful fielding of Theater Air and Missile Defense (TAMD) Family of Systems (FoS) to the warfighting customers. In addition, it supports the development of joint interoperability TAMD doctrine, Concepts of Operations (CONOPS), and Tactics, Techniques, and procedures (TTPs); and provides Joint/Coalition/Allied TAMD interoperability data..</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 0 See Project 3359 (PE 0603872C and PE 0603873C) for related activities. <p>Total 0</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 2140 Support CINC USJFCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs • 2931 Support CINC USFK by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs • 2140 Support CINC USPACOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs • 2233 Support CINC USEUCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs • 2048 Support CINC USCENTCOM by adding TAMD overlays to selected exercises, collecting data, analyzing results, and developing CONOPS &TTPs <p>Total 11492</p>										
B. <u>Other Program Funding Summary</u>										
	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
3359, Test, Eval & Assessment, PE 0603872C	19915								TBD	TBD
3359, Test, Eval & Assessment, PE 0603873C	22252	68627							TBD	TBD
<p>Project 3265 Page 21 of 37 Pages Exhibit R-2A (PE 0603873C)</p>										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3265
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C. Acquisition Strategy: The CINC Experiments program is managed and executed through the use of weekly task plans, monthly progress and expenditure reports, quarterly reviews, and semi-annual assessments. Each theater conducts monthly In-process reviews to monitor and manage the preparation for scheduled activities. ORDs/CRDs, CONOPs and TTPs are updated throughout the year.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
CINC Experiments		1Q-4Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3265		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. CINC Experiments	Suballocation	Theater CINC's		11492								
Subtotal Test and Evaluation:				11492								
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												
Remark:												
Project Total Cost:				11492								
Remark:												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3352	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3352 Modeling & Simulation	0	25133								
A. <u>Mission Description and Budget Item Justification</u>										
<p>This project is responsible for the implementation of a comprehensive program that establishes and maintains an affordable and validated set of Core Models and Simulations (M&S). These Core Models and Simulations along with an extensive support structure are required for pre- and post-test evaluation activities that support the Corporate Test Program and Major Defense Acquisition Programs (MDAP) testing events. This project provides for the program management, planning, coordination, and technical oversight of system level M&S.</p> <p>Extended Air Defense Testbed (EADTB) provides for the operations, maintenance and continued enhancement of three Modeling and Simulation (M&S) tools that support the Ballistic Missile Defense Organization (BMDO) system engineering and test and evaluation needs. The simulation tools maintained under this task are EADTB, Extended Air Defense Simulation (EADSIM) and Commanders Analysis and Planning System (CAPS).</p> <p>EADTB will be developed to support the Army Operational Evaluation Command's interoperability demonstration for Patriot PAC-3 Independent Operational Test and Evaluation (IOT&E) and its milestone III decision. EADTB simulation and its models provide capability to do system engineering at the C4ISR architecture level, focusing on warfighter needs for interoperability. EADSIM will support the force on force domain that will focus on mission needs in a theater environment. CAPS is now supporting the Joint Defensive Planning (JDP) capability by providing a simulation with war planning capability for TBMD.</p> <p>This project will provide Specific System Representation (SSR) model development for EADTB and expertise for defining requirements for development of the EADTB, EADSIM, and CAPS simulations. The SSR models will support the Corporate Test Plan and the system engineering process. The modeling and simulation requirements process will focus on support of FoS interoperability integration among MDAPs and among allied systems.</p> <p>This task supports the development and sustainment of the Theater Missile Defense System Exerciser (TMDSE), BMDO's primary Hardware-in-the-Loop (HWIL) test tool for developmental TMD Family of Systems (FoS) interoperability testing. The task effort includes sustainment and required modifications of the TMDSE Build 3.1 system (Build 3.1+), development of Build 4, and future builds planning.</p> <p>This project is conducted in accordance with DoDD 5000.59, DoD Modeling and Simulation (M&S) Management.</p>										
Project 3352			Page 24 of 37 Pages				Exhibit R-2A (PE 0603873C)			

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3352
FY 2000 Accomplishments:		
•	0	
Total	0	
FY 2001 Planned Program:		
•	9258	Provides for the operations, maintenance and continued enhancement of three modeling and simulation (M&S) tools that support the Ballistic Missile Defense Organization (BMDO) system engineering and test and evaluation needs. The simulation tools maintained under this task are Extended Air Defense Testbed (EADTB), Extended Air Defense Simulation (EADSIM) and Commanders Analysis and Planning System (CAPS). Support provided under this task includes operation, maintenance, hardware, and software of the Testbed Product Office EADTB site in Huntsville, Alabama. Support is also provided for EADSIM and CAPS tool maintenance. Independent Verification and Validation (IV&V) is provided for the EADTB M&S tool. Operations Engineering is another key aspect of EADTB support. This effort funds System Engineering, Subject Matter Expertise for Technical Interchange Meetings (TIMs), and BMDO study support.
•	5034	Provides Specific System Representation (SSR) model development for EADTB and expertise for defining requirements for development of the EADTB, EADSIM, and CAPS simulations. The SSR models will support the Corporate Test Plan and the system engineering process. Also, capability will be provided to support Joint Theater Ballistic Missile Defense (JTBMD), operational requirements definition and analysis, JTBMD System Requirements Document (SRD) development, Family of Systems (FoS) engineering analysis at the architecture level, Technical Requirements Document (TRD) development, and development of A and B specifications. The modeling and simulation requirements process will focus on support of FoS interoperability integration among Major Defense Acquisition Programs (MDAPS) and among allied systems.
•	10841	Supports the development and sustainment of the Theater Missile Defense System Exerciser (TMDSE), BMDO's primary Hardware-in-the-Loop (HWIL) test tool for developmental TMD Family of Systems (FoS) interoperability testing. The task effort includes sustainment of the TMDSE Build 3.1 system, development of Build 4, and future builds planning. The Build 4 development effort consists of system upgrades and the addition of new nodes consistent with user needs and validated requirements. It provides for system engineering, including requirements definition, system design and implementation, and VV&A. It supports delivery of TMDSE upgrades to the JNTF, including verification testing and Quality Deficiency Reports (QDRs) resolution. It supports the development of software and hardware for new TMDSE capabilities and implements upgrades to the tactical system drivers to maintain pace with tactical systems new software builds. It provides for the continuing upgrade of the control segment and of the JDN emulation provided by the Gateway network.
Total	25133	
Project 3352		
Page 25 of 37 Pages		
Exhibit R-2A (PE 0603873C)		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3352
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B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
3155 - Sys Eng & Integration, PE QB_0603873C	6881									
3155 - Sys Eng & Integration, PE OB_0603872C	11488									
3261 - TMD BM/C3I, PE QB_0603873C	12203									
3352 - Modeling & Sim, PE 0603874C	37573	44451								

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

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
HWILT-01b at JNTF		4Q						
JDN Thinker		2Q						
AWACS		1Q						
HWILT-01a @JNTF- TMDSE B3.1		2Q						
THAAD		3Q						
PAC-3		3Q						
CRC/CRE TPS-75		2Q						
JTAGS		2Q						
Aegis		3Q						
TAOM/ADCP/TPS-59		2Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3352		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SSR Development	Allotment	Multiple		9258								
b. EADTB	Allotment	SMDC, Huntsville, AL		5034								
c. TMDSE	Allotment	Multiple		10841								
Subtotal Product Development:				25133								
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												
Remark:												
Project Total Cost:				25133								
Remark:												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001																																																																																																																																						
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I				PROJECT 3354																																																																																																																																						
<i>COST (In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost																																																																																																																																				
3354 Targets	5886	0																																																																																																																																												
<p>A. <u>Mission Description and Budget Item Justification</u> The purpose of this effort was to provide for the acquisition of targets for SIT II and Impact 98 testing.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 5886 Developed and procured medium range ballistic missile for use during TMD Family of Systems Testing in System Integration Test II (SIT). Conducted Critical Design Review, established program plan, and identified range support requirements. <p>Total 5886</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 0 <p>Total 0</p>																																																																																																																																														
<p>B. <u>Other Program Funding Summary</u></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>FY 2000</u></th> <th style="text-align: center;"><u>FY 2001</u></th> <th style="text-align: center;"><u>FY 2002</u></th> <th style="text-align: center;"><u>FY 2003</u></th> <th style="text-align: center;"><u>FY 2004</u></th> <th style="text-align: center;"><u>FY 2005</u></th> <th style="text-align: center;"><u>FY 2006</u></th> <th style="text-align: center;"><u>FY 2007</u></th> <th style="text-align: center;"><u>To Compl</u></th> <th style="text-align: center;"><u>Total Cost</u></th> </tr> </thead> <tbody> <tr><td>2257 PATRIOT, PE 0604865C</td><td style="text-align: center;">180674</td><td style="text-align: center;">81016</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2260 THAAD, PE 0604861C</td><td style="text-align: center;">81614</td><td style="text-align: center;">542498</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2260 THAAD, PE 0603861C</td><td style="text-align: center;">506221</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1266 NAVY THEATER WIDE, PE 0603868C</td><td style="text-align: center;">368769</td><td style="text-align: center;">456372</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2263 NAVY AREA, 0604867C</td><td style="text-align: center;">303479</td><td style="text-align: center;">271052</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3354 TARGETS, PE 0603872C</td><td style="text-align: center;">43711</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3354 TARGETS, PE 0603874C</td><td style="text-align: center;">2159</td><td style="text-align: center;">50952</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3354 TARGETS, PE 0603878C</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3360 TEST RESOURCES, PE 0603874C</td><td style="text-align: center;">65386</td><td style="text-align: center;">102746</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3360 TEST RESOURCES, PE 0603872C</td><td style="text-align: center;">14954</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3360 TEST RESOURCES, PE 0603878C</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>												<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>	2257 PATRIOT, PE 0604865C	180674	81016									2260 THAAD, PE 0604861C	81614	542498									2260 THAAD, PE 0603861C	506221										1266 NAVY THEATER WIDE, PE 0603868C	368769	456372									2263 NAVY AREA, 0604867C	303479	271052									3354 TARGETS, PE 0603872C	43711										3354 TARGETS, PE 0603874C	2159	50952									3354 TARGETS, PE 0603878C											3360 TEST RESOURCES, PE 0603874C	65386	102746									3360 TEST RESOURCES, PE 0603872C	14954										3360 TEST RESOURCES, PE 0603878C										
	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>																																																																																																																																				
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Project 3354			Page 28 of 37 Pages				Exhibit R-2A (PE 0603873C)																																																																																																																																							

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3354
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C. Acquisition Strategy: This project utilized firm fixed price contract to procure required targets.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Critical Design Review	X							

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BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3354		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Theater Target	FFP	BMDO	5886									
Subtotal Product Development:			5886									
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												
Remark:												
Project Total Cost:			5886									
Remark:												

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 3359	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3359 Test, Evaluation and Assessment	22252	64827								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>Beginning in FY01, this project represents a consolidation of activities previously preformed and funded from multiple projects in the Family of Systems Program Element.</p> <p>This project funds detailed planning, execution and analysis of BMDO's primary corporate test events directed by BMDO/TE and for flight test signature analysis, interoperability support to systems engineering and other test needs reporting across the TBM community. The primary TE-directed test events are flight tests associated with the Critical Measurements Program (CMP). Live Flight Overlays includes the System Integration Test (SIT) II and the Hardware-in-the-Loop testing conducted at the Joint National Test Facility (JNTF) using the Theater Ballistic Missile Defense System Exerciser (TMDSE). In addition to these dedicated test programs, corporate data collection, analysis and reporting is funded across various other data collection events to include CINC TAMD exercises, MDAP flight testing, service testing, and allied TBMD testing as appropriate to meet BMDO test objectives. Specifically, subtasks are further defined as follows:</p> <p>Critical Measurements Program (CMP) - Designs, builds, and flies threat representative test articles in realistic scenarios that address critical BMD system functions and is an integral part of BMDO's Corporate Testing program contributing to the development of robust BMD systems. Includes test planning, execution and analysis associated with the CMP.</p> <p>Test Planning and Management Support - Includes technical analysis, planning and evaluation of Corporate Test opportunities and pre-test predictions with detailed models. Also provides management support for the Director, Program Support and Assessment and his staff.</p> <p>System Integration Test/Live Flight Overlays - SITs/ Overlays are dedicated, controlled live flight test with interceptors and targets to measure FoS interoperability response. This task includes the planning, execution, analysis and reporting from each test.</p> <p>Hardware-in-the-Loop Testing (HWILT) - HWILT combines actual tactical hardware and software to provide cost effective assessments of the latest interoperability software upgrades. Models & Simulations are the only approach of simultaneously representing joint interoperability of all the TAMD weapons, sensors and command centers under a wide variety of operational conditions against the full set of threats in the TMD Capstone Requirements Document.</p> <p>Corporate Data Collection and Analysis - This task funds corporate data collection, analysis and reporting on test events outside of the CMP, SIT/Overlay and HWILT testing programs. It also funds the TSCC, a deployable link data collection and analysis equipment suite, that is fielded in live joint play and testing events.</p>										
Project 3359			Page 31 of 37 Pages				Exhibit R-2A (PE 0603873C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3359
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FY 2000 Program:

- 3547 Supported CINCs by developing TAMD exercise framework, and assist with developing CONOPs and TTPs.
- 7104 SIT II planning.
- 1280 TCMP 3A and B planning and analysis.
- 2493 HWILT 00a planning, execution and analysis.
- 2342 Test planning and management support.
- 2217 Corporate data collection and analysis.
- 3269 OTA's conducted independent operational assessments of FoS using HWILT, service testing and Joint Exercises. Provided input to FoS T&E documentation.

Total 22252

FY 2001 Planned Program:

- 17793 Planning, execution and analysis of CMP3B. Planning for CMP Flight 4 series.
- 35587 Planning and execution of Systems Integration Test II.
- 5874 Planning, execution and analysis of HWILT 01a and 01b.
- 3242 Corporate data collection, analysis and reporting.
- 2331 Test Planning and Management Support.

Total 64827

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
3359 System Test and Eval, PE 0603872C	19915								Cont	Cont
3359 System Test and Eval, PE 0603874C		11375							Cont	Cont

C. Acquisition Strategy: Corporate testing supports MDAP and interceptor development. Ballistic Missile phenomenology/signature and Family of Systems interoperability data is collected, analyzed and reported to insert in the systems engineering process for product improvement.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
HWILT 99B	1Q							

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) DATE **June 2001**

BUDGET ACTIVITY **4 - Demonstration and Validation** PE NUMBER AND TITLE **0603873C Family of Systems E & I** PROJECT **3359**

HWILT 00A	3Q							
HWILT 01A		2Q						
HWILT 01B		4Q						
TCMP 3A	1Q							
TCMP 3B		2Q						

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BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I						PROJECT 3359		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TCMP	Allotment	SMDC - Huntsville, AL & JNTF - Colorado Springs, CO	13495									
Subtotal Product Development			13495									
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. System Test Plan/Exec	Allotment	Various	1169									
Subtotal Support Costs:			1169									
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Test Planning/Execution/ Data collection and analysis	Allotment & MIPR	Various	17615									
b. HWILT	Allotment & MIPR	Various		5874	1Q01							
c. SIT II	Allotment & MIPR	Various		35587	1Q01							
d. CMP	Allotment & MIPR	Various		17793	1Q01							
e. Corp. Data Collect and Analysis & Reporting	Allotment & MIPR	Various		3242	1Q01							
f. OT&E	Allotment	Other Test Agencies	5495	0								
g. CINCs Experiments	MIPR	Theater CINCs	3493	0								
Subtotal Test and Evaluation:			26603	62496								
Remark:												
Project 3359				Page 34 of 37 Pages				Exhibit R-3 (PE 0603873C)				

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 3359
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Technical Support	CPAF	Vanguard	300	2331	1Q							
b. Technical Support	CPAF	SRS	953									
Subtotal Management Services:			1253	2331								

Remark:

Project Total Cost:			42520	64827								
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Remark:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603873C Family of Systems E & I					PROJECT 4000	
<i>COST (In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
4000 Operational Support	9068	72088								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>Beginning with FY 01, this program element replaces the Joint TMD Dem/Val program element.</p> <p>This project funds three basic areas: personnel and related facility support costs; statutory and fiscal requirements, and support service contracts.</p> <p>Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, US Army PEO Missile Defense, US Navy PEO for Theater Defense, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.</p> <p>Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.</p> <p>Finally, assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 0 Efforts funded in the Joint Theater Missile Defense PE 0603872C <p>Total 0</p>										
Project 4000			<i>Page 36 of 37 Pages</i>				Exhibit R-2A (PE 0603873C)			

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603873C Family of Systems E & I	PROJECT 4000
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FY 2001 Planned Program:

- 72088 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.

Total 72088

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
N/A										

C. Acquisition Strategy:
N/A

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
N/A								

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	216910	308415								
1155 Discrimination	27880	0								
3153 Systems Architecture and Engineering	15569	4416								
3155 Systems Engineering and Integration	0	23574								
3161 Information Management and Technology	0	10579								
3352 Modeling and Simulation	37573	44451								
3353 JNTF	52510	46670								
3354 Targets	2159	50952								
3357 Facilities, Siting, and Environment	0	2975								
3359 Test, Evaluation, and Assessment	0	11375								
3360 Test Resources	65386	102746								
4000 Operational Support	15833	10677								

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603880C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

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

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603874C BMD Technical Operations
<p>include BMD systems architecting and engineering analysis, test resources and facilities, modeling and simulation, and phenomenology data collection and analysis. These highly specialized BMD-specific investments provide the threat representative data and derived requirements, modeling capabilities, test facilities, and facilities, siting and environmental programs necessary to meet the aggressive development, test, and deployment schedules of the TMD and NMD systems. These centrally managed programs are executed in a manner integrated with BMDO's mission areas.</p> <p>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.</p>		
B. Program Change Summary		
	<u>FY 2000</u>	<u>FY 2001</u>
Previous President's Budget (FY 2001 PB)	214445	270718
Congressional Adjustments		42500
Appropriated Value		313218
Adjustments to Appropriated Value		
a. Congressional General Reductions		-4125
b. SBIR / STTR		
c. Omnibus or Other Above Threshold Reductions		
d. Below Threshold Reprogramming		
e. Rescissions		-678
Adjustments to Budget Years Since FY 2001 PB	2465	37697
Current Budget Submit (FY 2002 PB)	216910	308415
<p>Change Summary Explanation: The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Element 0603880C.</p>		
<p>C. Acquisition Strategy: See Individual R2 summaries.</p>		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 1155	
COST (<i>In Thousands</i>)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
1155 Discrimination	27880	0								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>To prepare for critical future defense needs, technical operations will support MDAP programs by conducting a balanced program of high leverage technologies that yield improved capabilities across a selected range of boost, midcourse, and terminal phase missile defense interceptors, advanced target sensors, and innovative science. The objectives of these investments are subsystems with improved performance or reduced costs for acquisition programs, and technical solution options to mitigate advanced and near-term National and Theater Ballistic Missile threats.</p> <p>This program provides the U.S. with the data and predictive tools to generate high confidence target signatures for Ballistic Missile Defenses (BMD). This is a critical adjunct to the evaluation of BMD system performance across the full spectrum of threats and engagement scenarios. This program provides data collection sensors and instruments for use on live-fire missions and provides analysis of the resulting test data. This program provides predictive models of target signatures in both Radar and Electro-Optical regimes. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection.</p> <p>Data collection and exploitation of data is achieved by ground, air, and sea based assets for domestic and foreign tests. This includes collection by assets that are owned or operated by other agencies for use by BMDO.</p> <p>Algorithms and Analysis work is divided into optical and radar regimes. Promising acquisition, discrimination, track, and aimpoint algorithms are coded and installed at the Lexington Discrimination System (LDS) for evaluation in a real-time operating mode using real and simulated data. Algorithms from acquisition programs are evaluated for effectiveness in a variety of targets and scenarios.</p> <p>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.</p>										
Project 1155	Page 3 of 57 Pages					Exhibit R-2A (PE 0603874C)				

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 1155
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FY 2000 Accomplishments:

- 6744 Algorithms and Analysis: Provide data analysis support for TMD systems in Dev/Val and EMD. Provide support for NMD radar/optical discrimination algorithms and architectures for advanced NMD threats and pen aids. Develop algorithms for real-time sensor resource allocation to support threat-adaptive algorithm architectures.
 - 4853 Models: Continue development and validation of high fidelity signature and environment codes.
 - 13260 IR Data Collection Upgrade: Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR).
 - 233 Cobra Ball Upgrade: Initiate sensor subsystem design trade studies.
 - 1175 Government Project Personnel Support: Civilian Salaries for BMDO Executing Agent (EA)
 - 1615 International: Continue MESAR efforts and support of the Scientific Cooperative Research Exchange (SCORE) exchange with the UK.
- Total 27880

FY 2001 Planned Program:

- 0 Related activities transferred to projects 3352, 3359 and 3360 for FY01.
- Total 0

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
3352 Modeling and Simulation, PE 0603874C		4722								
3359 Test, Simulation & Assessment, PE 0603874C		7714								
3360 Test Resources, PE 0603874C		13825								

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

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) DATE **June 2001**

BUDGET ACTIVITY **4 - Demonstration and Validation** PE NUMBER AND TITLE **0603874C BMD Technical Operations** PROJECT **1155**

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
ODA Model and simulation support	1Q-4Q							
Support BMDO test flight programs	1Q-4Q							
IR Sensor SRR	1Q							
IR Sensor PDR	2Q							
IR Sensor CDR	4Q							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 1155
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. IR Sensor Upgrade	C, CPMF	Aeromet, OK	12884									
b. Cobra Ball Upgrade	C, TBD	Raytheon, TX	427									
			2000									
Subtotal Product Development:			15311									

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. OSC SW Maintenance	CPMF	TBE, Huntsville AL	947									
b. BES Development	Allot	SMDC, H'sville AL	961									
c. Bkgnds SW Dev	Allot	AFRL, MA	2106									
d. SSGM Software Dev	Allot	NRL, Wash DC	800									
e. SSGM SW Dev	CPMF	PRA, Calif Other, VA	2600									
f. Cont. Eng Supprt	C, CPMF	Other, VA	1791									
Subtotal Support Costs:			9205									

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Mission Planning supt.	Various	Other	781									
b. MESAR Trials	MIPR	PEO-TAD, Wash	225									
Subtotal Test and Evaluation:			1006									

Remark:

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)

DATE
June 2001

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 1155
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Plumes Analysis	Allotment	AFRL, CA	2105									
b. Radar Analy / Supprt	MIPR	MIT/LL Lex, MA	8641									
c. Optical analy (ODA)	CPFF	NRC, H'sville AL	5253									
d. Prog Man Pers	Allotment	SMDC, H'sville AL	745									
e. Other Intl prgms	Various	Other	623									
Subtotal Management Services:			17367									

Remark:

Project Total Cost:			42889									
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3153	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3153 Systems Architecture and Engineering	15569	4416								
A. <u>Mission Description and Budget Item Justification</u>										
<p>Beginning in FY 01, Project 3153 funds activities associated with the BMDO Chief Architect (BMDO/CA). Tasks within this project had funded the Chief Architect / Engineering Office (then BMDO/DE) activities prior to FY 01. These tasks will no longer be active in this project. This project resources architectural development to design an integrated Global Air and Missile Defense capability that meets current evolving threats. The Chief Architect establishes and maintains the Ballistic Missile Defense (BMD) Baseline Architecture. The BMD Baseline Architecture is the overarching and unifying BMD structure expressed in terms of components, connections, constraints, and their interrelationships. The architecture functions include assessing the evolving technical, military, and geopolitical environments, developing and evaluating architecture alternatives to provide suitable BMD capabilities, integrating the selected architecture alternative, and tracking architecture implementation. The BMD Baseline Architecture expressed as a series of time-phased spiral development epochs pacing the threat, serves as the technical basis for systems engineering and acquisition planning. The Chief Architect provides analytical support to the Director, BMDO, and staff through a common analysis framework. The Chief Architect conducts special studies related to alternative and extended missile defense architectures and quick reaction studies in response to immediate senior decision-maker requests.</p>										
FY 2000 Accomplishments:										
<ul style="list-style-type: none"> • 9394 System Engineering and Architecture Analysis: Supported analyses for Current Systems/Architectures, development of advanced/future systems/architecture requirements, and develop and maintain engineering threat documentation. Conducted functional and physical analysis and related allocation in support of current and advanced/future systems/architectures. Performed risk analysis and mitigation/control activities, trade-off analysis, and conduct program reviews in support of architecture analysis and control function. Supported BMDO corporate technical decision processes. • 3800 Missile Defense Interoperability: Formulate policy and implement DoD and BMD interoperability requirements in support of the services and coalition partners. Conduct BMC3 activities, to address NATO, US/GE, and US/UK customer interoperability scenarios and issues. NATO analysis will include joint experiment planning and upgrade of Extended Air Defense Test Bed. US and United Kingdom interoperability efforts concentrate on multi-sensor tracking and fusion. An interoperability study will be conducted during FY00. BMC3 interoperability activities address DoD's mandated implementation of the Joint Technical Architecture. BMC3 Support includes technical analysis of allies capabilities and interfaces to TAMD, tracking and maintaining an allies capability inventory, support of BICAR and DISA, quick reaction suspense/document reviews, analysis of CINC interoperability shortfalls, and interoperability analysis of Service Systems/JPN/JDN/JCTN. Data Standardization support includes development of TMD/NMD information exchange requirements, support of common data definitions required for NMD/TMD, analysis of standardization of interfaces to external systems, support to NMD data process and Missile Defense Data groups, review of Service BMC3 documents, MD Data Element Crosswalk input development, Metadata analysis, and technical review of data packages from JTAMDO and NMD. BMC3 interoperability efforts also develop joint TMD Technical Architectures. Technical Architectures and related analysis will be developed for 2003 and 2010 timeframes. 										
Project 3153			Page 8 of 57 Pages				Exhibit R-2A (PE 0603874C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3153
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- 850 Test and Evaluation: This task conducts T&E activities required to support BMDO architecture and system engineering functions by ensuring T&E is used to reduce acquisition risk and provide early and continuing estimates of system performance. It ensures test planning, testing and analysis of test results are integral parts of the systems engineering process to meet objectives. This includes reviewing SEMP's and other Systems Engineering (SE) documentation, to verify T&E programs and documentation (TEMP's) are traceable and support the SE requirements verification process. These T&E activities will also include assessing testability of current and future BMD architectures and MD Lethality Program test and experiment support.
- 1525 System Planning: Activities develop missile defense system concept alternatives, linked to the evolution of the currently defined BMD system, for inclusion in the BMD Master Planning process. Specific task activities include assistance in defense threat characterizations (post-2010), identification and description of future missile defense deficiencies, the conduct of competitive studies to define alternative defense concepts, system needs definition for advanced technology programs, leadership of Joint Technology Board process, and technical assistance in developing Pre Milestone I OSD required documentation.

Total 15569

FY 2001 Planned Program:

- 3235 Conduct the Ballistic Missile Defense System Architecture Study (BMDSAS) to develop, analyze, and assess the baseline and preferred architectures for Ballistic Missile Defense (BMD). Integrate the architectures from the National Missile Defense (NMD) and Theater Air and Missile Defense (TAMD) Family of Systems into a single evolutionary defense architecture covering 2000 to 2030. Conduct quantitative and qualitative analyses to provide insights into the various systems, potential alternatives, and integrated performance against current and potential threats. Support BMDO corporate technical decision processes. Develop, implement, and maintain the architecture configuration management process; produce and maintain the Architecture Description Document (ADD).
- 1181 Conduct special studies related to alternative and extended missile defense architectures, quick reaction studies in response to immediate senior decision-maker questions and requests, and unplanned Congressional tasking.

Total 4416

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
3153, Sys Arch & Engineering, PE0603873C		4615								
3153, Sys Arch & Engineering, PE0603877C										

C. Acquisition Strategy: Systems analysis work in this project is contracted. Expertise of Government, Federally Funded Research & Development Center (FFRDC), and Scientific, Engineering and Technical Assistance (SETA) personnel are leveraged in the execution of project activities, using existing contracts to the maximum extent possible. Additional contractor services will be procured if needed to meet emerging program requirements.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) DATE **June 2001**

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

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Initiate BMDSAS Iteration 8		1Q						
Final Architecture Description Document (ADD) version 1.0 to Director		1Q						
Initiate BMDSAS Iteration 9		2Q						
Initiate BMDSAS Iteration 10		3Q						
Final ADD Version 2.0 to Director		3Q						

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BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA Analysis Support	CPAF	SPARTA, CA		4260								
b. SETA Analysis Support	CPAF	CSC, VA		156								
Subtotal Management Services:				4416								
Remark:												
Project Total Cost:				4416								

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3155	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3155 Systems Engineering and Integration	0	23574								
A. <u>Mission Description and Budget Item Justification</u>										
<p>This project is part of a Program Element (PE) currently in a transition phase after BMDO's reorganization. BMDO has realigned its Systems Engineering functional tasks, which had previously been accomplished as a part of a number of projects under this PE and consolidated them under this project (3155). Beginning in FY02, the Systems Engineering efforts will reside in the new BMD Architecture and Engineering PE (0603877C).</p> <p>The Systems Engineer is responsible for producing the BMD Functional Baseline (Systems Architecture Allocated Functional Requirements Document (SAAFRD)), which ensures the technical viability, integrity, and interoperability of the BMD program, to include TAMD, NMD and cruise missile options. Working in conjunction with the Chief Architect, Systems Engineering provides the core engineering capability to assess operational requirements and translates them into system requirements that are allocated to: legacy systems, modifications of legacy systems, and/or new system concepts necessary to meet user needs. This includes the development and allocation of systems requirements necessary to ensure that the Major Defense Acquisition Program (MDAP) systems are fully interoperable and provide maximum flexibility to the warfighter. Battle Management Command, Control, Communication (BM/C3) Systems Engineering provides the warfighter with timely, early warning information through development of a theater missile defense architecture that fosters interoperability and system integration. These activities also develop data standards, conduct studies and analyses, and formulate and implement policy and procedures to ensure that DoD and BMD interoperability requirements support the Services, allied and coalition partners. Working closely with the intelligence community, Systems Engineering establishes and maintains the design-to-threat requirements, funded via PE 0603876C, to ensure consistent threat parameters across the MDAPs.</p> <p>To ensure the technical viability of BMDO programs, Systems Engineering conducts continuous assessments of systems development to assess progress, determine capability, and identify and mitigate risks, including risks incurred due to the evolving threat environment. Mitigation activities include the generation of technology requirements and identification of opportunities for technology insertion. Systems Engineering maintains an ongoing Corporate Lethality Program to characterize the effectiveness of the BMD architecture, understand post-intercept effects, establish methodologies to allow warhead typing based on impact response, and provide a common end-to-end lethality assessment capability across the MDAPs. Working in conjunction with the test and evaluation community, Systems Engineering develops test requirements and conducts post test analyses to ensure the MDAP systems meet requirements and satisfy warfighter needs. Finally, Systems Engineering executes the BMDO Configuration Control Process and maintains configuration control of TMD and NMD architecture baselines.</p> <p>Systems Engineering is executed in a collaborative environment. BMDO maintains a close working relationship with the MDAP Program Managers, PEOs and the PEO Systems Engineers, and the BM/C3 Community. Additionally, BMDO continues to work with the Military Services, U.S. Space Command, U.S. Joint Organization to ensure full integration of other systems, sensors, and command and control centers that contribute to BMD.</p>										
Project 3155			Page 12 of 57 Pages				Exhibit R-2A (PE 0603874C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3155
FY 2000 Accomplishments:		
<ul style="list-style-type: none"> • 		
Total	0	
FY 2001 Planned Program:		
•	12612	General Engineering - Initiate development of the BMD Functional Baseline (SAAFRD). Conduct system engineering assessments of BMD programs to identify performance/cost/schedule issues within these programs and assess potential solutions. Develop and implement the BMD Corporate risk management process. Develop and track Technical Performance Measures for the BMD System Architecture. Baseline the items for Configuration Control of the BMD Systems Architecture. Assemble and prioritize technology needs (including manufacturing technologies) for input to the BMDO S&T program. Lead migration of BMD systems and architectures toward Open Systems implementations. Perform cost benefit analysis of alternatives for BMDO MDAP high cost items and cost drivers. Perform independent technical and engineering assessments of BMD system architectures including trade-off studies using Federally Funded Research and Development Centers (FFRDC)/National Laboratories/University Affiliated Research Centers (UARC) resources.
•	4211	BM/C3 – Initiate development of a TBMD BMC3 System Requirements Document (SRD) to support the overarching Systems Architecture Allocated Functional Requirements Document (SAAFRD) document; develop a Family of Systems (FoS) Integrated System Specification (ISS) to baseline current TBMD performance capabilities; develop an FoS System Performance Specification (SPS) focused on meeting near-term BMC3 interoperability requirements. Develop TBMD Link-16 and Global Command and Control System (GCCS) interoperability enhancements (e.g. Coalition/Ally tactical TBM message exchanges, Joint Range Extension, and integration of joint service force planners such as the Joint Defensive Planner). Develop and maintain a list of BM/C4I risks; monitor and assess BM/C4I CARDS; develop TMD Interface Exchange Requirements (IER); develop a TMD/NMD Interoperability Program Plan and Interoperability Roadmap; and define interoperability test and tool requirements. Conduct interoperability studies and experiments; Missile Defense Interoperability Plan; BMDO annual interoperability and capability report, allied/coalition BM/C3 Analysis (NATO, UK, Israel, etc); Interoperability Analysis of Service’s Joint Planning Network, Joint Data Network and Joint Composite Tracking Network. Provide support to the Ballistic Missile Defense System Architecture Study (BMDSAS) with regard to C4ISR, and DUSD C3I efforts; support Joint Mission Area Analysis (JMAA) and development of Ballistic Missile Information Architecture. Support JTA Compliance and Missile Defense (MD) Annex development, Migration Plans and waivers as required; Data Element Dictionary (DED) for MD; development of BMDO Technical Architecture, and BMDO C4ISR Support Plans.
•	6751	Corporate Lethality Program (CLP) – Target Response; conducts high speed testing to improve understanding of the dynamics of structural response via hydrocode benchmarking. Agent/Debris Source Term Characterization; obtains salvage fuzing/radiation effects data by performing hydrocode runs of engagement conditions to predict particulars of primary high explosive initiation. Atmospheric Transport and Dispersion; conducts empirical studies of droplet stability and fluid break-up by developing codes with best drop deformation algorithms in open literature. Intercept Effects and Consequences, Sensitivity Analysis; generates hydrocode predictions of bulk chemical source terms for hazard propagation modeling; develops correlation between inputs and outputs, performs uncertainty and sensitivity studies. Data Collection/Analyses; correlates agent/simulant phenomenology by establishing a database for thickened VX for those characteristics relevant to lethality.
Total	23574	
Project 3155	Page 13 of 57 Pages	Exhibit R-2A (PE 0603874C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3155
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B. <u>Other Program Funding Summary</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
3155, Systems Engineering and Integration, PE 0603873C	60700	49289								
3155, Systems Engineering and Integration, PE 0603872C	47144									
3155, Systems Engineering and Integration, PE 0603876C		9692								
3155, Systems Engineering and Integration, PE 0208864C		3938								

C. Acquisition Strategy: The 3155 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy Systems Engineering performance requirements. A portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.

D. <u>Schedule Profile</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Identify BMC4I Risks		1Q						
Develop./Maintain Risk Mitigation Plans		1Q						
Develop/Maintain Software Engineering		1Q 4Q						
Revise SDIO Dir. 3405		2Q						
Coordinate BMDO Software Policy		3Q						
Develop/Revise MD Interop. Plan		1Q						
Develop/Revise Security Architecture		1Q						
Publish BMC4I Analysis Results		4Q						
Publish NATO BMC4 Analysis Final Report		4Q						
Publish US/GE Analysis Final Report		4Q						
Develop MD Technology Roadmap		1Q						
Standards Compliance Lessons Learned Data Base		3Q						
Publish JTA Annual Report		4Q						
Develop Processes JTA MD Subdomain		4Q						
Investigate Joint Tactical Radio System (JTRS)		2Q						
Maintain Control Over Sys. Interf.		Quarterly						

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations			PROJECT 3155	
BMC4I Standards Compliance		Quarterly						
Enforce BMDO JTA		Quarterly						
Direct Processes BMC4I Sensor System Engineering		Quarterly						
Final development/fielding of JDP V.2x into GCCS V4.0		3Q						
Final development/fielding of JDP V.2x into TBMCS V2.0		3Q						
TAMD-I ACTD		3Q						
TBMD Enhancements		1Q						
Develop TBMD BMC3 Systems Requirements Document (SRD)		3Q						
Integrated System Specification (ISS) Draft/Final		Quarterly						
System Performance Specification Draft/Final		Quarterly						
Joint Range Extension (JRE) Prototype Gateway Development	3Q							
Operational DEMO @ Roving Sands	3Q							
Develop JRE Intrem Capability		1Q						
Assemble tech viable analysis team to audit technical health of each BMD program		1Q						
Complete initial BMD level TPM's		1Q						
Develop Security Architecture		1Q						
Collect TPM Data to validate selected measures, establish control thresholds		2Q						
Start operational vs system requirements synergies vs disconnect analysis		2Q						
Stand-up CCB and BMD Configuration Management process – Run DTT through the process		2Q						
Develop M&S and Test Tool Strategy		3Q						
Complete initial technical viability assessments for BMD program		3Q						
Establish Configuration Control or BMD Baselines to be Managed, Complete Analysis of 1 st Iteration of System Architecture Baseline		4Q						
Assess TPM Utility, Relate Requirements to M&S and T&E Activities		4Q						
Operational/System requirements integration		4Q						
JRE Application Protocol		4Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) DATE **June 2001**

BUDGET ACTIVITY **4 - Demonstration and Validation** **PE NUMBER AND TITLE** **0603874C BMD Technical Operations** **PROJECT** **3155**

Complete expansion of SE World Class Engineering Process briefing into a training manual for new BMDO and contractor engineers		4Q							
Obtain Approval for Initial NMD/TBMD SAAFRS		4Q							
Complete initial integration of operational vs systems requirements		4Q							
JRE Protocol Gateway Development		Quarterly							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3155		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. System Engineering	Various	POET, Multiple		4543								
b. System Engineering & Integration (SE&I)	CPFF	TRW		4829								
c. System Engineering	CPAF	Sparta, Arlington, VA		2584								
d. System Engineering	CPFF	CSC, Arlington, VA		1915								
e. System Engineering	CPFF	VRI, Arlington, VA		302								
f. ABL PB	Allotment	Services, Various		1056								
g. TMDSE	Allotment	Services, Various		60								
h. BMD Functional Baseline & SAAFRS	Allotment	Services, Various		362								
i. TPM Development & Tracking	Allotment	Services, Various		121								
j. BMD Risk Management	Allotment	Services, Various		60								
k. Test Requirements	Allotment	Services, Various		121								
l. Configuration Baseline Tracking & Analysis	Allotment	Services, Various		302								
m. MDAP Baseline / TIM / ISS	Allotment	Services, Various		453								
n. JREAP & Interim Capability	Allotment	Services, Various		453								
o. JDP	Allotment	Services, Various		62								
p. BMC4I Standards Compliance	Allotment	Services, Various		201								
q. System Engineering	MIPR	DOE		1335								
r. System Engineering	Allotment	SMDC		1150								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations						PROJECT 3155		
s. System Engineering	MIPR	BATTELLE		1530									
t. System Engineering	MIPR	NSWCDD		888									
u. System Engineering	MIPR	UK		471									
v. System Engineering	MIPR	AFRL/AERO		776									
Subtotal Product Development:				23574									
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract	
a.													
Subtotal Management Services:													
Remark:													
Project Total Cost:				23574									
Remark:													

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001			
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3161		
COST (<i>In Thousands</i>)		FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3161	Information Management and Technology	0	10579								
A. <u>Mission Description and Budget Item Justification</u>											
<p>This project provides the Support Technology funding for the Ballistic Missile Defense Organization (BMDO) Data Centers Program. The primary responsibility for this project is for the BMDO Data Centers Information System Program Manager to provide management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. 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. Operation and management of the Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments of technical/programmatic issues and data center performance, coordinating NMD, TMD, and Support Technology customer program/data management requirements and cooperative partnership requirements.</p>											
FY 2000 Accomplishments:											
		0									
	Total	0									
FY 2001 Planned Program:											
	731										
	This task provides the Support Technology funding for the BMDO Data Centers Program and Virtual Data Center (VDC) operation and Maintenance (O&M). The primary responsibility under this task is for the BMDO Data Centers Information System Program Manager to provide management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. 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.										
	2592										
	Provides the U.S. Army with Project Funding to support the Missile Defense Data Center (MDDC), SMDC. The MDDC, as a primary BMDO Data Center will acquire, process, manage, and archive Ballistic Missile Defense (BMD) mission oriented technology. This includes the collection, organization, archiving, protection, processing, analyzing and dissemination of strategic and tactical missile systems (NMD and TMD) data products.										
	2155										
	Provides the U.S. Air Force with Project Funding to support the Advanced Missile Signature Center (AMSC) at AEDC, Arnold AFB, TN, as a primary BMDO Data Center that can process, manage, and archive BMD mission oriented data. AMSC also provides technical support, data cataloging, test/experiment planning, and data product distribution for BMDO-sponsored NMD FoS, CMD and BPI programs.										
	1653										
	Provides the Joint National Test Facility funds for the BMD Simulation Support Center (BMD SSC), as a primary BMDO Data Center that can process, manage and archive M&S, C2SIM and CINC Assessments, BM/C3I, and JEA data; provide technical and data catalog support; and conduct test/experiment planning and data product distribution for BMDO-sponsored programs.										
	3448										
	Provides funding for the design, development, engineering, implementation, and operation of the BMDO Wide Area Network (WAN).										
	Total	10579									
Project 3161		Page 19 of 57 Pages					Exhibit R-2A (PE 0603874C)				

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3161
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
3353, BMDO Data Centers Program, PE 0603874C	7099	0								
3352, SSC Support, PE 0603874C	567	821								
3352, SSC Support, PE 0603878C	0	0								
3161, Information Management and Technology, PE 0603877C	0	0								

C. Acquisition Strategy:

The work in this project is sourced through full and open competition. Primary Data Center Program support is performed at SMDC, AEDC, and JNTF. The SMDC contractor operates under a Cost Plus Award Fee (CPAF) first awarded in February of 1999. The AEDC contractor operates under a CPAF first awarded in October of 1995.

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Develop Standard Data Centers Program Cost Business Model		1Q						
Update Data Centers Plan		1Q						
Transition/Realign Data Centers Program with Corporate Information Management Program		3Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation						PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3161	
4												
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Data Centers	MIPR	BMDO		731	TBD							
b. Data Centers	Allotment	MDDC, Huntsville		2592	TBD							
c. Data Centers	Allotment	AMSC, Arnold AFB		2155	TBD							
d. Data Centers	Allotment	JNTF, Colorado Springs, CO		1653	TBD							
e. Wide Area Network	MIPR	BMDO		3448	TBD							
Subtotal Support Costs:				10579								
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												
Remark:												
Project Total Cost:				10579								
Remark:												
Project 3161												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3352	
COST (<i>In Thousands</i>)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3352 Modeling and Simulation	37573	44451								
A. <u>Mission Description and Budget Item Justification</u>										
<p>This project is responsible for the implementation of a comprehensive program that establishes and maintains an affordable and validated set of Core Models and Simulations (M&S). These mission focused Core Models and Simulations are required for pre- and post-test evaluation activities that support the Corporate Test Program and MDAP testing events. This project provides for the program management, planning, coordination, and technical oversight of system level M&S.</p> <p>This mission common task provides computing and networking infrastructure support for the ARC/SC. Specific efforts supported include the concept exploration, development, and test of Theater Air Missile Defense (TAMD) and National Missile Defense (NMD) U.S. Army elements. This task supports the operations and maintenance of computing resources for multiple testbeds within the ARC and supercomputers and local and wide area networking capabilities within both the ARC and SC.</p> <p>Signature Model and Synthetic Scene Generation and Simulation activities provide high confidence signature prediction capability for active and passive EO and RF sensors used in BMD elements and systems. Both empirical and physics-based models and computer codes are developed, verified & validated, maintained, and distributed to provide high-confidence results. These predictions support test planning, test target design, sensor design/development/test, data and systems analysis, operational test and evaluation, and algorithm development.</p> <p>M&S activities also funded by this project include: development, enhancement, and maintenance of the theater test beds and tools for the 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 three major areas: assessments, development/modification, and program management for BMDO and Service M&S programs.</p> <p>The Ballistic Missile Defense Simulation Support Center (BMDSSC) archives and maintains M&S tools which are joint, global and possess multi-level fidelity. The BMD SSC seamlessly links existing and planned simulations of C4I networks, platforms and weapon systems. This activity also includes the operation and maintenance of centralized M&S catalogs of databases that identify current and developing BMDO simulation tools. BMD SSC has been designated as the BMDO Node for models, simulations, and data on the Defense Modeling and Simulation (DMSO) Resource Repository (MSRR).</p> <p>Wargame 2000 is being developed as a BMD simulation to run wargames and exercises at the JNTF for the next 10 years. The requirements are to: design the simulation using an object oriented paradigm, enable "plug and play" of TMD and NMD models, facilitate integrating (BMDO's JNTF) internal and external elements into a flexible real-time simulation suite, incorporate realistic C2 displays, enhance wargaming productivity and responsiveness, and provide for multi-level security.</p>										
Project 3352			Page 22 of 57 Pages				Exhibit R-2A (PE 0603874C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603874C BMD Technical Operations	3352
<p>This task includes the "Wide Bandwidth Information Infrastructure Project" (WBII), which is to create a network for geographically distributed ground test facilities for both THAAD and NTW missile defense programs. Specifically, linking the Aegis Weapons System Combat Systems Engineering Development Sites (CSEDS) in Moorestown, NJ, and the Standard Missile-III Systems Integration Laboratory (SIL) in Tucson, AZ using networking and Virtual Private Network (VPN) technology. Both Hardware-in-the-Loop (HWIL) applications will involve information security and interoperability issues. The focus on networking technologies is to meet scaleable national security classification networking architecture requirements to distribute imagery data for seeker and sensor algorithm developers for the Ballistic Missile Defense Organization (BMDO) Project Hercules.</p> <p>In FY00 only, this project also provided acquisition and support services for the design, development, modernization, and control of BMDO Mission Oriented Information Technical Modernization (ITR). The objective for this program is to provide responsive ITR support and services via a flexible, responsive architecture to satisfy validated current and projected user ITR requirements. Specific tasks include processing of Mission Oriented ITR-related service requests, conducting the Mission Oriented ITR Working Group and supporting BMDO Chief Information Officer (CIO) initiatives such as the drafting and implementation of the mission oriented portions of the BMDO Strategic Information Management Plan and BMDO Five Year Information Resources Management Plan (FYIRMP). This project is also responsible for the identification and support of High Performance Computing requirements.</p> <p>Lethality Model activities provide modeling and simulation support for the BMDO Corporate Lethality Program and the lethality community. The Lethality program answers are the primary evaluation tools to determine the success or failure of a threat target intercept. This task supports the maintenance and enhancement of lethality models through the development of standard lethality threat-representative targets, the pre-flight prediction of tests and experiments to obtain lethality data and the incorporation of that data into the interceptor/target lethality models' design.</p> <p>This mission common task includes the government salaries and related support costs (e.g. rent, travel, supplies, etc.) for the Service Executing Agent (EA) government technical personnel, other than the PEO, directly supporting and assigned to the Testbed Product Office and the ARC/SC.</p> <p>This project is conducted in accordance with DoD 5000.59, DoD Modeling and Simulation (M&S) Management.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none">• 13453 The ARC/SC is a Major DoD computational, testbed, communication, and engineering support center. The ARC/SC successfully supported BMDO, USASMDC, NMD JPO, PEO AMD and the HPCMO in National Missile Defense (NMD), Theatre Missile Defense (TMD), Technology and other DoD programs and projects milestones. The ARC/SC successfully completed the design, development and installation of the second Integrated System Test Capability (ISTC2) in support of the National Missile Defense program. The Atmospheric Interceptor Technology (AIT) testbed has been designed, and a super computer purchased/ installed and the AIT is expected to be operational by the end of FY2000. In addition, the ARC/SC personnel continue to provide "hands-on" support to 108 BMDO and USASMDC programs and projects for complex problem resolutions. ARC/SC modeling and simulation resources continue to be used to isolate and correct missile, sensor, battle management, and radar software prior to critical milestones and flight tests.		
Project 3352	Page 23 of 57 Pages	Exhibit R-2A (PE 0603874C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3352
• 4471	Provided BMDO M&S support in three major areas: assessments, development/modification, and program management for BMDO and Service M&S programs. This area also included funding for Service M&S activities. Top priorities included: the BMDO M & S Acquisition Strategy and Investment Plan; Wargame 2000; BMD SSC; Modeling and Simulation Working Group (MSWG) management; execution of MSWG action plans; and model assessments/evaluations. Continued to incorporate new web technology into the BMD SSC, as well as continue the population and refinement of M&S catalogs/repositories. Continued to refine and update on-line query capabilities of both unclassified and classified information. Assisted and improved DoD support to the DMSO MSRR.	
• 7510	Provided JNTF Project funding to support continued development of Wargame 2000. The Wargame 2000 program continued to design and develop a "world-class" simulation tool for use in support of wargames and exercises testing operational concepts involving National Missile Defense and Theater Air and Missile Defense. Funding involved development to support a NMD Command and Control Simulation event, two Wargame 2000 Theater Air and Missile Defense (TAMD) demonstration exercises and a NMD Follow-on capability (FOC). Also, provided a version of Wargame 2000 for the FY '00 Multi National Conference.	
• 7313	Designed and developed a distributed HWIL Testbed linking the Ground Based Radar Simulation (GBRSIM) at the Advanced Research Center (ARC) with the AMCOM THAAD infrared HWIL facilities in Huntsville, AL. In parallel effort, connected AMCOM AIT (optical) and SMDC ARC (radar) HWIL connectivity for real-time information fusion analysis and algorithm development and design a Next Generation Internet/Virtual Private Network (NGI/VPN)-based geographically distributed network for the Navy Theater Wide (NTW) program. This NGI/VPN capability linked the Raytheon Standard Missile Block III infrared HWIL/SIL facility in Tucson, AZ, with the Moorestown, NJ AEGIS Combat System Engineering Development Site (CSEDS). The NGI/VPN technology supported high bandwidth communications over NGI networks, such as Internet 2, while providing the quality of service and security features that allow use of public networks for sensitive applications.	
• 1861	Continued to support BMDO's Mission Oriented ITR. Priorities included: continued modernization of BMDO's computer capabilities based on supporting BMD program priorities; continued upgrading of supercomputers to support modeling and simulations and computationally intensive analyses; implementation of new technology to support multimedia applications; replacement of obsolete computational resources; continue to expand Mission Oriented ITR data collections to include all Mission Oriented programs; and supported the drafting and execution of BMDO Strategic Information Management Plan and FYIRMP.	
• 2965	Provided funding for Army salaries in support of the ARC/SC and the SMDC Battlelab.	
Total		37573

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE
BUDGET ACTIVITY 4 - Demonstration and Validation		June 2001
PE NUMBER AND TITLE 0603874C BMD Technical Operations		PROJECT 3352
FY 2001 Planned Program:		
•	16899	Modernize/upgrade and expand high performance computing resources, provide high level technical support and operational capability for multiple NMD, TMD and Technology testbeds. These testbeds facilitate research, development and testing for the BMDO Missile Defense programs. Major areas of support include upgrades, enhancements, maintenance, and facility modification. FY2001 requirements have been developed and complied in the ARC/SC Long Range Plan (LRP). The LRP quantifies the infrastructure upgrades for the computational, networking and communications resources.
•	4722	Signature Models provide high confidence signature prediction capability for active and passive EO and RE sensors used in BMD elements and systems. Signature Models data will be used to support test planning, test target design, sensor design/development/test, data and systems analysis, operational test and evaluation, and algorithm development. The codes are used to generate databases to support HWIL and engagement-level simulations and to calibrate and improve the realism of force-on-force simulations. They are also used to gauge system and sub-system performance in aspects of the engagement envelope that cannot or will not be fight-tested.
•	3679	Provide BMDO M&S support in three primary areas: assessments, development/modification, and program management for BMDO and Service M&S programs. This area also includes funding for Service M&S activities. Top priorities include: the BMDO M&S Investment Plan; BMD SSC; MSWG management; execution of MSWG action plans; and model assessments/evaluations. 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.
•	7183	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 wargames and exercises testing operational concepts involving National Missile Defense and Theater Air and Missile Defense. The Executing Agent will maintain NMD capabilities and will continue to incorporate changes reflecting the evolving NMD/TMD architectures. Wargame 2000 will support NMD and JTBMD events in FY'01.
•	1092	Provide Lethality funding to support primary evaluation tools that determine the success or failure of a threat target intercept. Current models include Parametric Exo/Endoatmospheric Lethality Simulation (PEELS) and Post Engagement Ground Effects Model input for campaign level models. During FY01, the management of these models will be streamlined. Resources support BMDO Corporate Lethality Program (CLP), MSWG, CTWG, and TEWG subcommittees as well as other Defense committees and boards pertaining to lethality.
•	9315	Designed and developed a distributed HWIL Testbed linking the Ground Based Radar Simulation (GBRSIM) at the Advanced Research Center (ARC) with the AMCOM THAAD infrared HWIL facilities in Huntsville, AL. In parallel effort, connected AMCOM AIT (optical) and SMDC ARC (radar) HWIL connectivity for real-time information fusion analysis and algorithm development and design a Next Generation Internet/Virtual Private Network (NGI/VPN)-based geographically distributed network for the Navy Theater Wide (NTW) program. This NGI/VPN capability linked the Raytheon Standard Missile Block III infrared HWIL/SIL facility in Tucson, AZ, with the Moorestown, NJ AEGIS Combat System Engineering Development Site (CSEDS). The NGI/VPN technology supported high bandwidth communications over NGI networks, such as Internet 2, while providing the quality of service and security features that allow use of public networks for sensitive applications.
•	1561	Provide funding for Army salaries in support of the ARC/SC.
Total	44451	
Project 3352		
Page 25 of 57 Pages		
Exhibit R-2A (PE 0603874C)		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3352
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
3352, Modeling and Sim, PE 0603873C		25133								
3155, Sys Eng & Integration, PE 0603872C	11488									

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

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
BMDSSC Version Release (Unclassified)	1Q-4Q	1Q-4Q						
Wargame 2000 Integration with BMC3	1Q							
M-O FYIRMP	4Q	4Q						
BMD SSC Version Release (Classified)	1Q,3Q	1Q,3Q						
C2SIM with Wargame 2000	1Q							
C2SIM '00 w/ Wargame 2000		1Q						
Wargame 2000 TAMD IOC	3Q							
Wargame 2000 TAMD FOC (Block 33)		3Q						
M & S Acquisition Strategy	1Q							
M & S Investment Plan	2Q	2Q						
PEGEM Version 3.6		1Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3352
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ARC Infrastructure	SS/CPFF	Colsa Corporation (HSV)	14016	16899								
b. Simulation Center Infrastructure	C/CPFF	Madison Research (HSV)	8437									
c. WG2K Software Dvlpmt, Rqmt Analysis, System Engineering and design test	C/CPAF	TRW (JNTF)	22451	7183								
d. Services M&S	Allotment	Multiple	861	0								
e. BMDO Data Centers	Allotment	Multiple	12317	0								
f. Mission Oriented ITR	Allotment	Multiple	2907	0								
g. Bandwidth Infrastructure	Allotment	Multiple	7660	9315								
h. Signature Models	Allotment	Multiple	0	4722								
i. Lethality Models	Allotment	Multiple	0	1092								
j. SSC Support	Allotment	Multiple	0	821								
Subtotal Product Development:			68649	40032								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. T&E Technical Support	BMDO HQ Contract	Vanguard	1353	777								
b. T&E Technical Support	BMDO HQ Contract	TRSR	997	1302								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001			
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3352			
c.	T&E Technical Support	BMDO HQ Contract	SPARTA	2152	733								
d.	T&E Technical Support	BMDO HQ Contract	MITRE	2295	0								
e.	T&E Technical Support	BMDO HQ Contract	TRW	2895	0								
f.	T&E Technical Support	BMDO HQ Contract	EER	0	46							46	
Subtotal Test and Evaluation:				9692	2858							12550	
Remark:													
IV.	Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.	Army Salaries	Allotment	Huntsville	5484	1561								
Subtotal Management Services				5484	1561								
Remark:													
Project Total Cost:				83825	44451								
Remark:													

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001			
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3353			
COST (<i>In Thousands</i>)		FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3353 JNTF		52510	46670								
A. <u>Mission Description and Budget Item Justification</u>											
<p>The Joint National Test Facility (JNTF) is BMDO's premiere modeling, simulation and test capability for evaluating the interoperability of Theater Missile Defense (TMD) and National Missile Defense (NMD) functions. It is staffed by the military services with a focus on Family of System Interoperability for TMD and NMD in both Joint and Combined environments. In evaluating systems interoperability, the JNTF measures the integrated effects of systems and architectures, using both actual and simulated systems, and the capability to demonstrate effective information exchange within a prescribed scenario. In addition to conducting tests on systems of systems, JNTF also provides one-on-one support to TMD service developers for technical insertion and upgrade programs. JNTF also actively participates in CINC-sponsored TMD Exercises and Experiments supporting simulation and connectivity requirements, as well as collecting field interoperability data / information to assist in validating models and simulations. Both TMD and NMD Battle Management capabilities are exercised and evaluated at the JNTF. The JNTF provides inter-service computational capabilities and wide area network communication networks with Service facilities.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 24030 The JNTF conducted a TMD interoperability test and subsequent analysis in the third quarter. This test gave clear indications of interoperability problems that needed to be addressed by the various systems involved. Preparations were made and dry runs conducted for an expanded test that is to occur in the second quarter of FY01. The JNTF supported 30 CINC exercises with missile defense inputs through the Missile Defense and Space Tool. Conducted two Joint Theater and Air Missile Defense (JTAMD) wargames for the warfighter community. Conducted Passive Defense Early Warning Analysis for the JTAMD Organization Technical Director in support of their Joint Mission Area Assessment. Employed the JNTF's capability to compare and contrast various approaches to fusing data for NMD and TAMD functions which contributed to the Joint Composite Tracking Network algorithm benchmarking effort. Began conducting a verification and validation of the Theater Missile Defense System Exerciser (TMDSE) TADIL J Communication Emulation Segment. The JNTF provided high-end computational resources for the entire DoD community. This capability allowed the acceleration of the Wargame 2000 development. Provided a missile defense data repository to archive, manage, develop, distribute, and provide remote access to all relevant BMD test, experiment, M&S, and wargame data. Managed the BMDO Data Centers program. • 2023 Began the transition of Wide Area Network architectural changes to adopt Asynchronous Transport Mode as the technology of choice for remote connectivity. Upgraded information technology assets used to support the program management functions and to evolve to a more web-centric operation. Investments in data backup and restoral of key program management and mission data were completed. • 26457 Provide operations support of network, computer hardware, software, and communication procurement, installation, and maintenance, leased communication lines, systems engineering, security (both personnel and equipment), facility maintenance, government civilian pay, advisory and assistance service to the government, and contractor management services essential to missile defense acquisition. (Note: This area also supports \$28M of mission work from other BMDO PMAs and other DoD Agencies.) <p>Total 52510</p>											
Project 3353		Page 29 of 57 Pages					Exhibit R-2A (PE 0603874C)				

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3353
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FY 2001 Planned Program:

- 15239 Bridge the gap between warfighters and the Missile Defense acquisition community by creating key information related to Air and Missile Defense CONOPS, and the development, acquisition, and deployment of systems and architectures. Conduct two major TMD Hardware-in-the-Loop interoperability tests with analysis reports, and accomplish all preparations for a third test that will be conducted in 1QFY02. Continue to update the Theater Missile Defense System Exerciser (TMDSE) that provides a test platform for BMDO-sponsored Hardware in the Loop Tests (HWILT). Provide analysis expertise to address BMD issues across the entire development and operational spectrum. Provide command and control simulations for TMD and NMD for joint CONOPS development, and provide missile defense system simulations to CINC exercises. In addition to large C2 simulations, conduct one large C2 Simulation Workshop and 2-3 smaller simulations to support BMC3 procedure development. Incorporate new WEB technologies into the BMD Simulation Support Center, and update the TMD, NMD, and building block M&S catalogs/repositories.
- 1576 Continue to modernize and upgrade the Wide Area Network architecture to reduce costs for remote connectivity and prepare for growth in bandwidth requirements. Upgrade 15% of desktop productivity tools and roll out Microsoft Office 2000. Implement facility modernization to support the technology base.
- 29855 Provide operations support of network, computer hardware, software, and communication procurement, installation, and maintenance, leased communication lines, systems engineering, security (both personnel and equipment), facility maintenance, government civilian pay, advisory and assistance service to the government, and contractor management services essential to missile defense acquisition. (Note: This area also supports \$23M of mission work from other BMDO PMAs.)

Total 46670

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY2007</u>	<u>To Compl</u>	<u>Total Cost</u>
2259 Israeli Cooperative Projs, 0603875C	188	0								
2404 BMC3, 0603871C	4024	0								
2407 Systems Engineering, 0603871C	4325	0								
3153 TAMD Integration, 063873C		59								
3155 Sys Eng & Integration, 0603873C	1025	99								
3161 Data Centers & Management, 0603874C	0	1653								
3261 TMD BM/C3I, 0603873C	437	0								
3270 Threat And CM Program, 0603876C	2075	2526								
3352 Modeling & Simulation, PE 0603874C	8077	8004								
3359 Test, Eval & Assessment, 0603873C	2493	5874								
MIPRs from other DoD Agencies	4793	0								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3353
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C. Acquisition Strategy:

The tasks in this project are met through full and open competition. The CRDC contract, currently performed by TRW and its sub-contractors, will be re-competed in FY01 through full and open competition. Formal source selection procedures are envisioned with an estimated award date of 15 October 2001. Contracted Advisory & Assistance Services are provided by Vanguard Research as Cost Plus Award Fee. This contract is being re-competed as a technical and administrative assistance contract for the JNTF Government staff in FY00. Formal source selection procedures are envisioned with an estimated award date of 15 October 2001.

D. <u>Schedule Profile</u>	<u>FY2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
TAMD/CINC Exercises	1-4Q	1-4Q						
TAMD Wargame	4Q	2&4Q						
C2 Simulation (NMD)		1Q						
Interoperability Tests	2Q	2&4Q						
Wargame 2000 Block 31	3Q							
Wargame 2000 Block 32		1Q						
Wargame 2000 Block 33		2Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A												
Subtotal Product Development:												
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost FY99-01	Target Value of Contract
a.												
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. TRW	C/CPAF	JNTF	89948	36686	TBD							
b. Vanguard Research	C/CPAF	JNTF	7877	3900	TBD							
c. JNTF	Government	JNTF	7935	3924	N/A							
d. USN NRL	Government	JNTF	1675	800	N/A							
e. LLNL	FFRDC	LLNL, Livermore, CA	600	300	N/A							
f. MITRE	FFRDC	JNTF	1686	1060	N/A							
Subtotal Test and Evaluation:			109721	46670								
Remark: The JNTF provides missile defense-related analysis, system level engineering, integration, and test and evaluation; supports the development of joint and combined missile defense doctrine, requirements, and CONOPS; and supports warfighting CINCs by conducting joint and combined simulations and wargames and participating in exercises. It accomplishes this mission by hosting BMDO projects, and non-BMDO customers who have synergy with missile defense, with space occupancy (facility O&M, security, utilities, transportation and handling, etc.), computers (O&M, networking, supplies and materials, customer service, licensing, installation, etc.), communications, modernization of computer equipment and software, facility modifications and enhancements, and product engineering support. The JNTF focus is on interoperability testing. This involves conducting C2 simulations to develop and test CONOPS for missile defense, and conducting tests with all TMD missile defense systems connected to test their ability to work together in a theater defensive posture.												
Project 3353				Page 32 of 57 Pages				Exhibit R-3 (PE 0603874C)				

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3353
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On 1 Feb 99 JNTF consolidated the Lockheed Martin O&M contract and the TRW R&D contract into a TRW Consolidated R&D Contract.

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. N/A												
Subtotal Management Services:												

Remark:

Project Total Cost:			109721	46670								
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Remark:

UNCLASSIFIED

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3354	
COST (<i>In Thousands</i>)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3354 Targets	2159	50952								
A. <u>Mission Description and Budget Item Justification</u>										
<p>The PAC-3, Navy Area, THAAD, Navy Theater Wide, and Airborne Laser (ABL) programs require target system support to accomplish their planned test and evaluation programs. The PAC-3 program uses HERA and Storm targets launched from Ft. Wingate into White Sands Missile Range (WSMR) and from Wake Island to Kwajalein Missile Range (KMR). The Navy Area program will use HERA targets from Ft. Wingate into WSMR, Short-Range Air Launched Targets (SRALT) at PMRF for the Linebacker test series, and Navy Theater Wide is using the Minute Man I, M-56 second stage booster for Aegis Leap Intercept testing launched from Pacific Missile Range Facility (PMRF - Barking Sands, Kauai) into open ocean impact areas. Lance missiles have been used for testing with the PAC-3 and the Navy Area programs. U.S. Army Space and Missile Defense Command (USASMDC) and U.S. Air Force Space and Missile Command (USAFSMC) are developing short and long range air launched target (LRALT) capabilities. LRALT will augment the existing target inventory; provide the capability to launch targets at various azimuths and ranges into TMD test ranges; and allow multiple simultaneous engagements.</p> <p>In FY00, this project maintained 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. FY01 funding for STARS is in the NMD Technology Program Element (0603871C).</p> <p>In FY01, this project will support the Consolidated Targets Program (CTP), the mission of which is to provide threat-credible ballistic missile targets and target system support to weapon system development and acquisition programs in accomplishment of BMDO's reliance obligations to the Department of Defense (DOD). The major functions of the CTP include: design, development and presentation of Theatre Missile Defense (TMD) targets; management of the Target Certification Process; Verification, Validation and Certification (VV&C) of target assets; modification and reuse of strategic missile hardware; air launched and liquid fueled target development; matching ballistic re-entry vehicle development; proof of concept/risk reduction demonstration flights; the acquisition and management of actual threat targets (Foreign Material Acquisition), and program management. Each target developed for BMD testing will be certified as providing the correct threat representative characteristics to test a system.</p>										
FY 2000 Accomplishments:										
	2159	Provided for maintenance, storage, aging and surveillance, refurbishment and mission planning of STARS assets in anticipation of future launch requirements.								
Total	2159									
Project 3354			Page 34 of 57 Pages				Exhibit R-2A (PE 0603874C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3354
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- FY 2001 Planned Program:**
- 12155 Provide for the purchase, acquisition, refurbishment, storage, aging and surveillance, maintenance, and testing of boosters, RVs, and missile related components used to build target systems. This includes SR-19 boosters, Pershing II RVs, M-57 boosters, and the Lance Missile assets. Provide requirements analysis, mission planning, target VV&C, contract coordination, program management, cost reduction analysis, database development, range integration, and pre/post mission analysis services for all TMD customers.
 - 1600 Provide target infrastructure and target-related support systems required to ensure WSMR, PMRF, and Wake Island can operationally support interceptor flights, air launch programs, and limited mission planning for various TMD programs.
 - 31327 Includes Support design, development, and demonstration of the Long-Range Air Launched Target (LRALT) including a threat representative RV and MBRV-2 Risk Resolution Flight from Wake Island.
 - 794 Provide maintenance, refurbishment, and launch services for acquired Foreign Material Acquisition (FMA) targets. FMA assets provide actual threat targets for testing against TMD systems.
 - 2482 Provide target-related engineering and technical assistance in support of a liquid fueled surrogate target design. The design will address performance expectations, divergences from baseline signatures, trajectory kinematics accuracy, test range compatibility, and Laser Attack Vulnerability Assessment. Initiates Phase 1 of Liquid Surrogate target Development Program.
 - 2594 Provide government project personnel support.
- Total 50952

B. Other Program Funding Summary	<u>FY2000</u>	<u>FY2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
2257 PATRIOT, PE 0604865C	220674	79851								
2260 THAAD, PE 0604861C	81614	543498								
2260 THAAD, PE 0603861C	506221	0								
1266 NAVY THEATER WIDE, PE 0603868C	368769	456372								
2263 NAVY AREA, 0604867C	303479	271052								
2400 NMD, PE 0603871C	944922	1853877								
3354 TARGETS, PE 0603872C	43711									
3354 TARGETS, PE 0603878C										
3354 TARGETS, PE 0603873C	5886									
3354 TARGETS, PE 0603173C	8917	9433								
3360 TEST RESOURCES, PE 0603874C	66758	102746								
3360 TEST RESOURCES, PE 0603878C										
3360 TEST RESOURCES, PE 0603872C	14954									
3360 TEST RESOURCES, PE 0603871C	474	474								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3354
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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 Program Office (SMDC-TJ-TT) in Huntsville, AL. The Hera and Storm target systems are being procured under the Consolidated Theater Target Services (CTTS) contract. Coleman aerospace corporation, Orbital Sciences Corporation, and Lockheed Martin Missile Systems compete for TMD target services. This contract provides increased flexibility to meet MDAP schedules and requirements.
- The development and demonstration of the long range air launched ballistic target system (LRALT) is being managed by the USASMDC/TT&E office with the Air Force Space and Missile Command as the contracting agency.
- With the advent of LRALT STARS is no longer a required TMD target. STARS will continue to be supported in the NMD Technology Program Element (0603871C).
- A liquid fueled target development program was initiated in FY00 to design a liquid-fueled booster for TMD target use. FY01 initiates a design phase with development starting in FY02.

D. <u>Schedule Profile</u>	<u>FY2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Navy Area		1-4Q						
Navy Theater		1-4Q						
PAC-3	2Q-4Q	1-4Q						
Others (Technology Programs)		2Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3354
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Target Validation	Allot	USASMDC Huntsville, AL	56511	28482	N/A							
b. Liquid Fueled Targets	CPFF	USASMDC Huntsville, AL	0	2482								
c. LRALT	CPFF	USAFSMC Los Angeles, CA	0	16600								
d. FMA	CPFF	USASMDC Huntsville, AL	0	794								
Subtotal Product Development:			56511	48358								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3354
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Maintenance of System	Allot	USASMDC, Huntsville, AL	5467	2594	N/A							
Subtotal Management Services:			5467	2594								

Remark:

Project Total Cost:			61978	50952								
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations				PROJECT 3357		
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3357 Facilities, Siting, and Environment	0	2975								
A. <u>Mission Description and Budget Item Justification</u>										
<p>In FY01, this project provides environmental program guidance, environmental impact analyses and documentation, real property facility siting, acquisition, and facility operational support for the Ballistic Missile Defense Organization (BMDO) Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. This project plans, programs, budgets, and oversees facility acquisition through the Military Construction (MILCON) and RDT&E construction programs. This project provides guidance and supports BMDO TMD, NMD, and Advanced Technology Environmental Safety and Health (ESH) Programs, including the Environmental Assessment and Environmental Impact Statement process, environmental compliance, pollution prevention, and other environmental efforts.</p>										
FY 2000 Accomplishments:										
<ul style="list-style-type: none"> • • 										
Total	0									
FY 2001 Planned Program:										
<ul style="list-style-type: none"> • 1335 Ensure ESH compliance of BMDO weapon systems throughout the acquisition life cycle. ESH efforts are accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas are 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials, and 5) pollution prevention. Work continues on new BMDO requirements as well as on NMD, Space Based Laser (SBL), Navy Area, Navy Theater Wide, MEADS, THAAD, PAC-3, and technology programs to meet their requirements. • 1640 Ensure the FY00-03 MILCON, Minor MILCON, and RDT&E design and construction activities are executed in time to support BMD programs' facility requirements and ensure compliance with all applicable laws and regulations. Emphasis will be on completing the design for the National Missile Defense (NMD) facility requirements in support of the Deployment Readiness Review, TMD systems, and the SBL Test Facility. Provide for TMD and NMD test and evaluation facilities improvements to support increasingly complex test scenarios. 										
Total		2975								
<p>Project 3357 Page 39 of 57 Pages Exhibit R-2A (PE 0603874C)</p>										

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3357
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
2257 PATRIOT, PE 0604865C	220674	79851								
2260 THAAD, PE 0604861C	81614	542498								
2260 THAAD, PE 0603861C	506221	0								
1266 NAVY THEATER WIDE, PE 0603868C	368769	456372								
2263 NAVY AREA, 0604867C	303479	271052								
3354 TARGETS, PE 0603874C	2159	50952								
3354 TARGETS, PE 0603878C										
3354 TARGETS, PE 0603873C	5886									
3354 TARGETS, PE 0603173C	8917	9433								
3354 TARGETS, PE 0603872C	43711									
3360 TEST RESOURCES, PE 0603871C	474	474								
3360 TEST RESOURCES, PE 0603872C	14954									
3360 TEST RESOURCES, PE 0603874C	66758	102746								
3360 TEST RESOURCES, PE 0603878C										
3357 Facilities, Siting, & Environmental, PE 0603878C										
3357 MILCON Planning & Design 0603878C										
3360 MILCON Planning & Design 0603874C	124									
3357 Minor MILCON 0603878C										
3360 Minor MILCON 0603874C	1248									
2400 NMD MILCON Planning & Design 0603871C	15000	14500								
2400 NMD Minor MILCON 0603871C		2000								
2400 NMD Major MILCON 0603871C		85095								
2400 NMD, PE 0603871C 0603871C	944922	1853877								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3357
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C. Acquisition Strategy:

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

To provide technical assistance concerning facilities construction, siting, and environmental activities, BMDO implements a process which:

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

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

- U.S. Army Space and Missile Defense Command (USASMDC)
- U.S. Air Force Materiel Command
- Navy Program Executive Officer (Theater Surface Combatants)
- U.S. Army Corps of Engineers (USACE)
- U.S. Navy, Naval Facilities Engineering Command (NAVFAC)
- U.S. Army Program Executive Officer-Missile Defense.
-

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Environmental Support for BMDO Programs		1-4Q						
Facility Acquisition Support for BMDO Programs		1-4Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3357
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army TMD Facility/ Environmental Programs Development	Allot	Army PEO, Huntsville		100	10/01/00							
b. Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TSC, Arlington VA		50	10/01/00							
c. Air Force TMD Facility/Environmental Programs Development	Allot	AF SMC, Los Angeles CA		77	10/01/00							
d. Army SMDC Fac/Envir Prog Development	Allot	Army SMDC, Huntsville, AL		20	10/01/00							
Subtotal Product Development:				247								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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		84	10/01/00							
b. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc. – Bethesda, MD		2622	10/01/00							
c. Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington DC		22	10/01/00							
Subtotal Support Costs:				2728								

Remark:

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3357
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III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:				2975								
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3359	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3359 Test, Evaluation, and Assessment	0	11375								
<p>A. Mission Description and Budget Item Justification</p> <p>Fiscal year 2001 Test, Evaluation and Assessment activities consist of selected activities previously performed under Project 1155, Discrimination.</p> <p>To prepare for critical future defense needs, technical operations will support BMDO programs by conducting several cross cutting programs that will yield improved capabilities across a selected range of boost, midcourse and terminal phase missile defense interceptors, advanced target sensors and innovative science. The ultimate objective is improved performance, reduced costs for acquisition programs and technical solutions options to mitigate evolving threats associated with National and Theatre Ballistic Missile Defense.</p> <p>This program provides the critical BMD signature data collection, analysis and reporting provided to the BMD community necessary for weapon system and interceptor development. Analysis efforts consist of Radar Cross Section analysis and Infrared signature analysis using data collection by assets owned or operated by BMDO or operated by other agencies for use by BMDO.</p> <p>This program also supports BMDO efforts to engage Allied countries in conducting collaborative efforts associated with ballistic missile signature and phenomenology research. Exchanges are conducted to assist Allies in facilitating surveillance, acquisition, track, discrimination and kill assessment through data collection, analysis and reporting.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • <p>Total 0</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 7021 Optical/RCS data collection analysis and reporting • 1533 International • 1489 Advanced Multi-sensor Fusion Test Bed support • 693 Corporate data collection, analysis and reporting • 639 Test Planning and Management Support <p>Total 11375</p>										
Project 3359			Page 44 of 57 Pages				Exhibit R-2A (PE 0603874C)			

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3359
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B. <u>Other Program Funding Summary</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
3359 System Test and Eval, PE 0603872C	19915									
3359 System Test and Eval, PE 0603878C										
3359 System Test and Eval, PE 0603873C	22252	64827								

C. **Acquisition Strategy:** This program provides critical optical/IR and RCS signature data and algorithm development for the BMDO MDAPs and is inserted in the systems engineering process for weapon system improvement. International collaborative efforts promote shared ballistic missile defense research and technologies which will contribute to a stronger ballistic missile defense capability by Allied countries

D. <u>Schedule Profile</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Live BM flight events (MDAP DT/OT, CMP, SIT, Real World)		1Q/4Q						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3359		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contt
Subtotal Support Costs:												
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Mission Planning supt.	MIPR	Various		261	1Q01							
b. Collection, analysis and reporting	Allotment	Various		7714								
c. International	Multiple	Various		1533								
d. Testbed Support	Allotment	PMRF		1489								
Subtotal Test and Evaluation:				10997								
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SMDC	Allotment	SMDC, Huntsville, AL		378	1Q01							
Subtotal Management Services:				378								
Remark:												
Project Total Cost:				11375								
Remark:												
Project 3359												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3359	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3360 Test Resources	65386	102746								
A. <u>Mission Description and Budget Item Justification</u>										
<p>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.</p> <p>The ground test facilities include:</p> <ul style="list-style-type: none"> Kinetic Kill Vehicle Hardware in the Loop Simulator (KHILS) at Eglin AFB in Fort Walton Beach, FL AEDC Hypervelocity Wind Tunnel Number 9 (Tunnel 9) at White Oak, MD Infrared and Blackbody Standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD. Hypervelocity Ballistic Range G Light Gas Gun Von Karman Facilities (VKF) at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN 7V and 10V Space Chambers at AEDC, Tullahoma, TN National Hover Test Facility (NHTF) at Edwards AFB, CA Army Missile Optical Range (AMOR) at Redstone Arsenal, AL Aero-Optic Evaluation Center (AOEC) at Calspan-University of Buffalo Research Center (CUBRC), NY Holloman High Speed Test Track (HHSTT) at Holloman AFB, NM <p>The test range facilities include national ranges such as:</p> <ul style="list-style-type: none"> White Sands Missile Range (WSMR) in Las Cruces, NM including Ft. Wingate Launch Complex near Gallup, NM Kwajalein Missile Range (KMR) in the Marshall Islands Pacific Missile Range Facility (PMRF) and Kauai Test Facility (KTF) at Kauai, HI Wake Island Launch Complex <p>The range instrumentation special test equipment, data collection assets, and range instrumentation include:</p> <ul style="list-style-type: none"> IR data collection sensors and platforms Mobile Range Safety System and Kwajalein Range Safety Control Center Upgrades NP-3 Aircraft upgrade for remote area safety support. Sea-Lite Beam Director (SLBD), based at White Sands Missile Range, Las Cruces, NM Miscellaneous improvements to BMDO infrastructure and support systems 										
Project 3359			Page 47 of 57 Pages				Exhibit R-2A (PE 0603874C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
<p>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), BMC³ and interoperability testing. Range instrumentation provides a cost-effective capability to collect missile characteristics, phenomenology data, and target/interceptor diagnostics on flight tests. These facilities and capabilities support systems design, verification and validation of weapon system and target realism, and the evaluation of test results.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 12278 Provided ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 and AOEC; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G/VKF; primary IR standards, black body and optical materials, calibrations at the NIST; Integrated kill vehicle testing at NHTF; capability for sled track maintenance and upkeep at HHSTT; upgrades at KHILS to support TMD, AIT and NMD interceptor kill vehicle testing; Lidar test activities at AMOR; and IR testing at the POST facility. • 3238 Provided test range planning and range instrumentation support, maintenance and upgrades. Included all efforts associated with integrating the Ballistic Target Program with National Range activities, MDAP customers, BMDO, and National Laboratories. Included all efforts associated with direct target launch mission support, efforts associated with target launch logistics support, development and coordination of all required Universal Documentation System inputs, and efforts associated with target launch site development at the various National Ranges. • 17883 Continued support of Navy Area and Theater-Wide Programs TBMD risk reduction at-sea testing and infrastructure improvements at PMRF. Provided support to SLBD, an infrared optical data collection, data recording/reduction, and data analysis and reporting system. Provided maintenance of the physical plant, the technical systems and the compliance posture of the Kauai Test Facility. Supported risk reduction activities for Navy Area and Navy Theater Wide testing, by implementing additional upgrades and improvements to the radar instrumentation, range data display system, telemetry instrumentation, a scenario planning tool, and advanced electro-optical sensor technology at PMRF. • 1777 Provided for White Sands Missile Range (WSMR) general support to BMDO and for the maintenance and care of launch facilities which support BMD testing. Contracted with land owners for the use of their land. Provided White Sands technical support to BMDO to conduct studies and respond to taskings as requested. • 14849 Provided O&M core funding to keep the IR data collection platforms, including AST and HALO/IRIS, intact and the system operational in order to support customer-funded TMD and NMD live fire tests at ballistic missile test ranges worldwide. Performed collection and analysis of requirements for external (non-range) sensor platforms to support MDAP test and evaluation data collection needs. • 7794 Provided range services, upgrades, and repairs in support of BMD testing at Kwajalein Missile Range. Provided caretaker activities to maintain Meck Island facilities and a composite mobile range safety system, configured on a mobile sea platform/ship, to manage overall flight safety (USS Worthy/Kwajalein Mobile Range Safety System). Provided the KMR Wake Island maintenance, development and integration of core technical support capabilities. Continued a multiyear effort to upgrade the Range Safety Control Center for Multiple Simultaneous Engagements and to replace the underground communications cable on the islands of Kwajalein, Roi Namur and Meck. Provided for upgrade to KMR communications link to CONUS using a DS-3 level communications capacity. 		
Project 3360	Page 48 of 57 Pages	Exhibit R-2A (PE 0603874C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE
BUDGET ACTIVITY		June 2001
4 - Demonstration and Validation	PE NUMBER AND TITLE	PROJECT
	0603874C BMD Technical Operations	3360
• 2423	Integrated ESH considerations into BMDO weapon systems acquisition life cycle; to reduce overall risk and costs, while enhancing the human environment and systems' performance. ESH analyses were accomplished in five (5) areas to integrate ESH issues into the systems engineering and other program planning processes. These areas were: 1) the National Environmental Policy Act (NEPA), 2) environmental compliance, 3) safety and occupational health, 4) hazardous materials management, and 5) pollution prevention. Work continued on environmental analyses for National Missile Defense (NMD), Medium Extended Air Defense System (MEADS), and Advanced Interceptor Technology (AIT). Work also continued on new BMDO requirements as well as on Space Based Laser (SBL), Navy Area, Navy Theater Wide, THAAD and PAC-3 systems.	
• 1650	Ensured the FY99-01 MILCON, Minor MILCON, and RDT&E design and construction activities were executed in time to support BMD programs' facility requirements and ensured compliance with all applicable laws and regulations. The design emphasis was on completing design for the National Missile Defense (NMD) facility requirements in preparation for the Deployment Readiness Review and design for TMD systems. Provided for TMD and NMD test and evaluation facilities improvements to support increasingly complex test scenarios.	
• 1838	Provided technical support for BMDO T&E activities including: development of a T&E Program Plan; test resource planning; analysis, planning and resource support for test ranges, facilities and targets; Test & Evaluation Working Group (TEWG) support; and special studies and analyses as tasked.	
• 1656	Provided for government personnel and project support.	
Total	65386	
FY 2001 Planned Program:		
• 17502	Provide ground test facility infrastructure and upgrades for BMDO testing including: wind tunnel testing at Tunnel 9 and AOEC; sensor testing at AEDC 7V/10V; lethality testing at AEDC Range G/VKF; primary IR standards, black body and optical materials, calibrations at the NIST; Integrated kill vehicle testing at NHTF; capability for sled track maintenance and upkeep at HHSTT; upgrades at KHILS to support TMD, AIT and NMD interceptor kill vehicle testing; Lidar test activities at AMOR; and IR testing at the POST facility.	
• 2681	Provides test range planning and range instrumentation support, maintenance and upgrades. Includes all efforts associated with integrating the Ballistic Target Program with National Range activities, MDAP customers, BMDO, and National Laboratories. Includes all efforts associated with direct target launch mission support, efforts associated with target launch logistics support, development and coordination of all required Universal Documentation System inputs, and efforts associated with target launch site development at the various National Ranges.	
• 25023	Support continuing Navy Area and Theater-Wide Programs TBMD risk reduction at sea-testing and infrastructure improvements at PMRF. Support to SLBD, an infrared optical data telescope, which collects calibrated radiometric and metric images of missile flights over WSMR. Maintenance of the physical plant, the technical systems and the compliance posture of KTF. Congressional plus-ups totalling \$20.5M were received for, PMRF Upgrades, Electro-Optical Sensors, the Range Data Fusion Upgrade Project, and installation of a software based program (ESPRIT) at PMRF which facilitates the planning and scripting of test events.	
• 2085	Provides for White Sands Missile Range (WSMR) general support to BMDO and provides for the maintenance and care of launch facilities which support BMD testing. Contracts with land owners for the use of their land. Provides White Sands technical support to BMDO to conduct studies as needed, to respond to tasking as requested, and to provide manpower support to BMDO in the Washington, D.C. area.	
• 16137	Provide O&M core funding to keep the AST data collection platform intact and operational in order to support customer-funded TMD and NMD live fire tests at ballistic missile test ranges worldwide. Perform collection and analysis of requirements for external (non-range) sensor platforms to support MDAP test and evaluation data collection needs.	
Project 3360		
Page 49 of 57 Pages		
Exhibit R-2A (PE 0603874C)		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
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- 6157 Provide for the caretaker activities to maintain Wake Island facilities for BMD target launch operations. Provides lease of Defense Information Systems Agency provided relay satellite bandwidth and the receiver earth station at Hickam AFB, Hawaii. Provides for the payment of shipments to and from Wake Island via air and sea. Provides fuel purchases. Provides environmental compliance for Wake Island.
 - 6256 Provide range services, upgrades, and repairs in support of BMD testing at Kwajalein Missile Range. Provides caretaker activities to maintain Meck Island facilities and a composite mobile range safety system, configured on a mobile sea platform/ship, to manage overall flight safety. Provides the KMR Wake Island maintenance, development and integration of core technical support capabilities. Provides for upgrade to KMR communications link to CONUS using a DS-3 level communications capacity.
 - 3306 Provide technical support for BMDO T&E activities including: development of a T&E Program Plan; test resource planning; analysis, planning and resource support for test ranges, facilities and targets; Test & Evaluation Working Group (TEWG) support; and special studies and analyses as tasked.
 - 4866 Provide core funding to perform all activities required to maintain a mission-ready optical data collection test asset (HALO/IRIS) to support TMD/NMD data collection missions required/requested by BMDO, MDAPs, and other Programs/Projects.
 - 16804 Improve target and background data collection capabilities of airborne sensors in support of NMD and TMD sensor development. Provide for Optical Data/Sensor Fusion efforts.
 - 1929 Provide for government personnel and project support.
- Total 102746

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
2257 PATRIOT, PE 0604865C	220674	79851								
2260 THAAD, PE 0604861C	81614	542498								
2260 THAAD, PE 0603861C	506221									
1266 NAVY THEATER WIDE, PE 0603868C	368769	456372								
2263 NAVY AREA, 0604867C	303479	271052								
3354 TARGETS, PE 0603874C	2159	50952								
3354 TARGETS, PE 0603878C										
3354 TARGETS, PE 0603873C	5886									
3354 TARGETS, PE 0603173C	8917	9433								
3354 TARGETS, PE 0603872C	43711									
3360 TEST RESOURCES, PE 0603871C	474	474								
3360 TEST RESOURCES, PE 0603878C										
3360 TEST RESOURCES, PE 0603872C	14954									
3357 MILCON Planning & Design		0								
3360 MILCON Planning & Design	124									
3357 Minor MILCON		0								
3360 Minor MILCON	1248									

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
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2400 NMD MILCON Planning & Design	15000	14500							
2400 NMD Minor MILCON		2000							
2400 NMD Major MILCON		85095							
2400 NMD, PE 0603871C	944922	1853877							

C. Acquisition Strategy:

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

In providing range and test facilities support to the MDAP Program managers, BMDO implements a process which:

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

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

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

D. <u>Schedule Profile</u>	<u>FY2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
KHILS – DITP (Quantum Well, Integration Tests)	1-4Q	1-4Q						
KHILS – DTRA (Nuclear Requirements)	1-4Q	1-4Q						
KHILS – BPI (System Studies)	1-4Q	1-4Q						
7V/10V – GBI: Raytheon	1-4Q	1-4Q						

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
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Tunnel 9 – THAAD Support	1-4Q	1-4Q							
Tunnel 9 – Arrow Support	1-4Q	1-4Q							
Tunnel 9 – NMD	1-4Q	1-4Q							
Range G – NMD	1-2Q	1-2Q							
Range G – Navy Theater TBMD	1-4Q	1-4Q							
Range G – THAAD	3-4Q	3-4Q							
RCSS Operational Capability									
NIST – 7V/10V, EKV SM-3, SBIRS (Blackbody Calibration)	1-4Q	1-4Q							
NIST – SM-2, THAAD, EKV, NraD (Emissivity)	1-4Q	1-4Q							
KMR TCMP Launch	2Q	2Q							
WSMR Navy SM2-Blk IV Testing	1Q	1Q							
Airborne Data Collection	1-4Q	1-4Q							
Airborne Data Collection Upgrades	1-4Q	1-4Q							
NHTF – NTW TBMD	1-4Q	1-4Q							
HHSTT – Navy Lower Tier	1-2Q	1-2Q							
HHSTT – NTW TBMD	3-4Q	3-4Q							
POST – NMD	1-4Q	1-4Q							
AOEC – Navy Lower Tier	1-2Q	1-2Q							
AOEC – AIT Technology	1-4Q	1-4Q							
Environmental Support for BMDO Programs	1-4Q								
FacilityAcquisition Support for BMDO Programs	1-4Q								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Army TMD Facility/ Environmental Programs Development	Allot	US Army PEO, Huntsville	138		N/A							
b. Navy TMD Facility/ Environmental Programs Development	Allot	US Navy PEO TSC, Arlington VA	330		N/A							
c. Air Force TMD Facility/Environmental Programs Development	Allot	USAF SMC, Los Angeles CA	364		N/A							
d. Army SMDC Fac/Envir Prog Development	Allot	USASMDC, Huntsville, AL	422		N/A							
e. PMRF Upgrades	Allot	US Navy, PMRF	30000	15391								
f. Optical Sensor Upgrade	Allot	US Navy, PMRF	10000	4965								
g. Data Collection Upgrades	Allot	USASMDC	0	16558								
h. Data Collection Upgrades	Allot	USAF	0	246								
Subtotal Product Development:			41254	37160								

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Facility Acquisition Life-Cycle Management and Support	MIPR	Various	228	0	N/A							
b. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc. Bethesda, MD	2601	0	8/1/00							
c. Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington, DC	30	0	N/A							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3360		
d. T&E Technical Support	CPFF	SRS Technologies Arlington, VA	1189	0	N/A							
e. T&E Technical Support	CPAF	Vanguard Research Fairfax, VA	1917	2377	6/00							
f. Subtotal Support Costs			5965	2377								
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. HALO & AST Support	Allot	USASMDC Huntsville, AL	16230	21350	N/A							
b. Wake Island Support	Allot	USASMDC Wake Island	11609	6157	N/A							
c. KTF	Allot	US Navy, Kauai Test Facility	3526	3674	N/A							
d. Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington, DC	30	0	N/A							
e. Sea Light Beam Dir	MIPR	SPAWAR	874	993	N/A							
f. Kwaj. Missile Range Spt	CPAF	USASMDC	9290	6256	N/A							
g. White Sands Missile Range Spt	Allot	WSMR White Sands, NM	1920	2085	N/A							
h. Target Launch Support	Allot	USASMDC	1997	2681	N/A							
Subtotal Test and Evaluation:			45476	43196								
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Core Infrastructure Planning Support	Allot	USASMDC, Huntsville, AL	30943	2482	10/1/00							
b. Core Infrastructure Planning Support	Allot	USAF	17141	14623	10/1/00							
Project 3360												
Page 54 of 57 Pages												
Exhibit R-3 (PE 0603874C)												

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 3360
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c. Core Infrastructure Planning Support	Allot	JNTF	294	0	10/1/00						
d. Core infrastructure Planning Support	Allot	USN	1351	0	10/1/00						
e. Core Infrastructure Planning Support	MIPR	Various	4542	979	TBD						
f. Gov Project Personnel Support	Allot	USASMDC, Huntsville, AL	1656	1929	10/01/00						
Subtotal Management Services:			55927	20013							

Remark:

Project Total Cost:			148622	102746							
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603874C BMD Technical Operations					PROJECT 3360	
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
4000 Operational Support	15833	10677								
<p>A. <u>Mission Description and Budget Item Justification:</u></p> <p>This project funds three basic areas: personnel and related facility support costs; statutory and fiscal requirements, and support service contracts. In FY-02, all projects in this Program Element has been transferred to Program Element 0603877C, BMD Architecture and Engineering and Program Element 0603878C, BMD Test and Evaluation.</p> <p>Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Missile Defense Command, US Army PEO Air and Missile Defense, US Navy PEO for Theater Surface Combatants, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.</p> <p>Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.</p> <p>Finally, assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 15833 Provided management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies. • • • <p>Total 15833</p>										
Project 3360			Page 56 of 57 Pages				Exhibit R-2A (PE 0603874C)			

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603874C BMD Technical Operations	PROJECT 4000
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FY 2001 Planned Program:

- 10677 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.
-
-
-

Total 10677

Change Summary Explanation: Internal readjustment to management account.

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY2007</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>

C. Acquisition Strategy:

D. <u>Schedule Profile</u>	<u>FY2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	83984	129699								
1161 Advanced Sensor Technology*	3999	35423								
2259 Israeli Cooperative Project	79985	94276								

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Elements 0603881C and 0603884C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

A. Mission Description and Budget Item Justification

This program is in Budget Activity 4 – Demonstration and Validation, Research Category 6.3B. The International Cooperative Program Element (PE) was created at Congressional direction. This PE provides for cooperative efforts with Israel and the Russian Federation. Cooperation with Israel centers around the development of an initial capability for the Arrow Missile Defense system that is interoperable with U.S. missile defense forces. The PE also provides for work with the Russian Federation to demonstrate advanced space-based remote sensor technologies and supports other cooperative research.

B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001 PB</u>)	81560	116992		
Congressional Adjustments		14000		
Appropriated Value		130992		
Adjustments to Appropriated Value				
a. Congressional General Reductions		-1008		
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming	2334			
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001 PB</u>	2334	12992		
Current Budget Submit (<u>FY 2002 PB</u>)	83894	129699		

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	
<p>Change Summary Explanation: Significant FY01 increase due to Congressional Action.</p> <p>The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense Organization Program Elements 0603880C, 0603881C, and 0603884C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.</p>		
<i>Page 2 of 15 Pages</i>		Exhibit R-2 (PE 0603875C)

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603875C International Cooperative Programs					PROJECT 1161	
COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
1161 Advanced Sensor Technology*	3999	35423								
<p>*FY00 activities partially funded from reprogrammed FY99 resources.</p> <p>A. <u>Mission Description and Budget Item Justification</u></p> <p>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. The objectives of these cooperative investments are subsystems with improved performance and reduced costs for acquisition programs.</p> <p>Russian-American Cooperative Programs:</p> <ul style="list-style-type: none"> The Russian-American Observation Satellites (RAMOS) program is an innovative U.S.-Russian space-based remote sensor research and development program addressing ballistic missile defense and national security. This program engages Russian developers of early warning satellites in the joint definition and execution of aircraft and space experiments. The program will ultimately design, build, launch, and operate two satellites that will provide stereoscopic observations of the earth's atmosphere and ballistic missile launches in the short wavelength and mid-to-long wavelength infrared bands. Near-term experiments have focused on planning and executing nearly simultaneous observations of Earth features using U.S. and Russian satellites. The final phase of the near-term experiments included the development of U.S. and Russian instruments for proof-of-concept measurements from the Flying Infrared Signatures Technology Aircraft (FISTA). <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> (\$4.260M provided from FY99 funds reprogrammed in accordance with the FY00 Program Budget Decision 224C). Continued to collect and analyze data from specialized infrared sensors developed by the United States and Russia and flown aboard the U.S. Flying Infrared Signature Technology Aircraft (FISTA). Continued efforts focused on the modeling and simulation of high-altitude cloud sun glint and cloud background scene structure in the mid-to-longwave infrared band. Finalized prototype design of a space hyperspectral polarimeter. Conducted a scientific review of the program objectives and validated that the utility of RAMOS results still justify the technology investment. 										
Project 1161			Page 3 of 15 Pages				Exhibit R-2A (PE 0603875C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 1161
---	--	-------------------------------

- 3999 Began the preliminary design process for the satellite experiment to confirm application of chosen bandwidths toward meeting program objectives. Reviewed system and subsystem requirements, identified risk items and provided recommended mitigation. Initiated discussions on government-to-government agreement, which defines work package split between the United States and Russia concerning launch vehicles, integration planning, mission operations concept, and data analysis capabilities. Began preliminary design process for the platform and instruments including definition of system level requirements, identification of interfaces, and analysis of alternatives. Outlined concept of operations and began experiment planning.
- Total 3999

FY 2001 Planned Program:

- 26223 Translate program objectives into system requirements and specifications from which the preliminary design of the Russian built satellites and supporting systems are derived. Complete the preliminary design process for the space platform, ground system, and launch vehicle including component specifications, draft test plans, trade-off analysis and risk mitigation plans. Design and fabricate mock-ups of the satellite platform to be used to support integration development and design.
Complete the preliminary design process for the primary sensor package including component specifications, test plans, trade-off analysis and risk mitigation plans. Design and fabricate mock-ups of the sensor package to be used to support integration development and design. Continue to update concept of operations and experiment plans based on system design. Begin data management plan.
 - 8900 Establish system engineering and configuration control processes. Define work package split between the United States and Russia concerning launch vehicles, integration planning, mission operations concept, configuration control, and data analysis capabilities. Monitor and facilitate progress of preliminary design. Provide technical review of exported data. Prepare program documentation for technology protection and security. Provide in country administrative, security and technical support of RAMOS Program Office.
 - 300 Validate models used for predictions of background scene clutter. Provide reliable estimates of the effects of sensor performance on the background clutter suppression performance of chosen algorithms. Assess sensor jitter models to provide a more robust assessment of the relative performance of the RAMOS bands for tracking of post-burnout theatre targets.
- Total 35423

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
N/A										

C. Acquisition Strategy:

RAMOS is a cooperative experiment program designed to engage the Russians in early warning and theater missile defense related technologies. The tasks to complete the design, fabrication, launch, and operations of the two-satellite constellation will be completed under three major contracts.

The first contract is with Utah State University (USU)/Space Dynamics Laboratory (SDL), a designated University Affiliated Research Center for space sensors. SDL is the current U.S. prime contractor for RAMOS and has a prime/subcontractor relationship with the Russian State Company, Rosvoorouzhenie (now Rosoboronexport), for

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 1161
---	--	-------------------------------

Russian tasks. This contractual approach will be used for design and development of the RAMOS system through the Preliminary Design Review (PDR) scheduled for 2Q FY02. After PDR, USU will remain as the prime U.S. contractor for the sensor development and fabrication as well as mission planning and data reduction.

The second contract will be a direct contract with the Russian State Company, Rosoboronexport (formerly Rosvoorouzhenie.) During FY01, BMDO plans to negotiate a government-to-government agreement with the Russian Federation to govern the RAMOS program. Once this agreement is concluded, BMDO will contract directly with Rosoboronexport for the Russian efforts. Under this contract, Rosoboronexport, through Russian subcontractors, will be responsible for the development and fabrication of the satellite platforms, development and operation of the ground system, and launch services for the two RAMOS satellites.

The third contract is with Ball Aerospace and Technologies Corporation of Boulder, CO. As the Systems Engineering and Integration contractor for BMDO, BATC will be primarily responsible for monitoring the Russian effort and facilitating the integration of U.S. and Russian components. Ball will also support preparation of program documentation for technology protection and security and provide in country administrative, security and technical support of RAMOS Program Office.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Data Analysis of Previous Experiments	1Q,2Q							
Additional FISTA Measurements	1Q							
Prototype Design of Space Hyperspectral Polarimeter	1Q							
Complete Science Review on Objectives	3Q							
Contracted with USU/SDL for PDR and Sensor Development	3Q							
Initiate Development of Preliminary Satellite Design	3Q							
Award Systems Engineering and Integration Contract		2Q						
Complete Systems Specification		2Q						
Complete Systems Requirements Review		2Q						
Conclude Gov't-to-Gov't agreement		3Q						
Conclude Direct Contract with Russians		3Q						
Preliminary Design Review for U.S. Sensors								
RAMOS System Preliminary Design Review								
Complete Critical Design for U.S. Sensors								
Complete Critical Design Review for System								
Begin Fabrication								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 1161
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Sensor GFE delivered to Russia								
Begin Sensor to Satellite Integration								
Begin Ground Segment Integration								
Satellite Fabrication and Testing Complete								
Launch								
On Orbit Operations Begin								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 1161
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Hardware Development	CPAF	USU/SDL, Logan, UT	41525	26223								
b. Hardware Development	OTAF	Rosoboronexport, RF										
c. Hardware Development	CPAF	BATC, Boulder CO		8000	25 Jan 01							
Subtotal Product Development:			41525	34223								

Remark: Prior to FY 1999, the RAMOS program was in BA3 - Advanced Technology Development, PE 0603173C, Support Technologies – ATD. Funding for Rosoboronexport in FY2001 and prior is as a subcontract to USU/SDI.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Development Support	Allot	AFRL, Hanscom AFB	1925	300								
Subtotal Support Costs:			1925	300								

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

AFRL technical support will be required in program development, experiment planning and data analysis, with emphasis on earth backgrounds, data certification, technology transfer and surveillance.

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.			0	0								
b.												
c.												
d.												
e.												
f.												
Subtotal Test and Evaluation:												

Remark:

Project 1161 Page 7 of 15 Pages Exhibit R-3 (PE 0603875C)

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 1161
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Program Management Support	CFFF	CSC/NRC, Arlington, VA and Aerospace, El Segundo CA	1095	900								
Subtotal Management Services:			1095	900								
Project Total Cost:			44545	35423								

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

UNCLASSIFIED

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603875C International Cooperative Programs					PROJECT 2259	
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2259 Israeli Cooperative Project	79985	94276								
A. <u>Mission Description and Budget Item Justification</u>										
<p>This project provides funding for the Arrow Deployability Program (ADP) to include the third Arrow battery and Arrow interoperability with U.S. Theater Missile Defense (TMD) systems, as well as the Arrow System Improvement Program (ASIP), Israeli Test Bed (ITB), and the Israeli System Architecture and Integration (ISA&I). The United States derives considerable benefits from its participation in these projects. The presence of a ballistic missile defense system in Israel developed under this project helps ensure U.S. freedom of action in future contingencies and provides protection against ballistic missile attacks to U.S. forces deployed to the region. The cooperative effort also provides risk reduction and alternative technologies for U.S. ballistic missile defense programs as well as phenomenology and kill assessment data.</p> <p>The ADP consists of efforts to integrate and test the elements making up a ballistic missile defense system for Israel. Under the ADP, the jointly developed Arrow II interceptor and launcher are being integrated with the Israeli developed Arrow components, to include: fire control radar (Green Pine), battle management center (Citron Tree) and launcher control center (Hazelnut Tree). The ADP is the third phase of the cooperative Arrow program. Phase I consisted of the Arrow Experiments project that cooperatively developed the pre-prototype Arrow I interceptor. It was followed by the Arrow Continuation Experiments (ACES) project which consisted of critical lethality and flight tests using the upgraded Arrow II interceptor. The Arrow II interceptor development, now complete, provided the basis for an informed Government of Israel (GOI) engineering and manufacturing decision to proceed with development of an integrated ballistic missile defense capability. ACES was highly successful and satisfied the Israeli requirement for a ballistic missile interceptor for defense of Israeli critical assets and population centers. The phase II program contributed to the U.S. technology base for new advanced ballistic missile defense technologies that were incorporated into the U.S. TMD systems, and also provided risk reduction technologies in the event that U.S. TMD technical efforts failed to meet expectations.</p> <p>The third phase is the current ADP, which began in FY96. This phase of the program provides for development, test, and deployment of an Arrow User Operational Evaluation System (UOES) to permit the Government of Israel to make a decision regarding its deployment (without financial participation by the United States beyond the Research and Development (R&D) stage). This effort includes integrated system-level flight tests of the total Arrow Weapon System (AWS). The first such integrated intercept flight test was successfully conducted in Israel on November 1, 1999. The Green Pine radar detected a Scud-class ballistic target, and the Citron Tree battle management center commanded the launch of the Arrow II interceptor and communicated with it in-flight to successfully destroy the incoming missile. A second ADP intercept flight test, conducted on September 14, 2000, was the first intercept of an air-launched Black Sparrow ballistic target. In this intercept test, the target was flown toward Israel making this the first Arrow intercept of an incoming target vice past intercept test wherein the target was flown away from Israel.</p> <p>The International Agreement (IA) between the U.S. and Israel for the ADP will be amended to provide additional funding of \$34M in FY02 for the Arrow third battery. In January 1998, Israel requested \$169 million to fund the procurement of a third Arrow battery. Congress provided a plus-up of \$45M in FY98 and a second \$45M plus-up in FY00. DoD requested, and Congress appropriated, third battery funding of \$45M in FY01. For each third battery installment, Congress authorized the ADP</p>										
Project 2259			Page 9 of 15 Pages				Exhibit R-2A (PE 0603875C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 2259
<p>IA to be amended to increase the U.S. cost share and allow Israel to withdraw an equal to acquire components of the third battery. Of the total \$169M requested by Israel in January 1998 for the third Arrow battery, a balance of \$34 M now remains. DoD has programmed that amount in FY02 as the final installment, which will then complete the U.S. commitment.</p> <p>Arrow is being made interoperable with U.S. TMD systems using the Joint Tactical Information Distribution Systems (JTIDS)/Link-16 communications architecture and message protocol. An interface has now been developed and delivered in Israel for AWS interoperability. Early proof-of-concept tests using the BMDO-developed TMD System Exerciser (TMDSE) have been conducted via interactive simulation exercises to lay the foundation for future test, assessment, and validation of the JTIDS-based interoperability between the AWS and U.S. TMD systems. The TMDSE experiments, to be largely completed in FY01, will assess AWS operability with deployed U.S. TMD systems. The interoperability effort will be funded in FY01 by a \$6M Congressional add-on which also pays back Israeli money which funded the effort in FY00.</p> <p>An Arrow System Improvement Program (ASIP) feasibility study will be conducted in FY01 to explore ways to maintain the Arrow's capability against emerging regional threats, including countermeasures and longer range ballistic missiles. This effort will be funded in FY01 by an \$8M Congressional add-on. The United States and Israel will determine, at the conclusion of the feasibility study, whether the ASIP is technically mature to proceed to the next ASIP phase. ASIP, if shown to be feasible, would be conducted in three phases. Phase I, a 9-12 month feasibility study, will be conducted during FY01 and will provide a determination concerning feasibility of upgrading the Arrow Weapon System and a detailed plan if shown to be feasible.</p> <p>Since Arrow program initiation in 1988, Israel successfully improved the performance of its pre-prototype Arrow I interceptor to the point that it achieved a successful intercept and target destruction in June 1994. Arrow II design and component testing progressed to the successful demonstration of the new warhead, electro-optical seeker, radar fuse, first stage booster, sustainer booster, launcher canister, and launcher. The ADP IA was signed in March 1996, and Presidential certification was completed in May 1996. Under the ADP agreement, the first flight test of the integrated AWS, a non-intercept fly-out test, was successfully completed on September 14, 1998. This was a combined ACES/ADP flight test, and its success marked the conclusion of the ACES Program. This flight test was the first in which the other elements of the AWS, rather than test range assets, were used to control and communicate in-flight with the Arrow missile. This test demonstrated the technical maturity of the AWS and was followed by a successful integrated system intercept test against a ballistic missile target on November 1, 1999. Following the successful intercept of an incoming Black Sparrow target on September 14, 2000, the Israeli Air Force declared the Arrow Weapon System operational on October 16, 2000.</p> <p>The ITB Program is a medium-to-high fidelity theater missile defense simulation that provides the capability to evaluate potential Israeli missile defenses, aids the Israeli Ministry of Defense (IMoD) in the decision of which defense systems to field, provides insights into command and control in TMD and the role of Human-in-the-Loop (HIL), and trains Israeli Air Force personnel to function in a TMD environment. A structured set of joint U.S./Israeli experiments is being executed to evaluate the role of missile defenses in Middle East theater operations. This funding also provides for a portion of the operation and maintenance of the ITB and for planned enhancements. The implementation of the Distributed Interactive Simulation (DIS) and high level architecture (HLA) technologies enables joint exercise experiments to be conducted both in Israel and across the water between U.S. TMD and Israeli TMD systems, using a combination of such modeling and simulation tools as the Extended Air Defense Simulation (EADSIM), Extended Air Defense Test Bed (EADTB), and the ITB.</p>		
Project 2259	Page 10 of 15 Pages	Exhibit R-2A (PE 0603875C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603875C International Cooperative Programs	2259
<p>ITB experiments are used to validate the performance of the prospective near-term Israeli Theater Missile Defense System and provide valuable insight into the potential role of HIL for a TMD system. The ITB is being used as a tool to assist with the development of Combined Standard Operating Procedures (CSOP) between the U.S. European Command (USEUCOM) and Israel for potential combined TMD operations. Early warfighter activities in developing the CSOP at the ITB were invaluable during U.S. contingency operations in late FY98. Further ITB experiments involving the Israeli Air Force and USEUCOM were undertaken in FY00 and FY01 to finalize combined operating procedures and to begin the integration of the AWS in USEUCOM'S CSOP and Operations Plan (OPLAN).</p> <p>The ISA&I tasks provide ongoing analysis and assessment of the baseline, evolutionary, and responsive threats to support the definition and evaluation of an initial Israeli Reference Missile Architecture (IRMA), a baseline missile configuration from which to assess and evaluate architectural effectiveness. Evolutionary growth paths to enhance the IRMA robustness against future threats are being identified. Critical TMD system architecture issues and technologies are being analyzed, and the conformance to established requirements of various TMD programs, including the Arrow Deployability Program (ADP), Boost Phase Intercept concepts, and the ITB are being conducted. Finally, previously developed simulations and models are being used selectively to address significant TMD issues. Collectively, the tasks conducted under this cooperatively sponsored ISA&I project 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.</p> <p>The ISA&I project activities have demonstrated that defense of the State of Israel from Theater 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 United States benefited from the architecture analysis work, including identification and progress toward resolution of critical TMD system issues such as kill assessment and the lethality study of a novel interceptor warhead. The ISA&I is playing a critical role in identifying possible AWS upgrades to preserve system effectiveness as more robust regional ballistic missile threats continue to evolve.</p> <p>The cooperative R&D program supports the advancement of emerging TMD technologies. The IMoD and the BMDO will jointly measure the phenomenology and kinematics of theater ballistic missile systems.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none">• 76923 Arrow Deployability Program. Continued AWS development to migrate the system toward an initial operational capability and validate activities via integrated flight tests. Transferred the results of the AWS tests to U.S. TMD interceptor developers. Conducted two successful intercepts of ballistic missile targets with the integrated Arrow Weapon System. Continued lethality, kill assessment, and producibility studies leading to an Israeli operational capability. Continued interoperability activities to include upgrading the Citron Tree battle management software to accept Link-16 messages. The TMDSE Proof-of-Concept (TPOC) test in July 2000 laid the groundwork for the Closed Loop test in FY01 that validated that the AWS could interoperate with U.S. TMD systems via common Link-16/Tactical Digital Information Link "J" (TADIL-J) protocols. Funding includes \$45M Congressional plus-up to offset Israel's continued requirement for procurement of components for a third Arrow battery.		
Project 2259	Page 11 of 15 Pages	Exhibit R-2A (PE 0603875C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 2259
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- 1889 Israeli Test Bed (ITB). Continued ITB experiments on near-term improvements to the Arrow TMD system deployability. Provided improved threat model and Arrow II update enhancements. Conducted distributed interactive simulation over-the-water experiments. Supported USEUCOM/Israeli Air Force (IAF) CSOP and Commander-in-Chief (CINC) USEUCOM exercise requirements utilizing the ITB.
 - 1173 Israeli System Architecture and Integration (ISA&I). Analyzed results of ITB Interoperability experiments. Continued evaluations of the performance of the near- and far-term TMD system based on ADP system flight tests and evolving regional threats. Continued analysis of TMD system refinements necessary to defeat future threats such as the evolving Iranian Medium Range Ballistic Missiles (MRBM) threats.
- Total 79985

FY 2001 Planned Program:

- 81286 Arrow Deployability Program. Continue AWS development. Conduct an intercept of a ballistic missile target with the integrated Arrow Weapon System. Continue to transfer system development and flight test results to U.S. TMD interceptor developers. Continue activities for achieving and validating technical interoperability via the Closed Loop testing involving the AWS, U.S. PATRIOT and Aegis. Continue lethality and kill assessment efforts to achieve high confidence kill assessment. Funding includes \$45M, which allows Israel to reduce ADP funding and continue procurement of components for the third Arrow battery. Funding also includes \$6M Congressional add-on which funds interoperability work in FY01 and repays the Government of Israel for funding interoperability work in FY00.
 - 8000 Arrow System Improvement Program (ASIP). Initiate Arrow System Improvement Program (ASIP) Feasibility Study to define performance requirements and technical improvements for enhancing the AWS capability against emerging longer-range and more robust TBM threats in the Middle East. This effort will be funded in FY01 by an \$8M Congressional add-on.
 - 2098 ITB. Continue ITB experiments related to the operational Arrow TMD system deployability. Provide improved threat model and Arrow II update enhancements. Support USEUCOM/IAF CSOP development and CINC USEUCOM exercise requirements.
 - 1592 ISA&I. Analyze results of ITB Interoperability experiments. Continue evaluations of the performance of the AWS. Continue analysis of TMD refinements for AWS to remain effective against future emerging threats
 - 1300 Cooperative R&D. Instrument test threat missile and conduct flight test.
- Total 94276

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
N/A										

C. Acquisition Strategy: This is an ongoing cooperative U.S./GOI development program. By completing the Arrow Deployability Program, U.S. TMD programs will be afforded state-of-the-art technical data for program risk reduction and the Government of Israel will have developed a robust AWS to defend against known regional ballistic missile threats. Through the ADP, Link-16-based interoperability between the AWS and U.S. TMD systems will be achieved. The United States and the Government of Israel, 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. The

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 2259
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ADP will be completed in FY02. The Government of Israel will continue to fund the acquisition of Arrow Weapon System components beyond FY02. The Government of Israel is interested in continuing missile defense cooperation beyond the Arrow Deployability Program. The Arrow System Improvement Program feasibility study was funded via a Congressional \$8M plus-up in FY01 and the final results of that study will provide a basis for assessing the viability of a follow-on FY02-07 cooperative missile defense program.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Initiate Interoperability Tests (APOC I)	1Q							
Arrow Weapon System Flight Tests	1Q & 4Q	3Q						
U.S. Benefits Review	1Q							
Conduct TMDSE Proof-Of-Concept Test I	2Q							
Conduct TMDSE Proof-Of-Concept Test II		2Q						
Initiate Interoperability Tests w/ U.S. TMDSE		2Q						
ADP final Third Battery Cost Share Adjustment								
Complete ASIP Feasibility Study		4Q						
Complete ADP								
Conduct cooperative R&D Flight Test								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ADP Development and Third Arrow Battery	International Agreement with Israel	Israel Ministry of Defense, Israel	115278	78286								
b. Arrow System Improvement Program	International Agreement with Israel	Israel Ministry of Defense, Israel		8000	2Q							
c. ISA&I	FFP with Cost Share	Wales, Ltd., Israel	2622	1592								
d. ITB	FFP	USA/SMDC Huntsville, AL	3651	1963								
e. Gov Personnel & Spt	Direct Funding	USA/SMDC Huntsville, AL	138	135								
f. Cooperative R&D	FFP	USA/SMDC Huntsville, AL		1300	2Q							
Subtotal Product Development:			121689	91276								
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ADP Arrow Project Office	Direct Funding	PEO/AMD	6092	3000	N/A							
Subtotal Support Costs:			6092	3000								
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Test and Evaluation:												

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603875C International Cooperative Programs	PROJECT 2259
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Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:			127781	94276								
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603876C Intelligence Program
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	21575	22414								
3155 Systems Engineering and Integration	0	9692								
3270 Threat and Countermeasures Program	21575	12722								

The BMD Program and resulting FY02 President's Budget request has been developed based on revised Secretary of Defense direction to develop capabilities to defend against the missile threat and sustain appropriate deterrence levels. Beginning in FY02, funding from this Program Element is moved to the Ballistic Missile Defense (BMD) System Program Element 0603880C to facilitate BMD system capability evolution, allow timely responses and reactions to changes in the BMD program, and provide the programmatic agility to mitigate unforeseen consequences.

A. Mission Description and Budget Item Justification

The purpose of this Intelligence program is to define potential adversary military force missile threats. The program consists of two component tasks: Intelligence Program and Intelligence Applications. A new Program Element (PE) was consolidated under project 3155. This provision calls for the establishment of a PE to be referred as the "Systems Engineering and Integration Program." The purpose of this program is to assist 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.

<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)	21002	22293		
Appropriated Value		22621		
Adjustments to Appropriated Value		-207		
a. OSD Inflation Adjustment				
b. Internal Reprogramming		573		
Adjustments to Budget Years Since FY 2001 PB				
Current Budget Submit (FY 2002 PB)	21575	22414		

Change Summary Explanation:

Funding: Funding adjustments made to support revisions in TMD core program schedules and requirements. Beginning in FY02, funding from this PE is moved to the BMD System Program Element 0603880C.
 Schedule: None
 Technical: None

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603876C Intelligence Program				PROJECT 3155		
COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3155 Systems Engineering and Integration	0	9692								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>This program is part of the System Engineering and Integration project. BMDO has realigned Systems Engineering functional tasks, previously accomplished under a number of projects. In this PE, Threat Systems Engineering activities are consolidated under this project 3155. This Program Element contains only the Threat Systems Engineering Program. A more complete description of the overall System Engineering and Integration project, can be found in the Mission Description for project 3155 in Program Element 0603873C, Family of Systems E & I and Program Element 0603874C, BMD Technical Operations.</p> <p>The BMDO Threat Systems Engineering Program assists TMD and NMD acquisition program offices in developing ballistic missile defense systems that are robust to potential countermeasures and are practical and within the means of anticipated adversaries. Included in this mission are Countermeasures Integration Program (CMIP) support to the TMD and NMD threat development process and advance warning to BMDO system designers. The BMDO CMIP reviews TMD and NMD systems for susceptibilities and identifies potential countermeasures, determines credibility through analyses and tests, characterizes credible countermeasures by providing designs and performance parameters, informs intelligence and system threat developers of potential countermeasures, informs TMD and NMD system designers with advance warning of potential countermeasures, and assists TMD and NMD system designers in developing counter-countermeasures. Providing vulnerability and susceptibility information, or "threat risk assessments", to the system designers early on 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.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • <p>Total 0</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 1130 Analyze to Threat/Capability based Threat development • 1790 Threat Risk Assessment • 2092 Provide Red Team Leadership and support for BMD related working group and Study Teams • 3670 Experiments and CHOP missions • 1010 DTT Baseline maintenance and update <p>Total 9692</p>										
Project 3155			<i>Page 2 of 8 Pages</i>				Exhibit R-2A (PE 0603876C)			

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603876C Intelligence Program	PROJECT 3155
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
3155 System Engineering and Integration, PE 0603872C	47144									
3155 Systems Engineering and Integration, PE 0603873C	60700	49289								
3155 Systems Engineering and Integration, PE 0603874C		23574								
3155 Systems Engineering and Integration, PE 0603877C										
3155 System Engineering and Integration, PE 0208864C		3938								

C. Acquisition Strategy: The 3155 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy Systems Engineering performance requirements. A portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Threat Risk Assessments		X						
Support the CHOP missions		X						
Maintain the Threat Systems Engineering Library		X						
DTT baseline Maintenance and update		X						
Provide Red Team Leadership and support for BMD related Working Groups and Study Teams		X						

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603876C Intelligence Program	PROJECT 3155
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Threat Engineering	CPFF	SPARTA, CA		1940								
b. Red Engineering Team	MIPR	MIT/LL, MA		2041								
c. Red Engineering Team	MIPR	SNL, NM		2041								
d. CHOP Missions	MIPR	AFRL, NM		3670								
Subtotal Management Services:				9692								

Remark:

Project Total Cost:				9692								
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UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603876C Intelligence Program	PROJECT 3270
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
3270 Threat and Countermeasures Program	21575	12722								

A. Mission Description and Budget Item Justification

Intelligence Directorate. The BMDO Directorate of Intelligence defines potential adversary military force missile threats. To accomplish this mission, BMDO has a threat definition program, which is based on intelligence community projections and is traceable to quantifiable analysis. This project produces capstone threat and countermeasure documentation to ensure consistent technical threat definitions across all the Services. It does not duplicate Service-unique activities. The program consists of two component tasks: Intelligence Program and Intelligence Applications; and a secondary task providing funds for an Executing Agent at USASMDC to support the Intelligence Threat task.

Intelligence Program Task. The purpose of this task is to provide an Intelligence Community-Validated TMD and NMD threat description. The threat is divided into four major categories under this task: Operational Threat Environment, Targets, System Specific Threats (SST), and Reactive Threats. The Operational Threat Environment includes assessments of the operational and technological environments and projects the effects of developments and trends on TMD and NMD mission capability. The Targets category includes a projection of foreign missile systems and countermeasures that enhance their performance. This includes force structure, performance characteristics, and sample signatures. SST addresses threats to NMD and the TMD "family of systems" including reconnaissance, surveillance, and target acquisition; lethal and non-lethal threats; and regional integrated SST assessments. The Reactive Threats category includes those that an adversary may develop as a result of deployment of NMD and the TMD "family of systems."

Intelligence Applications Task. The accurate specification and characterization of ballistic missiles and the appropriate development and integration of scenarios using these characterizations are critical to the analysis of alternative ballistic missile architectures, the performance assessments of potential technology applications, and the operational performance evaluations of candidate designs. This task provides baseline and excursion scenario descriptions in documentary and digital form for use in analysis of BMD architectures and operational effectiveness. These descriptions are the only approved threat employment portrayals authorized for acceptable BMDO analysis. This task:

- Identifies user needs for threat scenario descriptions.
- Identifies analyses needed to fully specify and characterize the threat missile systems, penetration aids, tactics, etc., and ensures the analyses are accomplished.
- Provides the analysis results to all interested agencies for review and comment.
- Addresses critical threat issues, which arise during the analysis process.
- Ensures all supporting agencies' views on threat issues are fully aired.
- Reviews, approves, produces, and distributes all threat scenario descriptions.
- Produces threat computer digital media (threat tapes) and supporting documentation for use by the development and acquisition communities.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603876C Intelligence Program	PROJECT 3270
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FY 2000 Accomplishments:

- 13553 Intelligence Program Task:
 Theater Air and Missile Defense (TAMD) Capstone System Threat Assessment Report (STAR) Support: Intelligence support to TAMD focuses on describing the current and projected (20 years into the future) systems and forces which must be countered by TAMD and which threaten its survivability.
 National Missile Defense (NMD) STAR Support: Intelligence support to NMD focuses on describing the current and projected (20 years into the future) systems and forces which must be countered by TAMD and which threaten its survivability. The purpose of the BMDO intelligence task is to provide Intelligence Community-validated NMD threat descriptions for use by the NMD Joint Program Office (JPO).
 Aerodynamic Missile Threat Document (AMTD) Support: This task provides integrated threat assessments on the current and future cruise missile threat from selected countries, to include land attack and antiship missiles.
 Missile Design Database (MDDDB)/STAMP upgrade and maintenance: MDDDB and STAMP are used to support BMDO analysis and studies in system-level evaluations.
 Ballistic Missile Reference Document (BMRD) production: Provides a comprehensive set of engineering data on worldwide ICBM, MRBM, SRBM, IRBM, and strategic SLBM systems for use in the BMRD.
 Space Missile Defense Command (SMDC) NMD and TMD related studies and designs: SMDC provides BMDO with technical inputs and review for the NMD and the TAMD Capstone STAR.
 National Ground Intelligence Center (NGIC) TMD related studies: NGIC provides BMDO with inputs into the STARS and with Defense Intelligence Reference Document (DIRD) reports. In an example task in support of TMD, NGIC will examine the ability of future air defense gun systems to defend fixed sites against cruise and tactical ballistic missile attacks.
 National Air Intelligence Center (NAIC) NMD related studies, designs, and models: NAIC provides BMDO with integrated ballistic missile threat assessments for use in the STARS and provides support to working groups and panels designed to develop or update the STARS.
 Missile Space Intelligence Center (MSIC) TMD related studies, designs and models: MSIC will provide BMDO with revised and updated SRBM and SAM/ATBM-related portions of the TAMD Capstone STAR to reflect new intelligence estimates.
 Office of Naval Intelligence (ONI) NMD related studies, designs and models: ONI provides BMDO with inputs into the STARS and with various level engineering designs for selected SLBMs which are addressed in the NMD STAR.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE
4 - Demonstration and Validation		June 2001
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
	0603876C Intelligence Program	3270
<ul style="list-style-type: none"> 3436 Intelligence Applications Task: <ul style="list-style-type: none"> Southeast Europe Campaign Scenario (scheduled completion Oct 01) (an update to an older scenario involving two bordering countries which attack a third country over water rights. This scenario is planned to have heavy NATO involvement) RT-2 Defense Plans Campaign Scenario (this scenario involves two countries which unify into one, and attack another border country) NMD IGT- Scenario engineering trajectories (JNIE-selected scenarios from the NMD Capability 1 Design-To Threats) North East Asia (NEA) III 2010 Campaign Scenario (weapons parameters updated) (an update to an older scenario involving two countries in northeast Asia. With updated weapons parameters and orders of battle) Directed Energy Weapons (DEW) Scenario engineering trajectories (strategic scenarios of analytical interest to the space-based laser program. Systems and trajectories are somewhat similar in detail to the NMD Design-To Threats) BMDO/SE Architecture Study (engineering trajectories for threat systems in a very far-term time period. Includes penaid) 4586 Threat Systems Engineering Task: Establish and maintain common engineering threat definition across BMD architecture. Create and maintain a Ballistic Missile Defense (BMD) "Design-to-Threat". Revitalize and operate a Red Engineering Team that take the role of an enemy striving for an effective ballistic missile attack on targets defended by US BMD systems. Provide Threat Systems Engineering Support to BMD architecture development and evolution. Conduct studies and analyses of proposed BMD architecture(s), system(s), and component designs from an adversary's point of view. Expand and/or develop countermeasures designs to an engineering detail level sufficient to support scenario development, modeling, simulation, and analysis. Conduct hardware development, experiments, and/or ground-tests to quantify the level of difficulty in creating countermeasures, quantify countermeasure performance, and provide test data to support systems analyses. 		
Total	21575	
FY 2001 Planned Program:		
<ul style="list-style-type: none"> 7524 Intelligence Program: Task: Provide Capstone STAR, specialty threats, targets analysis, operational threat environment intelligence assessments, management, and planning support 5198 Intelligence 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. 		
Total	12722	
Project 3270	Page 7 of 8 Pages	Exhibit R-2A (PE 0603876C)

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603876C Intelligence Program	PROJECT 3270
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B. Other Program Funding Summary (\$In Thousands)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	To Compl	Total Cost
2407 NMD Program, PE 0603871C	3000								
Missile Feasibility Assessment (MFA) 0603871C	2421								
1155 Technology- Research&Engr, PE 0603874C	200								

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 2000				FY 2001				FY 2002				FY 2003			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NMD STAR				X			X									
TMD Capstone STAR			X				X									
Threat Risk Assessment								X								
NEA III Scenario (Update)							X									
South East Europe Scenario				X				X								
RT-2 Campaign Scenario						X										

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	779584						Continuing	Continuing
1010 BMC2	0	0	30792						Continuing	Continuing
1020 Communications	0	0	10000						Continuing	Continuing
1030 Targets & Countermeasures	0	0	96539						Continuing	Continuing
1050 Systems Engineering & Integration	0	0	228663						Continuing	Continuing
1060 Test & Evaluation	0	0	391916						Continuing	Continuing
1090 Program Operations	0	0	21674						Continuing	Continuing

A. Mission Description and Budget Item Justification

The BMD System Program Element (PE) provides the resources to select, test, integrate, and demonstrate the multi-layered Ballistic Missile Defense System (BMDS). System-level activities allow for the combining of mission-oriented BMDS segments (Terminal, Midcourse, Boost, and Sensors) into a single coherent and harmonized missile defense system able to defend the United States, deployed forces, friends, and Allies. The BMD System mission is comprised of five primary activities: Battle Management, Command & Control (BMC2), Communications, Targets & Countermeasures, System Engineering & Integration (SE&I), and Test & Evaluation (T&E). Successful performance of these activities is necessary for fielding a multi-layered, evolutionary system for defense in depth against the full spectrum of ballistic missile threats.

The BMC2 project produces the system that provides command and control for the BMDS. This includes the development and allocation of BMC2 specifications necessary to ensure that the Boost, Midcourse, and Terminal Defense Systems and the Sensor Systems are fully interoperable with each other and with other external systems, and provide maximum flexibility to the war fighter.

The Communications project consolidates and refines communication systems that are being developed for the BMDS. BMD System Communications activities are responsible for developing capabilities that will allow all components of the BMDS to exchange data, and to permit command and control orders to be transmitted to the weapons and sensor systems. Communications efforts provide the engineering-based capability to assess and translate allocated requirements into communication system specifications necessary to meet multi-operator needs.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System
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The Targets and Countermeasures project provides threat credible ballistic missile targets, countermeasures, and target system support. This activity will provide new target and countermeasure development, risk reduction flights, and target characterization. Efforts will maintain the required inventory of major target components (boosters, Reentry Vehicles (RVs), countermeasures). The project provides resources for the operations, replacement, and upgrade of test range instrumentation, other BMDS-level test assets associated with targets and countermeasures efforts, and advanced target development.

The SE&I project provides the overall systems engineering development and integration of the BMDS. The SE&I mission is to define and manage the layered BMD system, providing the collaborative, layered, and detailed systems engineering and integration required across the entire spectrum of BMDS war fighter capabilities. The SE&I program scope spans the development of individual components (e.g. boosters), projects (e.g. Block 2006 THAAD), BMD segments (e.g. midcourse), and the fully integrated BMD System. SE&I activities provide the engineering core competency, modeling facilities, and integrative engineering development efforts needed to technically manage and field the capability-based BMDS.

The T&E project provides consolidated BMDS-wide T&E capabilities and resources required to allow for cohesive facilitation, management, and execution of test activities. T&E efforts include the development, operation, maintenance, and modernization of the BMD program-wide T&E infrastructure. T&E activities associated with specific BMDS segment level tests or test resources are captured in the respective BMDS segment. The T&E program also addresses crosscutting BMDS issues related to system lethality, discrimination, and other T&E derived mission critical functions. T&E activities are grouped in terms of Program Wide T&E; Test Support of facilities, ranges, sensors, and test instrumentation; modeling and simulation; and facilities, siting, and environmental efforts.

Program Operations funding includes the required personnel and management support for developing an integrated BMDS. This infrastructure includes items such as: Travel; personnel and related facility support costs; statutory and fiscal requirements, and support service contracts.

<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB				
Current Budget Submit (<u>FY 2002</u> PB)			779584	

Change Summary Explanation:

This is a new Program Element. A detailed crosswalk from the previous PE structure is provided in the Program Overview accompanying this budget submission

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1010
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1010 BMC2	0	0	30792						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Battle Management, Command & Control (BMC2) Project is responsible for producing the system that provides command and control for the BMDS. This includes the development and allocation of BMC2 specifications necessary to ensure that the Boost, Midcourse, Terminal and Sensor Segments are fully interoperable with each other, other external systems to provide maximum flexibility to the war fighter. These activities formulate and implement policy and procedures to ensure that Department of Defense (DoD) and BMD interoperability requirements support the Services, Allied and Coalition partners. Interfaces to external sensors, to a wide range of command systems, and to other defense systems such as the Theater Air and Missile Defense (TAMD) and the North Atlantic Treaty Organization's Air Command and Control System (NATO ACCS) will be engineered and built to ensure optimum effectiveness of the BMD.

BMC2 leverages on work done by the Ground Based Midcourse System, the Joint Defense Planner (JDP), as well as efforts in BMC2 by TAMD and the Single Integrated Air Picture (SIAP) Engineer. BMC2 is executed in a collaborative environment. BMC2 maintains a close working relationship with the other BMDS segments, the System Engineer, and the BM/C3I Community. Additionally, BMC2 continues to work with the Military Services, U.S. Space Command, Joint Forces Command, and Allies/Coalition partners to ensure full integration of other systems, sensors, and command and control centers that contribute to BMD.

FY 2000 Accomplishments:

- 0 Project was funded under Program Elements 0603873C (Family of Systems Engineering and Integration and 0603874C (BMD Technical Operations) Previous projects included: 3155 Systems Engineering & Integration and 3261 BM/C4I Procurement.
- Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Elements 0603873C (Family of Systems Engineering and Integration and 0603874C (BMD Technical Operations) Previous project was 3155 Systems Engineering & Integration.
- Total 0

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1010
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FY 2002 Planned Program:

- 30792 Develop the initial architecture for the BMC2. Allocate requirements from the Systems Engineering to the BMC2 components (engagement coordination, fire control, situational awareness, planning tools and infrastructure). Develop specifications for the BMC2 components. Analyze requirements for interfaces to other segments, to external systems including TAMD and Allies/Coalition partners. Develop interface design documents, including specifications. Develop a Risk Management Plan and initiate a risk mitigation program. Establish test requirements for the segment. An initial proof-of-concept system will be built in FY2002 using the Ground Based Midcourse System framework and plugging in actual or modeled components such as Ground Based Terminal System and Airborne Boost System. This increment 0 demonstrator will be used to familiarize operators with the concept. A laboratory capability will be established at the Joint National Test Facility (JNTF) to be used for integration, demonstrations and operator interaction. Continue development of the Joint Defense Planner. Conduct tests on the POC BMC2, both to ascertain performance as well as to conduct operator in the loop experiments. Analyze results to feed back for design of the ensuing increments of BMC2. Develop detailed test plan for BMC2 increments. Plan for and initiate operator interaction process, to enable the development of BMDS operation concepts. Develop objectives for war game activities.

Total 30792

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
PE 0603880C, BMD System; Project 1020, Communications			10000						Cont.	Cont.
PE 0603880C, BMD System; Project 1030, Targets & Countermeasures			96539						Cont.	Cont.
PE 0603880C, BMD System; Project 1050 Systems Engineering & Integration			228663						Cont.	Cont.
PE 0603880C, BMD System; Project 1060, Test & Evaluation			391916						Cont.	Cont.
PE 0603880C, BMD System; Project 1090, Program Operations			21674						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment			495600						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603873C, Family of Systems-PDRR	145499	227444								
PE 0603874C, BMD Tech. Ops.-PDRR	216910	308415								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1010
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PE 0603876C, Intelligence Program	21575	22414							
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C. Acquisition Strategy:

A more detailed acquisition plan will be developed, and actions will be taken in FY02, to award a contract for the development of the BMC2. BMC2 will be built upon existing programs. The Ground Based Midcourse System will provide the basic infrastructure for the BMC2. The subsequent increments for BMC2, each scheduled for approximately two years in duration, will provide a detailed plan for development.

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
D. Schedule Profile								
TBMD Enhancements-ongoing effort			4Q					
Integrated System Specification (ISS) Final			1Q					
System Performance Specification Final			1Q					
Develop BMD System Architecture			1Q					
Risk Mitigation Plan			2Q					
GB Midcourse Infrastructure for BMD			2Q					
Establish JNTF BMC2 Lab			2Q					
Acquisition Plan			1Q					
Configuration Management Plan			2Q					
Proof-of-Concept Demonstrator			3Q					
JNTF Wargame			4Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction					PE NUMBER AND TITLE 0603880C BMD System					PROJECT 1010		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. BMC2 Development/Integration Contractor	TBD	BMDO, TBD				5280	June 2002				5280	
b. BMDS Integration Cntr		BMDO, JNTF, CO				4100					4100	
c. BMC2 Integration		Services				2600					2600	
d.												
Subtotal Product Development:						11980					11980	
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. BMC2 SE&I Contractor		BMDO, HQ				15312					15312	
b.												
Subtotal Support Costs:						15312					15312	
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. BMC2 Management	TBD	BMDO, HQ				3500					3500	

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1010
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b.												
Subtotal Management Services:						3500						3500

Remark:

Project Total Cost:													30792		30792
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Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1020
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1020 Communications	0	0	10000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Communication Project consolidates and refines communication systems that are being developed for the BMDS. It is responsible for developing capabilities that will allow all components of BMDS to exchange data, and to permit command and control orders to be transmitted to the weapon and sensor systems. It will be a mechanism for transmitting the information to the command and control to enable a complete, near-real time situational picture to be available. Communication between BMDS and external sensors, to a wide range of command systems, and to other defense systems such as the Theater Air and Missile Defense (TAMD) and the NATO ACCS will be engineered and built to ensure the optimum effectiveness for Ballistic Missile Defense.

Communication provides the engineering capability to assess allocated requirements and translate them into communication system specifications necessary to meet operator needs. This includes the development and allocation of communication specifications for transmission, for switches, relays and connection point hardware. Communication will use as a starting point the backbone system being developed by the Ground Based Midcourse System, a hybrid system of fiber optics and satellite systems. To meet the requirements of the other BMDS layers, it will be necessary to augment the Ground Based Midcourse System. On-going efforts such as the Joint Range Extension (JRE) program and the communication work undertaken by the Single Integrated Air Picture (SIAP) will be exploited to develop the global Ballistic Missile Defense communication system.

FY 2000 Accomplishments:

- 0 Project was funded under Program Elements 0603873C (Family of Systems Engineering and Integration) and 0603874C (BMD Technical Operations)
Previous projects included: 3155 Systems Engineering & Integration and 3261 BM/C4I Procurement.
- Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Elements 0603873C (Family of Systems Engineering and Integration) and 0603874C (BMD Technical Operations)
Previous project was 3155 Systems Engineering & Integration.
- Total 0

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1020
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FY 2002 Planned Program:

- 10000 Develop an initial architecture (operational, system, and technical) for Communications, leveraging from work being accomplished on the Ground Based Midcourse Defense communication network and the efforts on interoperability for the Joint Planning Network, Joint Data Network (JDN) and the Joint Composite Tracking Network. Allocate system and test requirements generated by the System Engineer to the appropriate components (i.e., transmission, entry points, switches, relays). Develop the detailed specifications for these Communication components. Analyze requirements for communication interfaces to other BMD segments, and to external systems including TAMD and Allies/Coalition. Establish a Communication risk management process that will define the risk mitigation program to be employed. Refine the JRE Application Protocol by designing a layered approach to accommodate global communications. Continue the development of Link-16 and Global Command and Control System interoperability enhancements. Work with the SIAP Engineer to ensure compatibility of the BMDS and the SIAP.

Total 10000

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
PE 0603880C, BMD System; Project 1010, BMC2			30792						Cont.	Cont.
PE 0603880C, BMD System; Project 1030, Targets & Countermeasures			96539						Cont.	Cont.
PE 0603880C, BMD System; Project 1050 Systems Engineering & Integration			228663						Cont.	Cont.
PE 0603880C, BMD System; Project 1060, Test & Evaluation			391916						Cont.	Cont.
PE 0603880C, BMD System; Project 1090, Program Operations			21674						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment			495600						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603873C, Family of Systems-PDRR	145499	227444								
PE 0603874C, BMD Tech. Ops.-PDRR	216910	308415								
PE 0603876C, Intelligence Program	21575	22414								

C. Acquisition Strategy:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1020
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Communication leverages off existing Ground Based Midcourse Communication Network (Long-Haul)/JDN/JRE efforts and accomplishes supporting tasks to satisfy Systems Engineering performance requirements. Future Satellite based programs may require stand-alone requirements, which will be determined as the Communication project evolves.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Comm. Acquisition plan (Draft/Final)			1Q					
JRE Spiral 4 Verification Testing (S4T)			3Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction						PE NUMBER AND TITLE 0603880C BMD System					PROJECT 1020	
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001 Cost</u>	<u>FY 2001 Award Date</u>	<u>FY 2002 Cost</u>	<u>FY 2002 Award Date</u>	<u>FY 2003 Cost</u>	<u>FY 2003 Award Date</u>	Cost To Complete	Total Cost	Target Value of Contract
a. Communication Integration Contractor	TBD	BMDO, HQ				500	June				500	
b. JNTF		BMDO, CO				1000					1000	
c. Communication Integration	Allot	Services				4500					4500	
d.												
Subtotal Product Development:						6000					6000	
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001 Cost</u>	<u>FY 2001 Award Date</u>	<u>FY 2002 Cost</u>	<u>FY 2002 Award Date</u>	<u>FY 2003 Cost</u>	<u>FY 2003 Award Date</u>	Cost To Complete	Total Cost	Target Value of Contract
a. SE&I Contractor						2800					2800	
b.												
Subtotal Support Costs:						2800					2800	
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001 Cost</u>	<u>FY 2001 Award Date</u>	<u>FY 2002 Cost</u>	<u>FY 2002 Award Date</u>	<u>FY 2003 Cost</u>	<u>FY 2003 Award Date</u>	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Test and Evaluation:												
Remark:												

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1020
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. BMC2 Management						1200					1200	
b.												
Subtotal Management Services:						1200					1200	

Remark:

Project Total Cost:						10000					10000	
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1030
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1030 Targets & Countermeasures	0	0	96539						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Targets & Countermeasures Project will provide threat-credible ballistic missile targets, countermeasures, and target system support. This activity will fund new target and countermeasure development, risk reduction flights, and target characterization, as well as, maintain inventory of major target components (boosters, RVs, countermeasures). Advanced target instrumentation will be developed, and Targets & Countermeasures will provide for aging and surveillance, refurbishment, and reuse of Minuteman and Pershing II hardware. As in years prior, users will continue to fund direct target costs and launch operations.

FY 2000 Accomplishments:

- 0 Project was funded under Program Elements 0603874C (BMD Technical Operations), 0603873C (Family of Systems Engineering and Integration), 0603173C (Support and Technologies- Advanced Technology Development). Previous project was 3354, Targets.
- Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Elements 0603874C (BMD Technical Operations), 0603873C (Family of Systems Engineering and Integration), 0603173C (Support and Technologies- Advanced Technology Development). Previous project was 3354, Targets.
- Total 0

FY 2002 Planned Program:

- 22239 Provide for Target Logistics, Inventory and Range Coordination.
 - 12100 Provide for Target Integration and Launch Services.
 - 40700 Provide for Targets Booster Development.
 - 6500 Provide for Target Payloads.
 - 15000 Provide for Development of Target Countermeasures.
- Total 96539

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1030
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>
PE 0603880C, BMD System; Project 1010, BMC2			30792						Cont.	Cont.
PE 0603880C, BMD System; Project 1020, Communications			10000						Cont.	Cont.
PE 0603880C, BMD System; Project 1050, System Engineering & Integration			228663						Cont.	Cont.
PE 0603880C, BMD System; Project 1060, Test & Evaluation			391916						Cont.	Cont.
PE 0603880C, BMD System; Project 1090, Program Operations			21674						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment			495600						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603873C, Family of Systems-PDRR	145499	227444								
PE 0603874C, BMD Tech. Ops.-PDRR	216910	308415								
PE 0603876C, Intelligence Program	21575	22414								

C. Acquisition Strategy:

Short and medium range ballistic missile targets are being developed by the U.S. Army Space and Missile Defense Command and Air Force Space and Missile Command. Short-range air launched target systems, being developed by Coleman Research, are being procured under the Consolidated Theater Target Systems (CTTS) contract. A medium range ballistic missile target is being developed by Orbital Sciences Corp under a contract with SMC. The development of a long-range air launched ballistic target system is being managed by USASMDC, Theater Targets Project Office with SMC as the contracting agency. A liquid fueled target development program was initiated in FY00 to design a liquid fueled booster for ballistic missile defense testing. In FY02 a down select to two contractors will be made to continue booster development over a two-year period. FMA target support will be competed under the CTTS contract. Development of target countermeasures, instrumentation and characterization will be executed under contracts at SMDC, SMC and BMDO.

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Target Infrastructure Sustainment			1-4Q					
LRALT Development			1-4Q					
Liquid Fueled Target Development			1-4Q					

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction				PE NUMBER AND TITLE 0603880C BMD System			June 2001
Threat Representative RV Development			1-4Q				
<i>Page 15 of 40 Pages</i>				Exhibit R-2A (PE 0603880C)			

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction						PE NUMBER AND TITLE 0603880C BMD System					PROJECT 1030	
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> 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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Target Logistics, Inventory and Range Coordination	Allot	USASMDC Huntsville, AL				7200	1 Oct 2001				7200	
b. Target Logistics, Inventory and Range Coordination	Multiple	BMDO, Various				12200	TBD				12200	
c. Target Integration and Launch Services	Allot	USASMDC Huntsville, AL				1400	1 Oct 2001				1400	
d. Target Integration and Launch Services	Multiple	BMDO, Various				10700	TBD				10700	
e. Target Boosters	Allot	USASMDC Huntsville, AL				6100	1 Oct 2001				6100	
Project 1030			Page 16 of 40 Pages					Exhibit R-3 (PE 0603880C)				

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction						PE NUMBER AND TITLE 0603880C BMD System					PROJECT 1030	
f. Target Boosters	Allot	USAFSMC Los Angeles, CA				12600	1 Oct 2001				12600	
g. Target Boosters	Multiple	BMDO, Various				22000	TBD				22000	
h. Target Payloads	Multiple	BMDO, Various				6500	TBD				6500	
i. Development of Target Countermeasures	Multiple	BMDO, Various				15000	TBD				15000	
Subtotal Test and Evaluation:						93700					93700	
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Gov't Project Per & Supt	Allot	USASMDC Huntsville, AL				2671	1 Oct 2001				2671	
b. Targets Mgmt Support	Government	BMDO, Washington DC				168	TBD				168	
Subtotal Management Services:						2839					2839	
Remark:												
Project Total Cost:						96539					96539	
Remark:												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1050
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1050 Systems Engineering & Integration	0	0	228663						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Systems Engineering & Integration (SE&I) project provides the overall connective engineering development and integration of the BMDS. The SE&I mission is to define and manage the layered BMD System and provide the collaborative, layered, and detailed system engineering and integration required across the entire spectrum of BMDS warfighter capabilities. The SE&I program scope spans the development of individual components (e.g. boosters), projects (e.g. Block 2006 THAAD), BMD segments (e.g. midcourse), and the fully integrated BMD System. SE&I activities provide the engineering core competency, modeling facilities, and integrative engineering development efforts needed to technically manage and field the capability-based BMDS. SE&I activities include System Engineering and Architecture Development, Threat Systems Engineering (TSE), Project Hercules, Intelligence System Threat, Joint Warfighter Support, and Joint National Test Facility (JNTF) efforts.

Systems Engineering and Architecture (SE&A) is responsible for the overall development and integration of the BMDS. This requires collaborative, detailed Systems Engineering be performed across the entire spectrum of activities from the development of individual components (e.g. boosters), projects (e.g. Block 2006 THAAD) to BMD segments (e.g. midcourse) to the fully integrated BMDS. Specifically, SE&A is responsible for the development, configuration control, and execution of a set of time-phased technical goals that enable the evolutionary development and delivery of incremental capability. Functional analysis and decomposition of BMD System level goals are performed to establish and allocate technical capabilities to individual segments, components, and project developers. Taking advantage of research, development, and technology efforts, SE&A develops new/alternative concepts, emphasizing multiple layers including boost, mid-course, and terminal intercept capabilities and employing multiple sensors integrated by BMC2 and communications projects, and conducts trade studies to support overall BMDS evolution. These trade studies include alternatives involving potential coalition partners that explore interoperability concepts, BMC2 alternatives, and associated engineering specifications. To eliminate duplication, engineering analyses are performed on crosscutting issues such as Lethality, Kill Assessment, and Phenomenology to provide a common understanding across all System activities. SE&A conducts both force-on-force level and detailed project level analyses to assess system effectiveness and establish expected capabilities. Particular focus is placed on tracking technical progress and system performance to identify and minimize/mitigate risks. Risk mitigation activities include the development of requirements and associated technical performance measures that quantify and drive technology development and insertion. SE&A is responsible for the implementation of Quality, Reliability and Manufacturing Technology (ManTech) associated with BMD component development. This includes applying Systems Engineering principles and resources to initiate or expand research, development, prototype construction, cost saving/cost reduction demonstrations, and other activities identified by systems analyses and assessments as offering potential remediation of a BMDO BMD problem area. SE&A develops requirements for and participates in T&E activities. SE&A is also responsible for the development, implementation, and operation of the BMD Information Management System, which includes decision support and collaboration tools, for both mission and business areas of the BMD Enterprise. Finally, SE&A works with the Services to smoothly transition developed capabilities to procurement.

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

DATE
June 2001

BUDGET ACTIVITY
4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE
0603880C BMD System

PROJECT
1050

Threat Systems Engineering develops, maintains, and provides configuration control of the detailed threat characterizations necessary to support BMD design, development, and testing. Using inputs from the Intelligence Community, TSE develops and maintains the BMD Design-to-Threat (DTT) to provide a common, stable, configuration controlled threat specification for use across all BMD System activities. TSE conducts engineering analyses to define technologically feasible changes in the threat and develops a parametric Reference Threat Document (RTD) to support evaluation of System robustness to unexpected developments. This activity includes the investigation of failure modes to examine unintended consequences of off-nominal performance of foreign systems. TSE also identifies potential countermeasures and determines their technical feasibility and the associated level of difficulty in design, development, manufacture, integration, and employment through analyses and tests. TSE develops and maintains a series of Reference Threat scenarios that illustrate the application of threat systems to support System analyses. This task includes the modeling and simulation of threat systems to provide data in both text and digital form. Finally, TSE employs its "adversary perspective" and experience in technologically feasible countermeasures to conduct analysis and perform risk assessments to support focused BMD projects such as Project Hercules.

Project Hercules is a specifically focused national systems engineering effort to develop the BMDO Corporate Countermeasure/Counter-Countermeasure (CM/CCM) Program and robust adaptive algorithms to counter off-nominal and evolving missile threats, across multiple BMD evolutionary system capabilities. The CM/CCM program provides a systematic approach to identify, prioritize, characterize and develop countermeasures and identify, develop, and test associated counter-countermeasures.

Intelligence Threat serves as BMDO's liaison with the Intelligence Community and provides current and projected intelligence information to support all BMDO activities. The BMDO Directorate of Intelligence defines potential adversary military force missile threats. To accomplish this mission, BMDO has a threat definition program, which is based on intelligence community projections and is traceable to quantifiable analysis. This project produces the Intelligence Community-Validated threat descriptions and associated capstone threat and countermeasure. 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 BMD 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 BMD System 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 BMD.

Joint TMD Warfighter support and assessment program allows CINCs to perform assessments of their Concepts of Operations (CONOPS) and Tactics Techniques and Procedures (TT&P) as part of their regular exercises to ensure BMDO programs provide systems that meet the warfighters requirements. These assessments provide valuable feedback needed to support BMD System evolution and the associated system engineering. This program also provides funds to support the BMDO role in the Joint Theater Air and Missile Defense (JTAMD) process in the development of the JTAMD Master Plan and assessment of associated system architectures and integration.

The JNTF is BMDO's premiere modeling, simulation and test capability for evaluating the interoperability of BMD functions. It is staffed by the military services with a focus on Interoperability for BMD systems in both Joint and Combined environments. In evaluating systems interoperability, the JNTF measures the integrated effects of systems and architectures, using both actual and simulated systems, and the capability to demonstrate effective information exchange within a prescribed scenario. In

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Program Definition and Risk Reduction	0603880C BMD System	1050
<p>addition to conducting tests on systems of systems, JNTF also provides one-on-one support to BMD service developers for technical insertion and upgrade programs. JNTF also actively participates in CINC-sponsored TMD Exercises and Experiments supporting simulation and connectivity requirements, as well as collecting field interoperability data / information to assist in validating models and simulations. BMD Battle Management capabilities are exercised and evaluated at the JNTF. The JNTF provides inter-service computational capabilities and wide area network communication networks with Service facilities</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 0 Project was funded under Program Elements: 0603173C (Support Tech - (Advanced Technology Development), 0603861C (THAAD System), 0603871C (NMD), 0603868C (Navy Theater Wide), 0603872C (Joint TMD), 0603873C (Family of Systems Engineering and Integration), 0603874C (BMD Technical Operations), and 0603876C (Intelligence Program). Previous projects included: 1180 Surveillance Technology, 1266 Navy Theater Wide, 2260 Theater High Altitude Defense, 3153 Systems Architecture and Engineering, 3155 Systems Engineering and Integration, 3270 Threat and Countermeasures Program, 3353 JNTF, 3359 Test, Evaluation & Assessment, and 4000 Operational Support. <p>Total 0</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 0 Project was funded under Program Elements: 0603868C (Navy Theater Wide), 0603871C (NMD), 0603873C (Family of Systems Engineering and Integration), 0603874C (BMD Technical Operations), and 0603876C (Intelligence Program). Previous projects included: 1266 Navy Theater Wide, 3153 Systems Architecture and Engineering, 3155 Systems Engineering and Integration, 3270 Threat and Countermeasures Program, 3353 JNTF, and 4000 Operational Support. <p>Total 0</p> <p>FY 2002 Planned Program:</p> <ul style="list-style-type: none"> • 87802 System Engineering and Architecture (SE&A) funds the core BMD System level engineering capability necessary to develop the integrated BMDS. <p>Systems Engineering will establish overall BMDS capabilities and allocate capability specifications to the individual projects and components. Develop Operational Concept(s) for the BMDS. Develop the BMD Systems Capabilities Specification Version 1.0 (SCS V1.0) and place it under configuration control. Fully implement the BMDS Configuration Control Board (CCB). Develop new/alternative concepts and conducts trade studies to support System evolution and risk mitigation. Specifically, support trade studies to further define boost phase projects and components. Develop integration standards and orchestrate integration activities across all BMDS projects to ensure System integration. Continue the establishment of BMDS level Technical Performance Measures (TPMs) and conduct technical reviews to assess progress, identify risks, support selection of alternatives, establish capability increments, and ensure integration. Continue risk mitigation activities, but provide an increased focus on crosscutting risk areas and expand activities to include risks associated with the industrial base needed to support BMD System development and manufacturing. Continue to execute the Corporate Lethality Program to support effective intercepts and establish collateral effects. Conduct force-on-force level and</p>		
Project 1050	Page 20 of 40 Pages	Exhibit R-2A (PE 0603880C)

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	
<ul style="list-style-type: none"> 87802 System Engineering and Architecture (SE&A) funds the core BMD System level engineering capability necessary to develop the integrated BMDS. <p>Systems Engineering will establish overall BMDS capabilities and allocate capability specifications to the individual projects and components. Develop Operational Concept(s) for the BMDS. Develop the BMD Systems Capabilities Specification Version 1.0 (SCS V1.0) and place it under configuration control. Fully implement the BMDS Configuration Control Board (CCB). Develop new/alternative concepts and conducts trade studies to support System evolution and risk mitigation. Specifically, support trade studies to further define boost phase projects and components. Develop integration standards and orchestrate integration activities across all BMDS projects to ensure System integration. Continue the establishment of BMDS level Technical Performance Measures (TPMs) and conduct technical reviews to assess progress, identify risks, support selection of alternatives, establish capability increments, and ensure integration. Continue risk mitigation activities, but provide an increased focus on crosscutting risk areas and expand activities to include risks associated with the industrial base needed to support BMD System development and manufacturing. Continue to execute the Corporate Lethality Program to support effective intercepts and establish collateral effects. Conduct force-on-force level and detailed project level analyses to assess System effectiveness, ensure robust performance, and establish expected capabilities. Supports analysis of System alternatives involving potential coalition partners that explore interoperability concepts, BMC2 alternatives, and associated engineering requirements. Establish requirements for and provide engineering support to System and verification and testing.</p> <p>SE&A includes Quality, Reliability, & Manufacturing Technology (ManTech) assessments and programs to implement technologies that address reliability and manufacturing technologies. These manufacturing technology programs focus areas include sensors, propulsion, electronics and materials that support cost reduction activities, technology insertion and increased producibility for all BMD programs.</p> <p>System Architecture provides for the development and analysis of the BMD system architecture with multiple layers including boost, mid-course, and terminal intercept capabilities and employing multiple sensors integrated by BMC2 and communications segments. Architectural goals are documented in the Technical Goals Document (TGD), which provides the overarching and unifying goals for the BMD system expressed in terms of segments, connections, constraints, and their interrelationships. To support architecture definition analyses, a process has been established to examine architecture alternatives and their associated capabilities against potential threat capabilities. This task also supports analysis of architecture alternatives involving potential coalition partners that explore interoperability concepts, BMC2 alternatives, and associated engineering requirements.</p> <p>SE&A is also responsible for the development, implementation, and operation of the BMD Information Management System, which includes decision support and collaboration tools, for both mission and business areas of the BMD Enterprise.</p>		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1050
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- 7200 This funds the TSE effort that develops and maintains configuration control of the detailed threat characterizations necessary to support System design, development, and testing. TSE will develop and update the baseline Design-to-Threat (DTT) from Version 2.0 to Version 3.0 and begin the transition to the more capabilities based Reference Threat Document (RTD). Provide threat risk assessment and countermeasures engineering support to Project Hercules. Initiate engineering efforts to develop parametric threat data and provide needed engineering detail for SBIRS and boost phase development. Complete Countermeasures Hands-On Program (CHOP) Skunkworks Mission 16 (SM-16) and integrate results into the Hercules efforts. Update the BMD System Reference Threat scenarios. Model, simulate, and produce digital threat data to support analyses. Continue to update and maintain the Threat Systems Engineering Library (TSEL).

- 59400 Hercules - Project Hercules is the BMDO corporate CM/CCM program; addresses issues to implement capability-based acquisitions in the BMD systems; and provides a national effort to develop algorithms enabling continued system improvement through spiral development.

- 10533 Intelligence Threat will continue to serve as BMDO's liaison with the Intelligence Community and provide current and projected intelligence information to support all BMDO activities. Intelligence will produce the Capstone Systems Threat Assessment Report (STAR), specialty threats, targets analyses, operational threat environment intelligence assessments, and provide management and planning support.

- 17802 Joint TMD Warfighter Support - This effort funds BMDO's Commanders In Chiefs (CINCs') Assessment Program. This program uses experiments, technology demonstrations, and theater-level exercises to help ensure the joint interoperability and successful fielding of Theater Air and Missile Defense (TAMD) Family of Systems (FoS) to the warfighting customers. In addition, it supports the development of joint interoperability TAMD doctrine, Concepts of Operations (CONOPS), and Tactics, Techniques, and Procedures (TTPs); and provides Joint/Coalition/Allied TAMD interoperability data.

- 45926 The JNTF - The JNTF is BMDO's premiere modeling, simulation and test capability for evaluating the interoperability of BMD system functions. It focuses on Theater and Global missile defense Interoperability. The JNTF measures the integrated effects of systems and architectures, using both actual and simulated systems, and the capability to demonstrate effective information exchange within a prescribed scenario. In addition to conducting tests on systems of systems, JNTF also provides one-on-one support to BMD service developers for technical insertion and upgrade programs. JNTF also actively participates in CINC-sponsored TMD Exercises and Experiments supporting simulation and connectivity requirements, as well as collecting field interoperability data / information to assist in validating models and simulations. Both Theater and Global Battle Management capabilities are exercised and evaluated at the JNTF. The JNTF provides inter-service computational capabilities and wide area network communication networks with Service facilities.

Total 228663

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
PE 0603880C, BMD System; Project 1010, BMC2			30792						Cont.	Cont

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY	PE NUMBER AND TITLE					PROJECT
4 - Program Definition and Risk Reduction	0603880C BMD System					1050
PE 0603880C, BMD System; Project 1020, Communications			10000			Cont. Cont
PE 0603880C, BMD System; Project 1030, Targets & Countermeasures			96539			Cont. Cont
PE 0603880C, BMD System; Project 1060, Test & Evaluation			391916			Cont. Cont.
PE 0603880C, BMD System; Project 1090, Program Operations			21674			Cont. Cont
PE 0603881C, Terminal Defense Segment			988180			Cont. Cont.
PE 0603882C, Midcourse Defense Segment			3940534			Cont. Cont
PE 0603883C, Boost Defense Segment			685363			Cont. Cont.
PE 0603884C, Sensors Segment			495600			Cont. Cont
PE 0603175C, Technology			112890			Cont. Cont
PE 0603873C, Family of Systems-PDRR	145499	227444				
PE 0603874C, BMD Tech. Ops.-PDRR	216910	308415				
PE 0603876C, Intelligence Program	21575	22414				

C. Acquisition Strategy:

Systems Engineering and Architecture is a collaborative effort and the strategy is to acquire a SE&A Team to perform the BMD System level engineering and leverage engineering efforts performed at the BMD segment and project levels. The SE&A Team will be composed of engineers from Federally Funded Research and Development Centers (FFRDCs), defense contractor(s), and BMDO. Threat Systems Engineering and Intelligence Threat will be conducted by the Threat Systems Engineering and Intelligence Support Contractors and leverage efforts conducted by the Intelligence Community, National Laboratories, and Military Services.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
System Engineering and Architecture								
BMD Technical Goals Document			1Q					
BMD Systems Architecture Performance Assessment			1Q					
BMD Systems Requirements Document			1Q					
QRM Mantech Program Update			4Q					
Threat System Engineering								
Complete CHOP Mission 16			2Q					
Update the Threat Systems Engineering Library			4Q					
DTT/RTD baseline Maintenance and update			2Q					

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1050
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Hercules								
Identify, design, and assess Countermeasures through Hercules Red Team			1Q-4Q					
Identify, assess, and implement Counter-Countermeasure through the Hercules Blue Team			1Q-4Q					
Algorithm Development and Testing			1Q-4Q					
Intel & System Threat								
NMD STAR			3Q					
TMD Capstone STAR			3Q					
Joint Warfighter								
CINC Experiments			1Q-4Q					
TAMD Master Plan			1Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1050
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Project Hercules	Various	LMMC/Sparta/SMDC				34400					34400	
b.												
Subtotal Product Development:						34400					34400	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. System Engineering	Various	Services, Various				14106					14106	
b. System Architecture	CPAF	SPARTA, VA				11285	1Q				11285	
c. QRM Engineering		Services				12000					12000	
d. BMD Information Management System	Various	Various				24458					24458	
e. Threat Characterization	MIPR	AFRL, NM				500					500	
f. Project Hercules	Various	IDA, SMDC				20000					20000	
g. IN Army Intel Support		SMDC, AL				1540					1540	
h. IN Air Force Intel Support		Air Force, CO				735					735	
i. IN Program Support		BMDO, VA				3794					3794	
j. IN App Support		BMDO, VA				2216					2216	
k. IN Scenario Production		JNTF, CO				1842					1842	
l. IN Wargaming Support		JNTF, CO				248					248	
m. AP Army Analysis	Suballocation	DAMO/FDE				375	1Q02			Continue	375	
n. Navy Analysis	Suballocation	PMS/456				375	1Q02			Continue	375	
o. Air Force Analysis Support	Suballocation	SAF/AQPT				375	1Q02			Continue	375	
p. Marine Corps Analysis Support	Suballocation	MARCORSSYSCOM				125	1Q02			Continue	125	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1050
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q. JTAMDO Website Support	Suballocation	JNTF						100	1Q02			Continue	100
r.													
Subtotal Support Cost:								94074					94074

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. QRM Engineering						2500					2500	
b. CINC Experiments	Suballocation	Theater CINCs				14302	1Q02			Continue	14302	
c. JNTF	C/CPAF	TRW				37204	TBD			TBD	37204	
d. JNTF	C/CPAF	Vanguard				2500				TBD	2500	
e. JNTF	Government	JNTF				3794	N/A			TBD	3794	
f. JNTF	Government	USN NRL				900	N/A			TBD	900	
g.												
Subtotal Test and Evaluation Cost:						61200					61200	

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Sys Engineering.	FFRDC/POET					10000					10000	
b. Sys. Eng SETA Support	Various					3600					3600	
c. Sys. Eng Mgmt Support	Government	WHS, Washington DC				3939					3939	
d. Sys. Eng. Mgmt Support	MIPR					500					500	
e. QRM Program Support						2500					2500	
f. SA SETA Support	CPAF	SPARTA, VA				1000	1Q			Continue	1000	
g. BMD IM/IT Plans, Policies & Analyses						1914					1914	
h. Threat Engineering	CPFF	SPARTA, CA				2149					2149	
i. Threat Engineering & Analysis	MIPR	MIT/LL, MA				1200					1200	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)

DATE June 2001

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE 0603880C BMD System PROJECT 1050

j.	Threat Engineering & Analysis	MIPR	SNL, NM				1250					1250	
k.	Threat Engineering		Various				2101					2101	
l.	JNTF	FFRDC	LLNL, Livermore, CA				300			TBD		300	
m.	JNTF	FFRDC	JNTF				1228			TBD		1228	
n.	Hercules		CSC, SMDC				5000					5000	
o.	IN Mgmt Support		Intel, VA				158					158	
p.	Cat II SETA & Analysis Support						2150	1Q02		Continue		2150	
Subtotal Management Services:							38989					38989	

Remark:

Project Total Cost:							228663					228663	
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Remark:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1060
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1060 Test & Evaluation	0	0	391916						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Test & Evaluation Project consolidates all Program-wide Test & Evaluation resources. This allows for the more cohesive facilitation, management and execution of these test activities for a single BMD System. This activity provides the resources needed for the test infrastructure and analytical tools needed by the BMD program and to execute a Program-Wide Test Program. Test & Evaluation costs associated with a specific BMDS segment level tests or test resources are captured in the respective BMDS segment.

The T&E Project also provides the resources for the development, operation, maintenance and modernization of BMD program-wide test and evaluation infrastructure. These include ground test facilities, range assets, instrumentation, data collection platforms, and computational facilities. The project also resources BMD core models and simulations (M&S), including their development, sustainment, upgrade, the development of applicable standards, assurance of compliance with those standards, implementation of the High Level Architecture, and verification, validation, and accreditation activities to ensure credibility of the analytical tools. Programs such as a Russian Cooperative Modeling and Simulation program, the Advanced Research Center and Simulation Center (ARC/SC) are also resourced within this project.

As BMDO has testing needs that go beyond those of the individual BMDS segments, this activity also resources a Program-Wide Test Program. This program is intended to address crosscutting issues such as lethality and discrimination, to perform critical characterization and phenomenology measurements, to support the development of other BMD System activities. The cornerstones of the Program-Wide Test Program are the Critical Measurements Program (CMP), the Hardware-in-the-Loop Tests (HWILT), and the System Integration Test (SIT) overlays on other tests and exercises.

FY 2000 Accomplishments:

- 0 Project was funded under Program Elements: 0603872C (Joint TMD), 0603873C (Family of Systems Engineering and Integration) and 0603874C (BMD Technical Operations). Previous projects included: 1155 Discrimination, 3352 Modeling & Simulation, 3357 Facilities, Siting & Environmental, 3359 Test, Evaluation & Assessment, and 3360 Test Resources.

Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Elements: 0603873C (Family of Systems Engineering and Integration) and 0603874C (BMD Technical Operations). Previous projects included: 3352 Modeling & Simulation, 3357 Facilities, Siting & Environmental, 3359 Test, Evaluation & Assessment, and 3360 Test Resources

Total 0

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1060
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FY 2002 Planned Program:

- 132206 Program Wide Test & Evaluation - provides test expertise to the Director, BMDO and Programs to support development of Missile Defense Systems; executes flight and ground test events to reduce developmental risks and support BMDO data collection and analysis, including threat signature, countermeasures, and lethality/kill assessment; tests and assesses Family of Systems integration and interoperability; and sponsors International test and evaluation programs.
 - 161125 Test Support - provides for BMDO planning, oversight and coordination of integrated test and evaluation facilities. This includes inter-project as well as inter-service test and evaluation efforts, and provides for common ground test facilities, ranges, sensors and other related instrumentation. This supports those test resources mutually supporting BMDO's Missile Defense program. Individual BMDO programs pay only the direct costs associated with their specific testing efforts at these mission critical facilities. The DD Form 1391, attached in the RDT&E Construction section of this BMDO FY02 APB submission, identifies \$5.4M of this amount for FY02 in support of the Missile Defense Test System Test Bed at Kodiak.
 - 88153 Modeling & Simulation – develops and maintains a validated set of Core models and simulations (M&S) and M&S support activities, the Advanced Research Center/Simulation Center (ARC/SC), and the BMDO Data Centers, in direct support of the Program-Wide Test Program, System Engineering Program, BMD Architecture development, Project Hercules, Joint Warfighter wargame support and cooperative international coalition efforts.
 - 6000 Russian Cooperative Modeling & Simulation program.
 - 3900 Facilities, Siting & Environmental (FS&E) - provides environmental program guidance, environmental impact analyses and documentation, real property facility siting, acquisition, and facility operational support for the BMDO's Missile Defense Systems.
 - 532 Provides travel funding for T&E personnel.
- Total 391916

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
PE 0603880C, BMD System; Project 1010, BMC2			30792						Cont.	Cont
PE 0603880C, BMD System; Project 1020, Communications			10000						Cont.	Cont
PE 0603880C, BMD System; Project 1030, Targets & Countermeasures			96539						Cont.	Cont
PE 0603880C, BMD System; Project 1050, System Engineering & Integration			228663						Cont.	Cont
PE 0603880C, BMD System; Project 1090, Program Operations			21674						Cont.	Cont
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1060
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PE 0603883C, Boost Defense Segment			685363						Cont.	Cont
PE 0603884C, Sensors Segment			495600						Cont.	Cont
PE 0603175C, Technology			112890						Cont.	Cont
PE 0603873C, Family of Systems-PDRR	145499	227444								
PE 0603874C, BMD Tech. Ops.-PDRR	216910	308415								
PE 0603876C, Threat & Countermeasures	21575	22414								

C. Acquisition Strategy:

Test and Infrastructure programs will be executed utilizing a diverse acquisition strategy to take advantage of private industry competitive forces and existing DoD agency, FFRDCs, and international coalition partner capabilities. Examples of participants in this acquisition strategy include the U.S. Army Space and Missile Defense Command, Air Force Space and Missile Command, and the U.S. Navy Research Lab. Samples of existing and possible industry participants include organizations such as Coleman Aerospace Corporation, Orbital Sciences Corporation, Lockheed Martin Missile Systems, TRW, and Computer Science Corporation.

Test programs will be executed utilizing a consolidated targets development, test resource, facilities, siting and environmental, and program-wide test program strategy. BMD management requirements will be met through BMDO and other DoD agency personnel. BMD technical and program management services will be competitively procured from industry to provide the required infrastructure, engineering, programmatic, test and evaluation, and system specific expertise required to develop BMDS programs.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
7V/10V – GBI: Raytheon			1-4Q					
Missile Defense System Testing at Tunnel 9			1-4Q					
Missile Defense System Testing at Range G			1-4Q					
IR Sensor Program(s) testing at NIST			1-4Q					
Airborne Data Collection			1-4Q					
Airborne Data Collection Upgrades			1-4Q					
Missile Defense System Testing at NHTF			1-4Q					
Missile Defense System Testing at HHSTT			1-4Q					
Missile Defense System Testing at AOEC			1-4Q					
Missile Defense System Testing at AMOR			1-4Q					
Missile Defense System Testing at KHILS			1-4Q					
Missile Defense System Testing at WSMR			1-4Q					
Missile Defense System Testing at KMR			1-4Q					
Missile Defense System Testing at PMRF			1-4Q					

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System
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Critical Measurements Program			2Q					
Hardware-In-the-Loop-Testing			1Q, 3Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1060
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Russian Cooperative Modeling and Simulation	Allotment & MIPR	Multiple EAs				6000	1 Oct 2001				6000	
b. Campaign/ FoF Model Development	Allotment & MIPR	Multiple EAs				7100	1 Oct 2001				7100	
c. FoS Model Interoperability	Allotment & MIPR	Multiple EAs				9300	1 Oct 2001				9300	
d. Engineering Model Development	Allotment & MIPR	Multiple EAs				11445	1 Oct 2001				11445	
e. Core Model V & V	Allotment & MIPR	Multiple EAs				6055	1 Oct 2001				6055	
f. Campaign /FoF Model Maintenance	Allotment & MIPR	Multiple EAs				3400	1 Oct 2001				3400	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE		
										June 2001		
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT		
4 - Program Definition and Risk Reduction					0603880C BMD System					1060		
g.	FoS Model Maintenance	Allotment & MIPR	Multiple EAs				6300	1 Oct 2001			6300	
h.	Engineering Model Maintenance	Allotment & MIPR	Multiple EAs				6900	1 Oct 2001			6900	
i.	Scene Generation	Allotment & MIPR	Multiple EAs				4000	1 Oct 2001			4000	
j.	Algorithm Code/ Testing	Allotment & MIPR	Multiple EAs				3000	1 Oct 2001			3000	
k.	Modeling Advanced Sensors	Allotment & MIPR	Multiple EAs				2000	1 Oct 2001			2000	
l.	Lethality Models	Allotment & MIPR	Multiple EAs				1000	1 Oct 2001			1000	
m.	Israeli Interoperability	Allotment & MIPR	Multiple EAs				3000	1 Oct 2001			3000	
n.	ARC DEVELOPMENT & OPERATIONS	Allot	USASMDC Huntsville, AL				12000	1 Oct 2001			12000	
o.	Core M&S Support (BoC, IV&V, HLA)	Allotment & MIPR	Multiple EAs				4765	1 Oct 2001			4765	
p.	Legacy Data Recovery	Allotment & MIPR	Multiple EAs				500	1 Oct 2001			500	
q.	Data Center Disaster Recovery	Allotment & MIPR	Multiple EAs				200	1 Oct 2001			200	
r.	SSC Support	Allotment & MIPR	Multiple EAs				829	1 Oct 2001			829	
s.	Army TMD Facility/ Environmental Programs Development	Allot	Army PEO Huntsville, AL				104	1 Oct 2001			104	
t.	Navy TMD Facility/ Environmental Programs Development	Allot	Navy PEO TSC Arlington, VA				101	1 Oct 2001			101	
u.	Air Force TMD Facility/Environmental Programs Development	Allot	Air Force SMC, Los Angeles, CA				77	1 Oct 2001			77	
v.	Army SMDC Fac/Envir Prog Development	Allot	Army SMDC, Huntsville, AL				254	1 Oct 2001			254	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE		
4 - Program Definition and Risk Reduction										June 2001		
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT		
					0603880C BMD System					1060		
w.	Facility Acquisition Life-Cycle Management	MIPR	U.S. Army Corps of Engineers Huntsville,AL				85	1 Oct 2001			85	
x.	Army PAX Support	MIPR	U.S. Army Corps of Engineering, Washington, DC				23	1 Oct 2001			23	
y.	Critical Measurements Program	Allot	USASMDC Huntsville, AL				26090	1 Oct 2001			26090	
z.	SIT II	Allot	USASMDC Huntsville, AL				4713	1 Oct 2001			4713	
aa.	SIT II	MIPR	BMDO Multiple				9827	TBD			9827	
bb.	Test Planning	MIPR	BMDO Multiple				820	TBD			820	
cc.	Program Wide Interop Ground Testing	Allot	Multiple EA's				12600	1 Oct 2001			12600	
dd.	Special Program Tests	Allot	USASMDC Huntsville, AL				7425	1 Oct 2001			7425	
ee.	Special Program Tests	MIPR	BMDO Multiple				2575	TBD			2575	
ff.	Radar Exploitation	Allot	USASMDC Huntsville, AL				1500	1 Oct 2001			1500	
gg.	Corp Data Collect & Analyze	Allot	USAF, Multiple				150	1 Oct 2001			150	
hh.	Corp Data Collect & Analyze	Allot					300	1 Oct 2001			300	
ii.	Corp Data Collect & Analyze	MIPR	BMDO Multiple				3040	TBD			3040	
jj.	Optical Data Analysis	Allot	USASMDC Huntsville, AL				2702	1 Oct 2001			2702	
kk.	Optical Data Analysis	Allot	USAF, Multiple				50	1 Oct 2001			50	
ll.	Optical Data Analysis	Allot	USN, Multiple				50	1 Oct 2001			50	
mm.	RCS Data Analysis	Allot	USASMDC Huntsville, AL				2260	1 Oct 2001			2260	
nn.	RCS Data Analysis	Allot	USAF, Multiple				25	1 Oct 2001			25	
oo.	RCS Data Analysis	Allot	USN, Multiple				25	1 Oct 2001			25	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1060
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pp. Data Analysis	Allot	Multiple EA's				11330	1 Oct 2001				11330
qq. International Program	Allot	USASMDC Huntsville, AL				24	1 Oct 2001				24
rr. International Program	Allot	USAF, Multiple				24	1 Oct 2001				24
ss. International Program	Allot	USN, Multiple				24	1 Oct 2001				24
tt. International Program	MIPR	BMDO Multiple				1316	TBD				1316
uu. Program Wide Support CM/CCM	Allot	Multiple EA's				27683	1 Oct 2001				27683
vv. Interoperability	Allot	Multiple EA's				5500	1 Oct 2001				5500
ww. Lethality (TREx)/ Kill Assessment	Allot	Multiple EA's				6120	1 Oct 2001				6120
xx. Ground Test Facilities	Allot	USASMDC Huntsville, AL				3250	1 Oct 2001				3250
yy. Ground Test Facilities	Allot	USAF, Multiple				18100	1 Oct 2001				18100
zz. Ground Test Facilities	MIPR	BMDO, Multiple				2800	TBD				2800
aaa. Ranges & Instrumentation	Allot	USASMDC Huntsville, AL				11941	1 Oct 2001				11941
bbb. Ranges & Instrumentation	Allot	USN, Multiple				5500	1 Oct 2001				5500
ccc. Ranges & Instrumentation	MIPR	BMDO, Multiple				58150	TBD				58150
ddd. Airborne Sensors	Allot	USASMDC Huntsville, AL				50807	1 Oct 2001				50807
eee. Targets Certification & Requirements	MIPR	BMDO, Multiple				3000	TBD				3000
fff. Test Support	MIPR	BMDO, Multiple				993	TBD				993
Subtotal Test & Evaluation:						369152					369152

Remark:

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1060
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. GOV Project Per & Supt	Allot	USASMDC Huntsville, AL				1555	1 Oct 2001				1555	
b. Support Contracts	Various Contract Types	BMDO, Multiple				4804	TBD				4804	
c. GOV PROJ PERS & SUPT	Allot	Multiple EA's				2627	1 Oct 2001				2627	
d. Support Contracts	Various Contract Types	BMDO, Multiple				3406	TBD				3406	
e. TE Mgmt Support	Government	BMDO, Multiple				532	1 Oct 2001				532	
f. System Engineering and Technical Support (BMDO)	CPFF	SciComm, Inc. Bethesda, MD				3256	1 Oct 2001				3256	
g. Support Contracts	Various Contract Types	BMDO, Multiple				6018	TBD				6018	
h. SMDC Gov't Salaries Sensors	Allot	USASMDC Huntsville, AL				566	1 Oct 2001				566	
Subtotal Management Services:						22764					22764	

Remark:

Project Total Cost:						391916					391916	
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1090
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
1090 Program Operations	0	0	21674						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project covers personnel and related facility support costs, statutory and fiscal requirements, support service contracts and the BMDO data Center Programs.

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

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

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

This project also includes the BMDO Data Centers Programs. The BMDO Data Centers Information System Program Manager provides management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. The BMDO Data Centers Program archives, manages, and develops data products, distributes and provides remote access to all relevant BMD data. Operation and management of Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments for technical/programmatic issues and data center performance, coordinating segment customer program/data management requirements, and cooperative partnership requirements.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System
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FY 2000 Accomplishments:

- 0 Project was funded under Program Elements: 0603872C (Joint TMD), 0603873C (Family of Systems Engineering and Integration) and 0603874C (BMD Technical Operations). Previous projects included: 4000

Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Elements: 0603873C (Family of Systems Engineering and Integration) and 0603874C (BMD Technical Operations). Previous projects included: 4000

Total 0

FY 2002 Planned Program:

- 21674 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rent & utilities, supplies and the data centers programs.

Total 21674

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
PE 0603880C, BMD System; Project 1010, BMC2			30792						Cont.	Cont.
PE 0603880C, BMD System; Project 1020, Communications			10000						Cont.	Cont.
PE 0603880C, BMD System; Project 1030, Targets & Countermeasures			96539						Cont.	Cont.
PE 0603880C, BMD System; Project 1050, System Engineering & Integration			228663						Cont.	Cont.
PE 0603880C, BMD System; Project 1060, Test & Evaluation			391916						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment			495600						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603873C, Family of Systems-PDRR	145499	227444								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1090
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PE 0603874C, BMD Tech. Ops.-PDRR	216910	308415							
PE 0603876C, Threat & Countermeasures	21575	22414							

C. Acquisition Strategy:

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603880C BMD System	PROJECT 1090
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:												
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Remark:
Project 1090

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 – Program Definition Risk and Reduction				PE NUMBER AND TITLE 0603881C Terminal Defense Segment						
COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	988180						Cont.	Cont.
2010 Ground-Based Terminal	0	0	974242						Cont.	Cont.
2090 Program Operations	0	0	13938						Cont.	Cont.

FY02 AMENDED PB REQUEST FOR PE 0603881C, TERMINAL DEFENSE IS \$20M MORE THAN THE FY02 AMENDED PB R-1 TERMINAL DEFENSE PE AMOUNT OF \$968,180K. THIS IS DUE TO THE TRANSFER OF \$20M FROM THE PE 0603175C, BMD TECHNOLOGY, IN SUPPORT OF THE FY02 CONTINUED ISRAELI COOPERATIVE PROGRAM.

A. Mission Description and Budget Item Justification

The Terminal Defense Segment (TDS) allocates resources to support development and selective upgrades of defensive capabilities that engage and negate ballistic missiles in their terminal phase of their trajectory. The primary projects under this Program Element (PE) are the Theater High Altitude Area Defense (THAAD) project and the Israeli Arrow Deployability Program (ADP). Related activities include the Israeli Test Bed (ITB), Arrow System Improvement Program (ADOP), and studies via the Israeli Systems Architecture and Integration (ISA&I) effort that assess the Arrow performance relative to both existing and emerging threats.

The mission of the THAAD Project is to defend against short and medium range theater ballistic missiles (TBMs) at long ranges and high altitudes. THAAD's long-range capability will protect U. S. and allied armed forces, broadly dispersed assets and population centers against TBM attacks.

The Arrow system (developed jointly by the U.S. and Israel) provides Israel an indigenous contingency capability to defend against short and medium range ballistic missiles and helps ensure U.S. freedom of action in future contingencies. Arrow also provides protection against ballistic missile attacks to U.S. forces deployed to the region. The Arrow Deployability Program (ADP) supports Israel's acquisition of a third Arrow battery and Arrow's interoperability with U.S theater missile defense systems (TMD) via a JTIDS/Link-16 common communication architecture. Technologies cooperatively developed under the Arrow Deployability Program are transitioned to U.S. TMD developmental programs for their use or to provide risk reduction and lessons learned. The Arrow System Improvement Program (ASIP) explores upgrades to the Arrow Weapon System designed to allow Arrow to address more stressing threats.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 – Program Definition Risk and Reduction	PE NUMBER AND TITLE 0603881C Terminal Defense Segment
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B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB				
Current Budget Submit (<u>FY 2002</u> PB)			988180	

Change Summary Explanation:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001			
BUDGET ACTIVITY 4 – Program Definition Risk and Reduction				PE NUMBER AND TITLE 0603881C Terminal Defense Segment					PROJECT 2010		
COST (In Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2010	Ground-Based Terminal			974242						Cont.	Cont.

A. Mission Description and Budget Item Justification
Ground Based Terminal Projects
 THAAD (The THAAD program has been transferred from PE 0604861C to PE 0603881C, Terminal Defense Segment).
 THAAD Project Development phase will refine and mature the project design to ensure component and project performance, producibility, and supportability. The mission of the THAAD Project is to defend against short and medium range Theater Ballistic Missiles (TBMs) at long ranges and high altitudes. THAAD's long range capability will protect U. S. and allied armed forces, broadly dispersed assets and population centers against TBM attacks. THAAD's capability to intercept at high altitudes allows multiple intercept opportunities and will significantly mitigate the effects of weapons of mass destruction. The THAAD Project consists of missiles, launchers, and radar(s), Battle Management/Command, Control, Communications, and Intelligence (BM/C³I) units, and support equipment.

Block 2004 THAAD Accelerate development of battle management and radar software, accelerate delivery of the first developmental radar, and acquire ten additional missile test assets. Upon successful completion of flight tests a limited contingency capability could be available in 2005.

Block 2006 THAAD The initial THAAD configuration (C1) delivery is planned for FY2007. C1 will include the capability to defeat all expected short and medium range threats. Enhanced survivability and battalion operational software are deferred to the next configuration (C2).

Block 2012 THAAD - Configuration 2 (C2) – to be available in FY2012 – represents the second capability increment delivered as part of THAAD's evolutionary acquisition/development strategy. C2 builds on the core, near-term missile defense capability provided by THAAD C1. C2 expands the capabilities of the THAAD project to address more advanced threats. C2 will implement battalion-level engagement operations and force operations battle management software for more flexible employment; additionally, upgraded missile and radar software will specifically enhance the project's performance in the presence of sophisticated countermeasures.

Israeli Arrow Program This project provides funding for the Arrow Deployability Program (ADP) to include the third Arrow battery, Arrow interoperability with U.S. Theater Missile Defense (TMD) projects, Phases I and II of the Arrow System Improvement Program (ASIP), Israeli Test Bed (ITB), and the Israeli System Architecture and Integration (ISA&I). The United States derives considerable benefits from its participation in these projects. The presence of a ballistic missile defense system in Israel developed under this project helps ensure U.S. freedom of action in future contingencies and provides protection against ballistic missile attacks to U.S. forces deployed to the region. The cooperative effort also provides risk reduction and alternative technologies for U.S. ballistic missile defense programs as well as phenomenology and kill assessment data. The Arrow Deployability Program (ADP), which will be completed in FY02, integrates and tests the cooperatively developed Arrow II missile with the Israeli developed ground components. The ADP effort also provides for project level flight testing and deployment of a contingency capable User Operational Evaluation System (UOES). The Arrow is interoperable with U.S. TMD systems through the Link 16 system. The International Agreement (IA) between the U.S. and Israel for the

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE
BUDGET ACTIVITY 4 – Program Definition Risk and Reduction		June 2001
PE NUMBER AND TITLE 0603881C Terminal Defense Segment		PROJECT 2010
ADP will be amended to provide a final installment of \$34M in FY02 to complete U.S. funding of an Arrow third battery. The ASIP effort will evolve the Arrow Weapon System (AWS) to defeat longer range and more robust threats expected to be deployed in the Middle East in the near future. An annex for phase II of ASIP will also be concluded to allow work on ASIP to continue. The Israeli Test Bed and ISA&I efforts will continue to support AWS development as well as develop future TMD architectures.		
FY 2000 Accomplishments:		
<ul style="list-style-type: none"> Funding for Terminal Defense Segment exists and is provided under Project 2260, Program Element 0604861C; Project 2259, Program Element 0603875C 		
Total		
FY 2001 Planned Program:		
<ul style="list-style-type: none"> Funding for Terminal Defense Segment exists and is provided under Project 2260, Program Element 0604861C; Project 2259, Program Element 0603875C 		
Total		
FY 2002 Planned Program:		
<ul style="list-style-type: none"> Ground Based Projects Block 2004 THAAD 210000 Continue missile, radar, BM/C³I, and launcher hardware and software development. Conduct BMC³I and launcher Critical Design Reviews (CDRs). Conduct project and Missile Preliminary Design Reviews (PDRs). Conduct radar software CDR. Complete breadboard testing. Begin design verification testing. Ground Based Project Block 2006 THAAD 614643 Continue missile, radar, BM/C³I, and launcher hardware and software development. Conduct BMC³I and launcher CDRs. Conduct project and Missile PDRs. Conduct radar software CDR. Complete breadboard testing. Begin design verification testing. 33100 Support Contracts: Continue software independent verification and validation. Continue nuclear environment survivability analysis. Continue discrimination, navigation and control algorithm development. 22200 Other Government Agencies (OGAs), Government Furnished Equipment (GFE)/other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios. Continue BMC³I, and simulation efforts. Continue project threat vulnerability assessment. Maintain integrated logistics and project assurance efforts. 18400 In-house support: Fund government salaries, benefits, travel, and training. 5400 Test Planning 1300 Operational Test & Evaluation (OT&E): Conduct independent assessment of the THAAD Project. 3500 Lethality: Conduct lethality simulation code validation. 		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 – Program Definition Risk and Reduction	PE NUMBER AND TITLE 0603881C Terminal Defense Segment	PROJECT 2010
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- **Israeli Arrow Program**
- 41699 Arrow Deployability Program. Finalize ADP interoperability validation to include assessing combined engagement coordination and providing Joint Interoperability Test Command assessment of AWS interoperability with U.S. TMD systems. Funding includes final U.S. installment of \$34M for Israel's third Arrow battery. The United States will again adjust its ADP cost share to allow Israel to reduce its ADP funding by an equal amount so that it may provide final funding of third battery components.
- 2500 ITB. Conduct ITB experiments to evaluate Arrow System Improvement Program performance specifications against future threats and assess Arrow interoperability between improved Arrow and U.S. TMD systems. Support USEUCOM/IAF involvement at the ITB to incorporate experiment results in subsequent revisions to the combined OPLAN and CSOP.
- 1500 ISA&I. Assess potential contributions by deployed U.S. TMD assets to Israel’s missile defense. Determine ITB experiment objectives and analyze experiment results. Assess improved Arrow performance against emerging regional threats and identify growth path refinements necessary for the AWS to remain an effective ballistic missile defense for the State of Israel.
- 20000 Continued Israeli Cooperative Programs. Continue ASIP and explore options to co-produce the Arrow missile in the U.S.
- Total 974242

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To</u>	<u>Total</u>
Ground-based Terminal Projects									<u>Compl</u>	<u>Cost</u>
PE 0603861C THAAD-PDRR	506221									
PE 0604861C THAAD – EMD	81614	542498								
PE 0603875C International Cooperative Program	83984	129699								
PE 0603880C BMD System			779584						Cont.	Cont.
PE 0603882C Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C Sensors			495600						Cont.	Cont.
PE 0603175C Technology			112890						Cont.	Cont.

C. Acquisition Strategy:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2a Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 – Program Definition Risk and Reduction	PE NUMBER AND TITLE 0603881C Terminal Defense Segment	PROJECT 2010
---	---	------------------------

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Block 2006 – THAAD								
Radar CDR (HW/SW)			1Q					
Launcher PDR								
BM/C ³ I PDR (HW)								
Launcher CDR			3Q					
BM/C ³ I CDR (SW/HW)			3Q					
Project PDR			3Q					
Missile CDR								
Project CDR								
Configuration 2 PDR								
Radar 1 Integration & Test Complete								
Component Test Flights Begin								
C2 Authority to Proceed (ATP)								
Developmental Tests –Begin								
Award 14 Missile Option								
Project Qualification Test Ready								
Project Readiness Review Assessment								
Long Lead Award								
Radar 2 Integration & Test Complete								
LRIP-1 Award								
FUE								
Israeli Arrow Program								
Arrow Weapon System Flight Tests			1Q & 3Q					
Conduct TMDSE Proof-Of-Concept Test II								
Initiate Interoperability Tests w/ U.S. TMDSE								
ADP final Third Battery Cost Share Adjustment			2 Q					
Complete ASIP Feasibility Study								
Complete ADP			2 Q					
Conduct cooperative R&D flight test			2 Q					

DATE
June 2001

BUDGET ACTIVITY
4 – Program Definition Risk and Reduction

PE NUMBER AND TITLE
0603881C Terminal Defense Segment

ASIP Phase II Activities			2Q					
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UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-3 Exhibit)										DATE June 2001		
BUDGET ACTIVITY 4 – Program Definition Risk and Reduction					PE NUMBER AND TITLE 0603881C Terminal Defense Segment					PROJECT 2010		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. THAAD Project	CPAF/FF	LMSSC				824643				Cont.	Cont.	
a. ADP Dev & Third Arrow Battery	International Agreement with Israel	Israel Ministry of Defense, Israel				38699				Cont.	Cont.	
b. ISA&I	FFP with Cost Share	Wales, Ltd., Israel				1500				Cont.	Cont.	
c. ITB	FFB	USA/SMDC Huntsville, AL				2500				Cont.	Cont.	
d. ASIP	International Agreement with Israel	Israel Ministry of Defense, Israel				17000				Cont.	Cont.	
e.												
Subtotal Product Development:						884342				Cont.	Cont.	
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA	Various		0			33100				Cont.	Cont.	
b. OGAs	MIPR		0			19000				Cont.	Cont.	
c. Program Mgmt	Various		0			18400				Cont.	Cont.	
a. ADP Arrow Project Office	Direct Funding	PEO/AMD				3000				Cont.	Cont.	
b. ASIP Support	Direct Funding	PEO/AMD				3000				Cont.	Cont.	
Subtotal Support Costs:						76500				Cont.	Cont.	

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-3 Exhibit)										DATE June 2001		
BUDGET ACTIVITY 4 – Program Definition Risk and Reduction					PE NUMBER AND TITLE 0603881C Terminal Defense Segment					PROJECT 2010		
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Test Planning	MIPR		0			5400				Cont.	Cont.	
b. OT&E			0			1300				Cont.	Cont.	
c. Lethality			0			3500				Cont.	Cont.	
a.												
b.												
c.												
Subtotal Test and Evaluation:						10200				Cont.	Cont.	
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. MIT/LL	MIPR/FFRDC	LEXINGTON,MA	0			1300				Cont.	Cont.	
b. MITRE	MIPR/FFRDC	FT.MONMOUTH, NJ	0			1900				Cont.	Cont.	
a.												
b.												
c.												
d.												
Subtotal Management Services:						3200				Cont.	Cont.	
Remark:												
Project Total Cost:						974242				Cont.	Cont.	
Remark:												

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-2a)									DATE June 2001	
BUDGET ACTIVITY 4 – Program Definition Risk and Reduction				PE NUMBER AND TITLE 0603881C Terminal Defense Segment					PROJECT 2090	
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2090 Program Operations	0	0	13938						Cont.	Cont.

A. Mission Description and Budget Item Justification

This project covers personnel and related facility support costs, statutory and fiscal requirements, support service contracts and the BMDO Data Centers Programs.

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

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

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

This project also includes the BMDO Data Centers Programs. The BMDO Data Centers Information System Program Manager provides management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. The BMDO Data Centers Program archives, manages, and develops data projects, distributes and provides remote access to all relevant BMD data. Operation and management of Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments for technical/programmatic issues and data center performance, coordinating segment customer program/data management requirements, and cooperative partnership requirements.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2a Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 – Program Definition Risk and Reduction	PE NUMBER AND TITLE 0603881C Terminal Defense Segment	PROJECT 2090
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FY 2000 Accomplishments:

- -
 -
 -
- Total 0

FY 2001 Planned Program:

- -
 -
 -
- Total 0

FY 2002 Planned Program:

- 13938 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, supplies and the data centers programs.
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 -
 -
- Total 13938

Change Summary Explanation:

Project 2090

Project 2090

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	3940534	0	0	0	0	0	Continuing	Continuing
3010 Ground-based Midcourse	0	0	3230725	0	0	0	0	0	Continuing	Continuing
3020 Sea-based Midcourse	0	0	596000	0	0	0	0	0	Continuing	Continuing
3050 Systems Engineering and Integration	0	0	44000	0	0	0	0	0	Continuing	Continuing
3090 Program Operations	0	0	69809	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Midcourse Defense Segment (MDS) develops increasingly robust capabilities for countering ballistic missiles in the midcourse stage of flight. Using a capability block approach, the MDS will develop and test multiple technologies to provide credible capabilities against the threat. This segment is divided into multiple projects including Ground-based Midcourse Projects, and Sea-Based Midcourse Projects, the successors to the National Missile Defense and Navy Theater Wide programs, and segment Systems Engineering and Integration.

A major focus of the MDS is to enhance our testing ability via the construction of a missile defense test bed. This test bed provides a realistic environment to test different missile defense capabilities under varying and stressing conditions. It demonstrates the viability of a layered missile defense concept; provides an actual operational environment to verify system element hardware and software integration; allows evaluation in a geographically dispersed operational environment and testing of multiple simultaneous engagements. This approach provides a near-term option to employ the test facilities – radars, command and control, and interceptor missiles at Fort Greely and Kodiak Island – in an operational mode. Its use in this mode could provide an interim capability to meet an emergent threat. The interim capability could subsequently be upgraded through technical improvements; replaced by deployment of production quality radars, command and control, and interceptors; or supplemented with a sea-based midcourse component.

Additionally, the test bed approach verifies construction, transportation and certification procedures. Logistics support concepts and system data will also be validated. This validation includes maintenance procedures; loading and unloading operations; supply activities and databases; technical manuals; and reliability, availability, and maintainability data. Finally, although its initial development occurs within the Ground-based Midcourse project, over time this test bed will expand to enhance overall test infrastructure and project maturation to include the Boost and Terminal Defense Segments.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment
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The Ground-based Midcourse project will develop an integrated system capable of countering known and expected threats and further demonstrate a “hit-to-kill” capability. Consistent with the capability block approach, this project will prepare for future block upgrades, and each successive block will develop capability against increasing threat complexity.

The Sea-based Midcourse project continues the work of the Navy Theater Wide and Aegis Light-weight ExoAtmospheric Projectile (LEAP) Intercept programs and could potentially provide protection against short and medium range threats. This capability builds upon the existing Aegis Weapons System and the STANDARD Missile infrastructure. The Sea-based Midcourse project also initiates concept definition for ascent phase intercept capability, to include engagements against longer range threat missiles.

This Program Element is divided into four projects: Ground-based Midcourse, Sea-based Midcourse, Systems Engineering and Integration, and Program Operations. Within each of the projects in any given budget year, work will proceed to support at least one Capability Block. The MDS project provides a realistic test bed to mature Block upgrade capabilities and allow an early emergency defense capability, both Ground- and Sea-based, if needed.

The MDS will incorporate recommendations from the Welch Review Panel and from the DoD, Director of Operational Testing and Evaluation. These include: Countermeasures Mitigation, a Combined Test Force to resolve differences between BMDO and the Operational Testing Community on the level of testing required, expanded engagement conditions, new target and interceptor launch sites, multiple engagement scenarios, expanded test range/engagement areas, and improved test bed infrastructure. The resulting improvements in the MDS developmental effort will be enhanced realism in test scenarios, multiple engagement test flight scenarios, intercept possibilities over a larger area, higher speed Exoatmospheric Kill Vehicle (EKV) engagements, improved test communications / data handling, all coupled with increased testing.

<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President’s Budget (<u>FY 2001</u> PB)				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB				
Current Budget Submit (<u>FY 2002</u> PB)			3940534	

Change Summary Explanation:

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	June 2001
<p>This PE has been restructured. FY 2000/2001 funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.</p>		

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
3010 Ground-based Midcourse	0	0	3230725	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Ground-based Midcourse project is designed to intercept ballistic missile threats to the U.S. during the descent phase of midcourse flight. The Ground-based Midcourse project has three objectives: 1) to develop and demonstrate an integrated system that has the capability to counter known and expected threats; 2) to complete project development and provide an RDT&E test bed that provides operational realism for further project development and, if necessary, limited protection; and 3) to assess the technical feasibility, schedule, and cost associated with maintaining a project development path which allows evolutionary upgrading of project capabilities to counter more complex threats. During the initial phase, the program develops and integrates the projects into a system and demonstrates “hit-to-kill” capability in a robust, operationally realistic RDT&E Test Bed and prepares for subsequent blocks.

The Ground-based Midcourse project provides for the Prime Contractor to develop and integrate the individual ground based projects into a cohesive system. The Prime Contractor will integrate system hardware and software to demonstrate the ability of the project to meet performance requirements and to provide the flexibility and robustness for growth in capability to counter known and future threats.

The 2004 RDT&E Test bed provides a development structure consisting of an upgraded COBRA DANE radar in Alaska as a surrogate for eventual UEWRs, an accelerated version of the In-Flight Interceptor Communications System (IFICS) and Battle Management Command Control and Communications (BMC3) capability, five silos, Command Launch Equipment (CLE), and software upgrades. Five ground-based interceptors using the Payload Launch Vehicle Plus (PLV+) booster, comprising the current test configuration booster plus a Minuteman (MM) II first stage, will be installed and ground tested as part of project test and project check-out, and could expeditiously be put on alert to provide a contingency defense if needed in the FY 2004 timeframe. The 2006 capability (Block 2006) will continue a robust test program incorporating data from three to four test flights in FY 2002. Research and development efforts for this block and subsequent blocks will support the further development of more-capable interceptors, sensors, and targets. The Prime Contractor validates project performance and performs the necessary project level trade studies to appropriately allocate requirements. The Prime Contractor will also operate and maintain models and simulations to include Integrated System Test Capability (ISTC), system Hardware in the Loop (HWIL), and Prime Contractor Integrated Development Systems (PCIDS). Until booster development is complete, EKV flight tests will be flown on a Payload Launch Vehicle (PLV), which is a booster comprised of MM II second and third stages. The Prime Contractor will initiate an alternate booster program, and will begin a complementary EKV program. BMC3 incremental prototypes will be integrated and demonstrated in a distributed fashion at multiple locations, and assessed with user participation to refine and focus BMC3 and project development.

2004 RDT&E Test bed –Development of prototype ground support projects to support the RDT&E test capability will be started in FY 2002. This includes the interceptor based upon the PLV+ booster, the current test configuration of the EKV, the “common” silo, launch complex, support requirements, and command and control (C2) nodes and communication links. In addition, the RDT&E capability will include enhancing the COBRA DANE radar to provide a surrogate for planned

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
<p>UEWR capability. Prototype C2 nodes and communication terminals will be constructed in initial quantities to support the RDT&E Test bed. The Ground-based Midcourse project incorporates efforts to mitigate community impacts at Fort Greely in areas of schools, municipal services, social services, and public safety. The project also incorporates funding to demilitarize and dismantle a number of older ABM silos no longer required.</p> <p><u>Midcourse Test Support</u> – This effort provides funding to support upgrades to range assets at the Kwajalein Missile Range (KMR) which includes the extension of range safety and mobile telemetry, test communications upgrades for improvements to existing test communications facilities and architecture within KMR and from KMR to Hawaii, and transportations costs for transporting assets, material and people within the KMR area.</p> <p><u>Block 2006</u> – In FY 2002, Boeing, the Ground-based Midcourse Prime Contractor, will conduct the Critical Design Review (CDR) for all prototype Ground-based Midcourse projects and components. In addition, Boeing will conduct three and potentially four integrated flight tests and a number of ground tests based on modeling and simulation and HWIL. In FY 2002, Boeing will also conduct studies, perform engineering evaluations of alternate boost vehicles, select an alternate boost vehicle approach and design a common silo to accommodate any of the potential choices, whether cannisterized or not. The alternate booster provides greater capability and expands the battlespace for the Ground-based Midcourse project. UEWR software builds 3 through 6 will be developed. The effect of the disturbed ionosphere on the UEWR will be characterized and corresponding algorithms will be developed. The Interceptor Rate Production Facility will be initiated in FY 2002 to support a wide range of interceptor needs for the increased rate of flight testing. When directed, we will prepare a procurement plan for deployment of up to 30-50 interceptors at a complex, sensors, BMC3 nodes, and XBR.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • A portion of the FY 2000 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C. <p>Total</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • A portion of the FY 2001 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C. <p>Total</p>		
Project 3010	Page 5 of 24 Pages	Exhibit R-2A (PE 0603882C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
<p>FY 2002 Planned Program:</p> <ul style="list-style-type: none"> • 481964 2004 RDT&E Test bed <u>Prime Contractor Development</u>: Initiate efforts for the FY 2004 RDT&E Test bed with five PLV+ boosters and EKV's, silos and CLE. Accelerate IFICS and BMC3 development. Initiate COBRA DANE radar hardware and software upgrades. <u>Government Operations and Oversight</u>: Initiate upgrade of the KMR range assets to enhance launch capabilities and range safety. This will add intercept areas, reduce artificiality in testing and add realism to test scenarios. Enhance ground test capability by adding Long Haul Communications Fiber Network to provide data assurance and speed up the data collection and reduction effort. Upgrades will allow for flight test scenarios featuring multiple engagements. • 273121 RDT&E Test bed Facility Construction Provides funding for design and construction efforts in support of the 2004 RDT&E Test bed. The DD Form 1391, which details these efforts, is included in the construction section of the BMDO FY 2002 budget submission. • 9700 Block 2004 Community Impacts Provides funding for mitigating community impacts. These efforts include an additional fire station, off post landfill, school assistance, and a communications/TV tower. • 21700 Kodiak Test Site Initiate efforts for the Kodiak Test Site in support of 2004 RDT&E Test bed. The attached DD Form 1391 identifies \$2.8M of this amount for construction at the Kodiak Test Site and is included in the construction section of the BMDO FY 2002 budget submission. The remainder is for equipment installation, design and environmental documentation. • 2444240 Block 2006 <u>Prime Contractor Development</u>: Conduct Project CDR. Continue booster development and investigate booster alternatives as part of risk mitigation. Conduct Booster Verification (BV) tests. Design common silo. Continue EKV development, including algorithm upgrades. Continue booster development. Develop GBI support projects, including Command Launch Equipment. Support T&E engineering, simulations, ground tests and conduct IFTs-7 through 9. Continue EKV algorithm upgrade. Begin GBI Rate Production Facility. Deliver basic XBR software. Develop and release BMC2 BI-2. Initiate northern tier SATCOM and fiber optic communications links to provide reliable communications to BMC2 nodes. Continue development of high fidelity simulations. Begin planning for simultaneous engagements to assess the project operational performance. Complete UEWR software builds 3 and 4. Conduct software/algorithm V&V, logistic/configuration support, and installation planning. Continue development of project deployment and sustainment strategy planning to include maintenance and supply support. Continue project RAM and supportability/testability data and issue analysis reports. Prepare MPT. Continue development and testing of incremental XBR & UEWR Software 		
Project 3010	Page 6 of 24 Pages	Exhibit R-2A (PE 0603882C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
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Government Operations and Oversight: Continue program management, technical and testing oversight of the GBI, XBR, UEWR and BMC3 projects. Support IFTs-7 through 9. Provide targets and target launches. Conduct post test data reduction activities. Initiate efforts for the Kodiak Test Site in support of 2004 RDT&E Test bed. Continue requirement refinement for SRD. Support major program milestones, project requirements and design reviews, internal and external interface development/implementation cost assessment support, elevation of deployment readiness, and project deployment. Update Project CARD against technical requirements. Develop/update detailed threat “design-to” and “analyze-to” parameters and scenarios. Conduct C2Sim exercise and tabletops. Continue integration with the SBIRS Program Office to ensure the satisfaction of project requirements. Perform nuclear environment calculations/requirements verification. Conduct data fusion/project discrimination development. Coordinate project Verification, Validation and Accreditation (VV&A) and maintain Independent Verification and Validation (IV&V) capability to perform project VV&A. Continue development of Project sustainment program planning. Conduct facilities designs. Continue project Reliability, Availability and Maintainability (RAM) and supportability/testability data and issue analysis reports. Develop plan for employing the Test, Training and Exercise Capability (TTEC). Review Manpower, Personnel and Training (MPT) issues and ensure MPT is on track to provide trained personnel for Block capabilities. Develop and issue Project Producibility and Manufacturing (P&M) Plans. Continue Environmental, Safety, and Health (ESH) documentation, including associated siting and NEPA analysis and ESH compliance documentation required for continued project development and deployment. Continue Programmatic Environmental Safety and Health Evaluation (PESHE).

Total 3230725 Ground-based Midcourse

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
PE 0603871C, NMD-PDRR	944922	1853877								
PE 0208871C, NMD-Proc		73845								
PE 0603868C, NTW-PDRR	368769	456372								

C. Acquisition Strategy: The Department has restructured the missile defense acquisition strategy into a multi-path approach to assure that the most effective missile defense is available at the earliest possible time. The Ground-based Midcourse project has adopted an acquisition approach that supports evolutionary projects development under the overall technical management of Boeing as the Prime Contractor. The strategy is to deliver capability blocks as early as practical, and adopt a spiral development methodology in recognition of the rapidly changing technology environment and the need to satisfy requirements that are defined in general terms within an evolving technology base. This process will (1) allow early implementation of a capability while supporting an evolving requirement/threat definition process, (2) minimize the risks of obsolescence posed by the rapid pace of technology development, (3) provide opportunities to update a project to a changing set of standards, and (4) allow informed trades between cost, schedule, and performance while exploring operational possibilities. The development approach has been enhanced to address issues raised prior and subsequent to the FY 2000 DRR. These include (1) initiating a countermeasures mitigation program and developing capabilities to resolve issues with likely countermeasures, (2) adding test infrastructure and improving test management to allow more operationally challenging representative flight tests and providing for increased testing against more challenging targets, and (3) increasing the fidelity of the project simulations.

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

DATE **June 2001**

BUDGET ACTIVITY
4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE
0603882C Midcourse Defense Segment

PROJECT
3010

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
C2Sim 02			2Q					
S/CDR			2Q					
XBR CDR			1Q					
IFT-7			1Q					
IFT-8			2Q					
IFT-9			4Q					
IGT-7			1Q					
BV-3			1Q					

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
PRIME CONTRACTOR												
	CPAF	Boeing				2532047	N/A			CONT	CONT	CONT
GBI												
Kodiak Test Site	TBD	TBD				21700	N/A			CONT	CONT	CONT
	CPFF	Boeing				247	N/A			CONT	CONT	CONT
	TM	NRC				8519	N/A			CONT	CONT	CONT
	CPFF	Sparta				2452	N/A			CONT	CONT	CONT
	TM	Mevatec				8786	N/A			CONT	CONT	CONT
	CPFF	SY TECH				523	N/A			CONT	CONT	CONT
	TM	TBE				4067	N/A			CONT	CONT	CONT
	CPFF	Stone Engineer				2128	N/A			CONT	CONT	CONT
	CPFF	Colsa				6	N/A			CONT	CONT	CONT
	MITRE	Eng/Tech Spt				300	N/A			CONT	CONT	CONT
	MIPR	OGAs				2300	N/A			CONT	CONT	CONT
	N/A	GBI IOB				7844	N/A			CONT	CONT	CONT
	N/A	Misc Contracts				428	N/A			CONT	CONT	CONT
BMC3												
	N/A	NWSC				2236	N/A			CONT	CONT	CONT
	CPAF	TRW				4814	N/A			CONT	CONT	CONT
	FFRDC	MITRE Corp.				1895	N/A			CONT	CONT	CONT
	BPA (ITSP)	Sencom (ITSP)				626	N/A			CONT	CONT	CONT
	CPFF	Sparta				4521	N/A			CONT	CONT	CONT
	CPAF	NRC				2001	N/A			CONT	CONT	CONT
	CPFF	CST				612	N/A			CONT	CONT	CONT
	MIPR	QRI				1132	N/A			CONT	CONT	CONT
	CPAF	CSC				1158	N/A			CONT	CONT	CONT
	MIPR	USACE-GFE				2119	N/A			CONT	CONT	CONT
	MIPR	AMCOM				447	N/A			CONT	CONT	CONT

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
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BUDGET ACTIVITY	MIPR	SMDC	PE NUMBER AND TITLE	PROJECT	MIPR	SMDC	PE NUMBER AND TITLE	PROJECT
			800		N/A			CONT
	CPFF	GBS	35		N/A			CONT
	CPFF	Colsa	77		N/A			CONT
	CPAF	Vanguard Research	278		N/A			CONT
	BPA (ITSP)	TECOLOTE	200		N/A			CONT
	MIPR	USAF ESC	77		N/A			CONT
	N/A	Misc Contracts	1278		N/A			CONT
	MIPR	ARL	294		N/A			CONT
XBR								
	CPAF	TBE	3114		N/A			CONT
	CPAF	Colsa	1357		N/A			CONT
	CPAF	NRC	1587		N/A			CONT
	MIPR	MITRE (Lincoln Labs)	1637		N/A			CONT
	CPAF	Ga Tech	1911		N/A			CONT
	TM	Mevatec	5022		N/A			CONT
	N/A	Misc OGA/IOB	6553		N/A			CONT
	N/A	OGA Other Spt	1719		N/A			CONT
UEWR								
	MIPR	MITRE	4362		N/A			CONT
	BPA (ITSP)	SENCOM	2836		N/A			CONT
	MIPR	MIT Lincoln Lab	361		N/A			CONT
	CPAF	TRW @ JNTF	619		N/A			CONT
	GSA	AFRL	144		N/A			CONT
	N/A	Misc Contracts	802		N/A			CONT
	TBD	TBD UK Spt	412		N/A			CONT
	TBD	TBD	464		N/A			CONT
TTEC								
	TBD	TBD	2000		N/A			CONT
Subtotal Product Development:			2650847					CONT

Remark:

Project 3010

Page 10 of 24 Pages

Exhibit R-3 (PE 0603882C)

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction					PE NUMBER AND TITLE 0603882C Midcourse Defense Segment					PROJECT 3010		
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING												
	CPFF	BMD/CSC				19807	N/A			CONT	CONT	CONT
	N/A	JNTF				1418	N/A			CONT	CONT	CONT
	N/A	DTRA				1942	N/A			CONT	CONT	CONT
	N/A	USAF/SMC/SBIRS				6133	N/A			CONT	CONT	CONT
	N/A	NSWC				3578	N/A			CONT	CONT	CONT
	MIPR	MIT/Lincoln Lab				3833	N/A			CONT	CONT	CONT
	MIPR	Misc/POET				89	N/A			CONT	CONT	CONT
DEPLOYMENT & SUSTAINMENT PLANNING (R&D)												
	CPFF	CSC				13930	N/A			CONT	CONT	CONT
	CPFF	Nichols				5185	N/A			CONT	CONT	CONT
	CPFF	Colsa				21	N/A			CONT	CONT	CONT
	CPFF	Mevatec				1376	N/A			CONT	CONT	CONT
	MIPR	SMDC				2453	N/A			CONT	CONT	CONT
	MIPR	AMCOM				4657	N/A			CONT	CONT	CONT
	MIPR	USACE				10143	N/A			CONT	CONT	CONT
	MIPR	USA War College				1454	N/A			CONT	CONT	CONT
	MIPR	Schreiver AFB				525	N/A			CONT	CONT	CONT
	MIPR	HQ AFCEE				1115	N/A			CONT	CONT	CONT
	MIPR	DOD Joint Spectrum Ctr				433	N/A			CONT	CONT	CONT
	MIPR	Hill AFB				210	N/A			CONT	CONT	CONT
	MIPR	NSA				420	N/A			CONT	CONT	CONT
	MIPR	USACECOM				53	N/A			CONT	CONT	CONT
	MIPR	ARSPACE				822	N/A			CONT	CONT	CONT
	MIPR	Alaskan Air Command				477	N/A			CONT	CONT	CONT
	MIPR	611 th ASG/FMA				4726	N/A			CONT	CONT	CONT
RDT&E Test bed Facility Construction	TBD	TBD				273121	N/A			CONT	CONT	CONT
Block 2004 Community Impacts	TBD	TBD				9700	N/A			CONT	CONT	CONT

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
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MANAGEMENT AND OPERATIONAL SUPPORT												
	N/A	GOVT PERS				22175	N/A			CONT	CONT	CONT
	N/A	SETA Support				70639	N/A			CONT	CONT	CONT
Subtotal Support Costs:						460435				CONT		

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
TEST AND EVALUATION												
	CPFF	Colsa				4920	N/A			CONT	CONT	CONT
	CPFF	Boeing				687	N/A			CONT	CONT	CONT
	CPAF	Nichols				1598	N/A			CONT	CONT	CONT
	MIPR	USAKA				8535	N/A			CONT	CONT	CONT
	FFRDC/MIPR	Sandia				39	N/A			CONT	CONT	CONT
	OGA/MIPR	USASMDC				687	N/A			CONT	CONT	CONT
	OGA/MIPR	JNTF				252	N/A			CONT	CONT	CONT
	MIPR	VAFB				642	N/A			CONT	CONT	CONT
	TM	Mevatec				3585	N/A			CONT	CONT	CONT
	CPFF	CAS				1111	N/A			CONT	CONT	CONT
	CPFF	SY TECH				229	N/A			CONT	CONT	CONT
	OGA/MIPR	SBIRS SPO				165	N/A			CONT	CONT	CONT
	MIPR	AMCOM				680	N/A			CONT	CONT	CONT
	MIPR	USARSPACE				344	N/A			CONT	CONT	CONT
	MIPR	Eglin AFB				993	N/A			CONT	CONT	CONT
	N/A	SATCOM				329	N/A			CONT	CONT	CONT
	OGA/MIPR	OGAs				15	N/A			CONT	CONT	CONT
	N/A	RTTC				350	N/A			CONT	CONT	CONT
	N/A	DYNETC				397	N/A			CONT	CONT	CONT
	N/A	VRC				1704	N/A			CONT	CONT	CONT
	N/A	EAC				268	N/A			CONT	CONT	CONT
	N/A	TEXCOM				298	N/A			CONT	CONT	CONT
	N/A	HRED				275	N/A			CONT	CONT	CONT
	N/A	SLAD				183	N/A			CONT	CONT	CONT
	N/A	CEI				1385	N/A			CONT	CONT	CONT

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3010
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	CPFF	Colsa				199	N/A			CONT	CONT	CONT
	CPFF	TRW				1383	N/A			CONT	CONT	CONT
	N/A	Various OGAs				161	N/A			CONT	CONT	CONT
	CPFF	SAIC				613	N/A			CONT	CONT	CONT
	MIPR	MIT LLNL				1864	N/A			CONT	CONT	CONT
	CPFF	ITT				714	N/A			CONT	CONT	CONT
	OGA/MIPR	AEDC				424	N/A			CONT	CONT	CONT
	N/A	Sandia				2372	N/A			CONT	CONT	CONT
	N/A	Mevatec				57	N/A			CONT	CONT	CONT
	N/A	TBE				719	N/A			CONT	CONT	CONT
	N/A	SMDC				71	N/A			CONT	CONT	CONT
TARGETS												
	FFRDC/MIPR	Sandia				43433	N/A			CONT	CONT	CONT
	OGA/MIPR	SMDC				5347	N/A			CONT	CONT	CONT
	MIPR	SMDC				5689	N/A			CONT	CONT	CONT
	N/A	Various OGAs				15946	N/A			CONT	CONT	CONT
	MIPR	LLNL				2493	N/A			CONT	CONT	CONT
	CPFF	SY TECH				2287	N/A			CONT	CONT	CONT
Range Assets Upgrades	TBD	TBD				3000	N/A			CONT	CONT	CONT
Test Communications Upgrades	TBD	TBD				3000	N/A			CONT	CONT	CONT
Subtotal Test and Evaluation:						119443				CONT		

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Management Services:												

Remark:

Project Total Cost:						3230725					CONT	
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Remark:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3020
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
3020 Sea-based Midcourse	0	0	596000	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Sea-based Midcourse project is designed to provide the capability for U.S. Navy Surface Combatants to actively defeat Mid-Range Ballistic Missiles and Inter-Continental Ballistic Missiles in the midcourse ascent phase of the exoatmospheric battlespace while forward deployed or on Fleet Missile Defense Patrol in defense of the nation, deployed U.S. forces, friends, and allies. This capability builds upon the existing Aegis Weapons System (AWS) and the STANDARD Missile (SM) infrastructure. The AWS will be evolved to support midcourse ballistic missile engagements. The Sea-based Midcourse project has three primary objectives: 1) to continue testing and complete the Navy Aegis Light-weight ExoAtmospheric Projectile (LEAP) Intercept Flight Demonstration Project (FDP) in order to demonstrate that LEAP technologies can be successfully integrated with the Navy's Standard Missile Block IV and the Aegis Weapon System; 2) to complete system design and development for a contingency sea-based ascent and midcourse ballistic missile intercept capability based on ALI and associated technologies, and to be prepared to expeditiously deploy such a project by FY 2005 in order to provide a limited capability to protect deployed U.S. and allied forces from Medium Range Ballistic Missile class threats; and 3) initiate in FY 2002 an effort which will provide a sea-based missile defense project designed to provide an ascent midcourse phase hit-to-kill capability in the FY2008-2010 timeframe against Intermediate Range Ballistic Missiles (IRBM's) and ICBM's.

Project development and testing will be conducted with an eye towards the possibility of a contingency sea-based missile defense deployment decision. Each advance will be evaluated for possible incorporation into such a project on a continuous basis. The overall program execution strategy will be to rely on the government and industry team while concurrently selecting combat system engineering agents for the FY2005 and FY2008-2010 capabilities.

2004 RDT&E Test bed – The ALI FDP currently 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 Block IV missile (called SM-3) and the AWS to successfully intercept a ballistic missile in the exoatmosphere. ALI successfully executed Flight Test Round (FTR) -1A in Jan 2001, and is scheduled to conduct an additional flight test, Flight Mission (FM)-2, in 4Q FY 2001. FM-2 is scheduled to be a Kinetic Warhead (KW) characterization flight and will include an operational Solid Divert Attitude Control System (SDACS). An additional 5 ALI flight tests, FMs 3-7, are scheduled for FY 2002. They are all intercept attempts. ALI will conclude in FY 2002.

Concept Definition – This effort provides for concept definition of the Sea-based Midcourse ascent phase intercept capability. In FY 2002, the Concept Definition phase will define system specifications and the program will award concept definition contracts encouraging the best use of known, deployed technologies, and technologies expected to be available in the 2010 timeframe. In FY 2002, risk reduction activities will be conducted to increase the technology readiness levels (TRLs) of key technologies. The program concept definition effort will investigate allocation of system specifications among ground-based and sea-based projects to achieve the best integrated segment performance at the lowest overall cost.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3020
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FY 2000 Accomplishments:

- A portion of the FY 2000 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.

Total

FY 2001 Planned Program:

- A portion of the FY 2001 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.

Total

FY 2002 Planned Program:

- **260000 RDT&E 2004 (ALI Contingency)**
Continue planning and execution of the ALI FDP, FM-3, FM-4, FM-5, FM-6, and FM-7 test events. Perform data reduction and analysis. Perform SM-3 SDACS qualification activities. Complete the development and manufacturing of ALI FTRs and associated ground hardware and test equipment. Complete AWS development engineering to support the ALI program. Begin engineering development of the Block 2004 Sea-based Midcourse expanding test infrastructure. Initiate procurement of test rounds and targets for threat representative testing.
- **336000 Concept Definition**
Initiate concept definition studies for the Sea-based Midcourse capability against intermediate and long range threats. Monitor and support contractor studies by government teams. Perform key technology risk reduction activities in the areas of ship integration, weapons control, radar suite, missile/launcher and BMC2/communications.

Total 596000 Sea-based Midcourse

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>
PE 0603871C, NMD-PDRR	944922	1853877								
PE 0208871C, NMD-Proc		73845								
PE 0603868C, NTW-PDRR	368769	456372								

C. Acquisition Strategy: The Department has restructured the missile defense acquisition strategy into a multi-path approach to assure that the most effective missile defense is available at the earliest possible time. The best approach (competitive or selected source) will be determined after considering all the technical and management

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) DATE **June 2001**

BUDGET ACTIVITY
4 - Program Definition and Risk Reduction

PE NUMBER AND TITLE PROJECT
0603882C Midcourse Defense Segment **3020**

aspects of the program. Current development activities supporting the Aegis (Light-weight ExoAtmospheric Projectile (LEAP) Intercept could be used in order to provide a limited capability to protect deployed U.S. and allied forces.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Flight Mission 3			1Q					
Flight Mission 4			2Q					
Flight Mission 5			3Q					
Flight Mission 6			4Q					
Flight Mission 7			4Q					

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3020
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
ALI												
AWS/VLS Development	CPAF	Lockheed Martin				15000	N/A			CONT	CONT	CONT
Missile Development	CPIF/AF	Raytheon				68000	N/A			CONT	CONT	CONT
VLS Development	CPAF	United Defense				1000	N/A			CONT	CONT	CONT
AWS Development	WR	Pearl Harbor NSY				500	N/A			CONT	CONT	CONT
AWS Development	RC	SUPSHIP				800	N/A			CONT	CONT	CONT
Sea-based Midcourse Contingency												
Missile Development	CPIF/AF	Raytheon				100000	N/A			CONT	CONT	CONT
Concept Definition												
Concept Definition-BAA	TBD	Competitive				60000	N/A			CONT	CONT	CONT
Risk Reduction Activity	CPAF	Lockheed Martin				67000	N/A			CONT	CONT	CONT
Risk Reduction Activity	CPAF	Raytheon				110150	N/A			CONT	CONT	CONT
Risk Reduction Activity	CPFF	JHU/APL				7640	N/A			CONT	CONT	CONT
Risk Reduction Activity	WR	NSWC/DD				12700	N/A			CONT	CONT	CONT
Risk Reduction Activity	WR	NAWC/CL				5085	N/A			CONT	CONT	CONT
Risk Reduction Activity	MIPR	MIT/LL				15255	N/A			CONT	CONT	CONT
Risk Reduction Activity	WR	NSWC/CD				10170	N/A			CONT	CONT	CONT
Subtotal Product Development:						473300					CONT	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
System Engineering												
	CPFF	JHU/APL				16550	N/A			CONT	CONT	CONT
	MIPR	MIT/LL				7500	N/A			CONT	CONT	CONT
	WR	NSWC/DD				11800	N/A			CONT	CONT	CONT
	WR	NSWC/CD				2550	N/A			CONT	CONT	CONT
	WR	NSWC/IH				1250	N/A			CONT	CONT	CONT

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction					PE NUMBER AND TITLE 0603882C Midcourse Defense Segment					PROJECT 3020		
	WR	NSWC/PHD				6250	N/A			CONT	CONT	CONT
	WR	NAWC/CL				4150	N/A			CONT	CONT	CONT
	WR	NWAS				950	N/A			CONT	CONT	CONT
	MIPR	BMPCOE				1200	N/A			CONT	CONT	CONT
	TBD	BMDO				16000						
Subtotal Support Costs:						68200					CONT	
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT&E	WR	PMRF				8528	N/A			CONT	CONT	CONT
DT&E	WR	NAWC/PM				3462	N/A			CONT	CONT	CONT
DT&E	WR	NSWC/DD				2346	N/A			CONT	CONT	CONT
DT&E	WR	NSWC/PHD				2346	N/A			CONT	CONT	CONT
DT&E	WR	NWAS				815	N/A			CONT	CONT	CONT
DT&E	MIPR	NAIC				1173	N/A			CONT	CONT	CONT
DT&E	MIPR	National Assess Gp				865	N/A			CONT	CONT	CONT
DT&E	CPFF	JHU/APL				2346	N/A			CONT	CONT	CONT
DT&E	MIPR	SMDC				6000	N/A			CONT	CONT	CONT
DT&E	MIPR	TETRATECH				246	N/A			CONT	CONT	CONT
DT&E	WR	AIRPAC				250	N/A			CONT	CONT	CONT
DT&E	WR	COMOPTEVFOR				223	N/A			CONT	CONT	CONT
Subtotal Test and Evaluation:						28600					CONT	
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	Anteon				16550	N/A			CONT	CONT	CONT
Program Management	CPFF	Paradigm				4150	N/A			CONT	CONT	CONT
Internal Operating		Govt Salary				4500	N/A			CONT	CONT	CONT
Internal Operating		Operating Funds				700	N/A			CONT	CONT	CONT
Subtotal Management Services:						25900				CONT	CONT	CONT
Remark:												
Project Total Cost:						596000					CONT	
Remark:												

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3050
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COST (<i>In Thousands</i>)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
3050 Systems Engineering and Integration	0	0	44000	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project funds risk reduction and the countermeasures mitigations initially addressing a few reentry vehicles with simple capabilities and expanding to complex countermeasures mitigation with several reentry vehicles.

Risk Reduction – In FY 2002, a complementary EKV program will begin. The complementary EKV is an effort to develop a kill vehicle utilizing latest technology to provide total risk mitigation. This will allow for potential common EKV for Ground and Sea-based Midcourse Defense. Development will be based on insertion of new technology and lessons learned from existing EKV developments. The program is planned to include design, testing and project insertion, where appropriate, into the block development approach.

Counter/Countermeasures – The counter/countermeasures effort identifies, develops, and demonstrates solutions to improve the performance of missile defense projects against countermeasure suites. Solutions with potential to improve the capabilities against countermeasures will be incorporated into a block upgrade. Intelligence estimates indicate that the ballistic missile threat is rapidly changing, especially the ability of States of Concern to develop and deploy countermeasures in response to missile defense programs. This results in greater uncertainty in the threat-based requirements for the midcourse. To minimize the programmatic impacts resulting from this uncertainty, the program is transitioning from threat point-designs to a capability-based approach. This requires a process to identify and prioritize solutions to credible countermeasures for integration into the program, and requires increased robustness in the test program to incorporate testing against a broader range of credible threats.

FY 2000 Accomplishments:

- A portion of the FY 2000 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.

Total

FY 2001 Planned Program:

- A portion of the FY 2001 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.

Total

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment	PROJECT 3050
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FY 2002 Planned Program:

- **30000 Risk Reduction**
Government Operations and Oversight: Initiate complementary EKV effort to reduce susceptibility to countermeasures and protect the program from current potential threat technological advances.

- **14000 Counter/Countermeasures**
Government Operations and Oversight: Initiate counter/countermeasures effort. The program is responsible for determining the capability of the baseline projects against credible countermeasure suites; identifying candidate solutions to address performance shortfalls; conducting ground tests against digital models of countermeasure suites; planning the integration of successful improvements into program block upgrades; and identifying candidate ground and sea-based midcourse solutions to credible countermeasures.

Total 44000 Systems Engineering & Integration

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
PE 0603871C, NMD-PDRR	944922	1853877								
PE 0208871C, NMD-Proc		73845								
PE 0603868C, NTW-PDRR	368769	456372								

C. Acquisition Strategy: The System Engineering and Integration project will include risk reduction activities for Ground- and Sea-based Midcourse Defense projects and counter/countermeasures that are capability rather than threat based. MDS will participate in a BMDO countermeasures program that will focus on identifying threat countermeasures that may not yet be evident, but are physically plausible and technically feasible. The program will then identify and develop solutions to improve the capability of ballistic missile defense projects to defeat those countermeasures. Solutions that successfully demonstrate an improvement in MDS project performance will be integrated into the block development program. For the complementary EKV, multiple EKV design efforts will be initially funded with down select to the most promising design. A complementary EKV will allow the program to take advantage of the performance capability strengths of the multiple EKVs, and structure follow-on acquisition of EKVs to give the Ground-based Midcourse project the most effective missile defense capability.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Complementary EKV SRR			2Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)											DATE June 2001	
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction						PE NUMBER AND TITLE 0603882C Midcourse Defense Segment					PROJECT 3050	
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Product Development:												
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING												
Concept Definition	TBD	TBD				30000	N/A			CONT	CONT	CONT
Counter/Countermeasures	TBD	TBD				14000	N/A			CONT	CONT	CONT
Subtotal Support Costs:						44000					CONT	
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Test and Evaluation:												
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Management Services:												
Remark:												
Project Total Cost:						44000				CONT		
Remark:												
Project 3050												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)								DATE June 2001		
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction				PE NUMBER AND TITLE 0603882C Midcourse Defense Segment				PROJECT 3090		
<i>COST (In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
3090 Program Operations	0	0	69809	0	0	0	0	0	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>This project covers personnel and related facility support costs, statutory and fiscal requirements, support service contracts and the BMDO Data Centers Programs.</p> <p>Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Missile Defense Command, US Army PEO Air and Missile Defense, US Navy PEO for Theater Surface Combatants, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.</p> <p>Fiscal Requirements include reimbursable services acquired through the Defense Working Capital Fund such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.</p> <p>Assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.</p> <p>This project also includes the BMDO Data Centers Programs. The BMDO Data Centers Information System Program Manager provides management, oversight, technical assistance, and expertise for the BMDO Data Centers Programs. The BMDO Data Centers Program archives, manages, and develops data products, distributes and provides remote access to all relevant BMD data. Operation and management of Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments for technical/programmatic issues and data center performance, coordinating segment customer program/data management requirements, and cooperative partnership requirements.</p> <p>FY 2000 Accomplishments:</p>										
Project 3090			<i>Page 22 of 24 Pages</i>				Exhibit R-2A (PE 0603882C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603882C Midcourse Defense Segment
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- A portion of the FY 2000 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.

Total

FY 2001 Planned Program:

- A portion of the FY 2001 Funding for the Midcourse Defense Segment exists and is provided under Project 2400, Program Element 0603871C, and Project 1266, Program Element 0603868C.

Total

FY 2002 Planned Program:

- **69809 Program Operations**
Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, supplies and the data centers programs.

Total 69809 Program Operations

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
PE 0603871C, NMD-PDRR	944922	1853877								
PE 0208871C, NMD-Proc		73845								
PE 0603868C, NTW-PDRR	368769	456372								

C. Acquisition Strategy: The Department has restructured the missile defense acquisition strategy into a multi-path approach to assure that the most effective missile defense is available at the earliest possible time. This project will support technical and management aspects of the program as the program determines the best approaches to Midcourse Defense.

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
N/A								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
BUDGET ACTIVITY 4 - Program Definition and Risk Reduction					PE NUMBER AND TITLE 0603882C Midcourse Defense Segment					PROJECT 3090		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Product Development:												
Remark:												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
MANAGEMENT AND OPERATIONAL SUPPORT												
	CPAF/CPFF	CSC				20923	N/A			CONT	CONT	CONT
	N/A	SFAE-MD				2480	N/A			CONT	CONT	CONT
	N/A	GOVT PERS				3121	N/A			CONT	CONT	CONT
	N/A	USSPACECOM				6450	N/A			CONT	CONT	CONT
	N/A	Operational accounts				22474	N/A			CONT	CONT	CONT
	N/A	GOVT PERS (HSV)				11240	N/A			CONT	CONT	CONT
	N/A	C2 Radar				3121	N/A			CONT	CONT	CONT
Subtotal Support Costs:						69809					CONT	
Remark:												
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Test and Evaluation:												
Remark:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
	N/A											
Subtotal Management Services:												
Remark:												
Project Total Cost:						69809					CONT	
Remark:												
Project 3090												

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	685363	0	0	0	0	0	Continuing	Continuing
4020 Sea-Based Boost	0	0	50000	0	0	0	0	0	Continuing	Continuing
4030 Air-Based Boost	0	0	410000	0	0	0	0	0	Continuing	Continuing
4040 Space-Based Boost	0	0	190000	0	0	0	0	0	Continuing	Continuing
4050 System Engineering and Integration	0	0	15000	0	0	0	0	0	Continuing	Continuing
4090 Program Operations	0	0	20363	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

BOOST DEFENSE SEGMENT

The mission of the Boost Defense Segment (BDS) is to protect US Forces, US Allies, friends and areas of vital interest from ballistic missile attack by providing the Ballistic Missile Defense System (BMDS) the capability to negate the effectiveness of ballistic missiles early in their trajectory while in powered flight. The objective of the BDS is to develop and demonstrate directed energy (DE) and kinetic energy (KE) capabilities to perform this mission, creating a boost phase early defense layer. Early proof of principle activities include a DE intercept demonstration in CY 2003 using an Airborne Laser (ABL) lethal shootdown and a KE intercept experiment in CY 2006 as part of the Space-Based Experiment (SBX). These activities will show the feasibility of engaging a ballistic missile during the boost phase in a realistic environment.

The boost phase of the ballistic missile trajectory is considered the flight segment from post launch through propellant burn out when the missile enters the midcourse phase of ballistic flight. The boost phase typically includes the first 100-300 seconds of flight and concludes at altitudes between 150-450 kilometers. This short duration and low altitude combined with an accelerating target pose significant technical challenges for boost phase intercepts. However formidable a challenge, engaging ballistic missiles in the boost phase is important to BMD as threats can be negated long before they have an opportunity to deploy reentry vehicles, submunitions, or countermeasures. Some of the critical technical challenges to be addressed in the BDS effort include: off-board and on-board sensors; battle management, command, control and intelligence (BMC2I) development; and the development of operations concepts sufficient to support the quick reaction launch of KE missiles or firing of DE weapons.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment
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The BDS consists of Sea-Based Boost, Air-Based Boost, and Space-Based Boost projects, as well as the required System Integration and Engineering (SE&I), Test and Evaluation (T&E) and supporting Program Operations. These efforts are defined in further detail below.

B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001 PB</u>)				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001 PB</u>				
Current Budget Submit (<u>FY 2002 PB</u>)			685363	

Change Summary Explanation:

The BDS is composed of both legacy programs and new efforts. The legacy programs include the ABL and SBL Program Elements (PE) that are now part of the BDS and have been previously described in PE 0603173C - Supp Tech/Adv Tech Dev (BMDO - FY2000), PE 0603174C – SBL (BMDO - FY2001), PE 0603876F – SBL (AF) and PE 0603319F - Airborne Laser Technology (AF). Future funding under these old PEs is now within the purview of the BDS PE 0603883C. The new efforts will explore DE and KE concepts to define and develop a robust boost phase capability.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)									DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation				PE NUMBER AND TITLE 0603883C Boost Defense Segment					PROJECT 4020	
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4020 Sea-Based Boost	0	0	50000	0	0	0	0	0	Continuing	Continuing
A. <u>Mission Description and Budget Item Justification</u>										
<u>SEA-BASED BOOST</u>										
<p>The purpose of this project is to 1) develop preferred system and operational concepts and 2) simultaneously reduce the technical and programmatic risks of fielding a boost phase intercept (BPI) capability using a sea-based platform. These two efforts are interdependent and will evolve iteratively via the spiral development process. In parallel, the sea-based boost project will be supported by modeling and simulation validated by rigorous experimentation and phenomenology data collection.</p>										
<u>Concept Definition</u>										
<p>During concept definition, alternative platforms, advanced technologies, and operational concepts for sea-based BPI will be conceptualized and evaluated to explore system and platform integration trade-spaces. Counter-countermeasure algorithms, seeker, and off board sensor characteristics and cueing modes will be analyzed. For candidate boost vehicles, burnout velocity and acceleration options will be optimized and traded against alternative kill vehicle (KV) kinematic capabilities. Ultimately, the ballistic missile kill chain functional areas will be evaluated and decomposed to develop the critical technical issues (CTIs) for both KVs and boosters.</p>										
<u>Risk Reduction</u>										
<p>A future decision on pursuit of a sea-based KE BPI concept as a block project line will be supported by a focused risk reduction initiative. This initiative may include development and captive carry testing of a high dynamic range KV seeker, system integration testing, hot fire tests of fast boosters, concepts for sea launch platforms that can accept "hot" booster missiles, and alternative systems review of sea-based KE BPI capabilities. Sensor and BMC2I assessment will be supported in this activity through future systems integrated testing of platform, KV, booster, and sensor. A functional analysis effort will be conducted to facilitate performance assessments, design, engineering trade-space evaluation, integration, and risk analysis for all sea-based KVs and potential sea-based platforms. The degree of success of these efforts will provide the necessary technical information needed to support management decisions regarding further development, including future KE BPI block project lines.</p>										
FY 2002 Planned Program:										
<ul style="list-style-type: none"> • 25000 Define and evaluate alternative sea-based KE BPI concepts. Develop and assess operational concepts. • 25000 Initiate risk reduction - KV and booster design and early component test 										
Total 50000										
Project 4020			Page 3 of 17 Pages				Exhibit R-2 (PE 0603883C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4020
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
1000 BMD System			779584						CONT	CONT
2000 Terminal Defense System			988180						CONT	CONT
3000 Midcourse Defense System			3940534						CONT	CONT
5000 Sensors			495600						CONT	CONT
6000 Technology			112890						CONT	CONT
BMDO SBL (PE 0603174C)		73712								
BMDO Supp Tech/Adv Tech Dev (PE 0603173C)	89290									
Airborne Laser Technology (PE 0603319F)	296903	231494								
Air Force Space-Based Laser (PE 0603876F)	68926	67414								

C. Acquisition Strategy:
 The Sea-Based Boost risk reduction efforts will reduce the high risks in several key areas to include technology development for boosters, kill vehicles, BMC2I, platform integration, and external sensors. BMDO will pursue multiple risk reduction efforts in these areas to ensure that adequate data is available to support a decision as early as FY03 to pursue or not to pursue development of a sea-based boost phase capability.

D. <u>Schedule Profile</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
Sea-Based KE Concept Definition Initiation		2Q						
Sea-Based KV Risk Reduction Initiation		2Q						
Sea-Based Booster Risk Reduction Initiation		2Q						

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)									DATE June 2001	
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NUMBER AND TITLE 0603883C Boost Defense Segment					PROJECT 4030
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4030 Air-Based Boost	0	0	410000	0	0	0	0	0	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p><u>AIR-BASED BOOST</u></p> <p>The <u>Airborne Laser (ABL) Block 2008</u> is an existing project line that will design, build and test an air-based laser weapon system to acquire, track and kill ballistic missiles in their boost phase. This weapon system integrates three major subsystems (Laser, Beam Control and Battle Management, Command, Control, Communications, Computers and Intelligence (BM/C4I)) into a modified commercial Boeing 747-400F aircraft. It also includes ABL-specific ground support equipment. The ABL program definition and risk reduction contract was awarded to the Boeing/TRW/Lockheed-Martin team in November 1996, to design, fabricate, integrate, and test an ABL aircraft with a laser device providing approximately half the projected power of the production version. This phase culminates in lethality (missile shoot-down) demonstrations against boosting ballistic missile threat-representative targets in CY 2003. Two full power aircraft, one prototype and one production, are to be delivered by FY 2009 as part of an initial operational capability (two full power ABL plus one half power ABL). Procurement of the remaining full power aircraft will be completed by FY 2011.</p> <p>FY 2000 Accomplishments:</p> <p>The Boost Defense Segment is a new program element (PE - 0603882C) that includes programmatics and funding transferred from PE 0603319F - Airborne Laser Technology (AF). For completeness, the accomplishments of this PE are included here.</p> <p>Airborne Laser (0603319F): Continued Boeing/TRW/Lockheed Martin program definition and risk reduction contract effort for design, fabrication, integration and testing the ABL weapons system, including design of the System Integration Laboratory (SIL) at the Birk Flight Test Facility at Edwards AFB, CA. Paid for final PDRR commercial aircraft (aircraft delivery). Supported special studies, simulations and analyses, technical support, risk management, and an independent review team specializing in lasers, aircraft, and aircraft integration. Continued support for labor, training Integrated Product Team (IPT) participation, and other government agencies. Conducted overseas star scintillometer campaign.</p> <p>Total 0</p>										
Project 4030			Page 5 of 17 Pages				Exhibit R-2 (PE 0603883C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4030
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FY 2001 Planned Program:
 The Boost Defense Segment is a new program element (PE - 0603882C) that includes programmatic and funding transferred from PE 0603319F - Airborne Laser Technology (AF). For completeness, the program plans/accomplishments of this PE are included here.
 Airborne Laser (0603319F): Continue Boeing/TRW/Lockheed-Martin program definition and risk reduction contract effort for design, fabrication, integration, and testing the ABL weapon system, including design and development of the SIL at the Birk Test Facility at Edwards AFB, CA. Continue support for special studies, simulations and analyses, technical support, risk management, and an independent review team specializing in lasers, aircraft, and aircraft integration. Continue support for labor, training, environmental studies, IPT participation, purchase of targets as GFP, and other government agency support requirements.

Total 0

FY 2002 Planned Program:

- 10000 ABL Block 2008: Procure long-lead optics for full-power ABL demonstration system.
- 330000 Continue program definition and risk reduction contract effort for development and test activities of the half-power ABL weapon system leading to delivery of one half-power aircraft in 2003.
- 70000 Continue support for studies, simulations and analysis, advisory and assistance services. Procure targets and conduct test activities. Continue government operations and support for labor, training, and IPT participation.

Total 410000

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
1000 BMD System			779584						CONT	CONT
2000 Terminal Defense System			988180						CONT	CONT
3000 Midcourse Defense System			3940534						CONT	CONT
5000 Sensors			495600						CONT	CONT
6000 Technology			112890						CONT	CONT
BMDO SBL (PE 0603174C)		73712								
BMDO Supp Tech/Adv Tech Dev (PE 0603173C)	89290									
Airborne Laser Technology (PE 0603319F)	296903	231494								
Air Force Space-Based Laser (PE 0603876F)	68926	67414								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) DATE **June 2001**

BUDGET ACTIVITY
4 - Demonstration and Validation

PE NUMBER AND TITLE PROJECT
0603883C Boost Defense Segment 4030

C. Acquisition Strategy:
Block 2008 Airborne Laser: Entered program definition and risk reduction in November of 1996. Engineering design and development is projected to start FY2004; production is projected for FY2008. The program plan is structured to demonstrate technical achievements throughout the preliminary design and risk reduction phase, culminating in lethality (missile shoot down) demonstrations against boosting ballistic missiles in late CY 2003. The half power ABL will be made available for deployment as an emergency capability immediately following the lethality demonstrations.

D. Schedule Profile	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
ABL: Start long lead items for design and dev.		1Q						

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4030
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ABL PDRR Contract and Concept Design	CPAF	Boeing Defense & Space Group Seattle, WA				340000	12 Nov 96			CONT	CONT	
b.												
c.												
Subtotal Product Development:						340000				CONT	CONT	

Remark:
ABL – The Air Force awarded an ABL program definition and risk reduction contract on 12 Nov 1996 to a team composed of Boeing, TRW, and Lockheed Martin.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. ABL Technical Support Contracts	Varies	Varies				6000				CONT	CONT	
b. ABL Government In – House and Other External Support	Varies	Varies				64000				CONT	CONT	
c.												
Subtotal Support Costs:						70000				CONT	CONT	

Remark:

Project Total Cost:						410000				CONT	CONT	
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Remark:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE		June 2001	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT	
4 - Demonstration and Validation				0603883C Boost Defense Segment						4040	
COST (In Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4040	Space-Based Boost	0	0	190000	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

SPACE-BASED BOOST

This effort is specifically aimed at advancing the state of the art for space-based BPI applications. Appropriate experimentation and test & evaluation activities will be conducted to support informed assessment and decision-making regarding candidate space based intercept capabilities to include space-based lasers and advanced space-based boost kinetic energy concepts. These candidate capabilities will be supported by risk reduction activities for development of large lightweight deployable optics, advanced sensor data integration and fusion, BMC2I, and advanced KV components and integration. Most effort in FY02 is concentrated on continuing design, design validation, risk reduction and component fabrication for a space-based laser integrated flight experiment. Additionally, alternative platforms for space-based interceptors will be conceptualized and evaluated during concept definition to determine trade-space. In parallel this project will be supported by modeling and simulation validated by experimentation and phenomenology data collection.

Concept Definition

A functional analysis effort for KE concepts will be conducted to facilitate performance assessments, design, engineering trade-space evaluation, integration and risk analyses for space-based KVs, and potential space-based platforms. Counter-countermeasure algorithms, seeker and off board sensor characteristics and cueing modes will be examined. For candidate drop stages (space-based boosters), burnout velocity options will be optimized and traded against alternative KV kinematic capabilities.

Ultimately, the ballistic missile kill chain functional areas will be evaluated and decomposed to identify the critical technical issues (CTIs) for both KVs and drop stages and the critical operational issues (COIs) for DE and KE concepts under evaluation. Risk reduction efforts will address CTIs while the concept definition will address COIs via wargames and operational concept development. The results of these efforts will help define achievable space-based boost capabilities and support establishing mission requirements and top-level project technical specifications for the BDS space-based mission. CTIs will be fed to space-based boost risk reduction and experiment activities for evaluation. COIs will feed into work to support development of a formal boost segment operational concept.

The concept definition phase will cover the areas identified above and will be led by a BMDO joint project office with broad national level technical support from boost segment technology experts from inside and outside the government (e.g., National Labs and FFRDCs). Multiple concept definition contracts may be awarded to augment the concept definition team and provide additional information on boost architectures, project concept technical designs, risk reduction experiments and risk mitigation plans, test requirements, and project life cycle costs.

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4040
<p><u>Space-Based Laser (SBL) Integrated Flight Experiment (IFX)</u> The SBL IFX funds technology development, component integration, ground testing and on-orbit testing to demonstrate feasibility of the boost phase intercept concept. The SBL IFX is part of the department's long-term strategy to enable the future development of an affordable, responsive SBL operational system. An operational SBL system may provide a highly effective defense against ballistic missile attack through continuous, global availability and the ability to perform early, boost phase missile destruction (prior to reentry vehicle and countermeasure deployment).</p> <p>The SBL effort comprises four closely coordinated, parallel activities. The first activity is design validation and risk reduction in the key areas of laser output; beam control; beam director design; and acquisition, tracking, and pointing. These efforts leverage work started under previous SBL-funded technology development programs. The second activity is the SBL IFX design, fabrication, integration, test, and flight experiment. Key decision points are being established to monitor progress. The third activity of the SBL project is the design and construction of the SBL Test Facility (STF). The STF consists of two separate facilities required to support the IFX: the Performance Test Facility (PTF), which will accommodate full power tests of the laser and integrated project; and the Space Qualification Facility (SQF), which will accommodate launch and space environmental testing. The SBL test facility construction plans, schedule, and costs are identified in the attached 1391's titled: SBL Performance Test Facility, SBL Test Auxiliary Facilities, and Minor Construction-Gas Storage Facilities for SBL Test Facility. The fourth closely coordinated activity within the SBL project is the Operational System Integrated Product Team (OSIPT). The purpose of the OSIPT is to explore SBL operational concepts that complement and support the BMDS and ancillary mission areas such as Force Enhancement, Force Application, and Space Control through architecture, operational effectiveness, and lethality analyses.</p> <p><u>Advanced Deployable Optics</u> Deployable optics is a separate, but parallel effort to the SBL IFX that may be enabling technology for a future SBL project line. FY02 efforts plan and initiate experiments and demonstrations to show feasibility. Major areas of exploration include light weighting of mirrors and mirror structure integration and control. Sub-project tests on latches, isolators, and actuators will also be performed.</p> <p><u>Space-Based Kinetic Energy Experiment (SBX)</u> The SBX is a risk reduction effort to demonstrate a KE BPI concept that can potentially provide a global-limited missile defense capability against emerging world threats. A decision regarding commitment to future development of a Space-based interceptor (SBI) capability hinges upon success in engaging a ballistic missile in the boost phase of flight. The objective for this experiment is to conduct a test in which a kinetic kill vehicle (KKV) engages a thrusting target against a below the horizon background. Success will provide "Proof of Concept/Feasibility" that a KKV can operate in the boost phase regime.</p> <p><u>Space-Based KE BPI Risk Reduction</u> In FY03 the SBX will be augmented with a parallel space-based KE BPI risk reduction activity will focus on advancing component technologies, required to support a decision to continue candidate space-based KE BPI concepts. These advanced component developments will support the operational design of alternate space-based concepts.</p>		
Project 4040	Page 10 of 17 Pages	Exhibit R-2A (PE 0603883C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4040
FY 2000 Accomplishments:		
<p>The Boost Defense Segment is a new program element (PE - 0603882C) that includes programmatic and funding transferred from PE 0603173C - Supp Tech/Adv Tech Dev (BMDO) and PE 0603876F – SBL (AF). For completeness, the accomplishments of these PE's are included here.</p> <p>Space-Based Laser (0603173C and 0603876F): Created a project baseline in an Integrated Program Execution Plan (IPEP) outlining the design, development, test, and risk reduction activities leading to an integrated ground demonstration known as an Integrated Payload Technology Demonstration (IPTD) on the path to an IFX. Completed phase II of the High Energy Laser (HEL) Affordability and Architecture Study (A&AS). Published environmental assessment report for candidate sites of the new test facility. Conducted design validation and risk reduction activities such as: high power laser optimization for flow conditions, alignment, and reverse wave suppression; beam control project improvements; high power autonomous alignment tests; uncooled resonator and gain generator ring fabrication. Defined Space-Based Laser (SBL) operational concept from operational and architectural perspectives.</p>		
Total	0	
FY 2001 Planned Program:		
<p>The Boost Defense Segment is a new program element (PE - 0603882C) that includes programmatic and funding transferred from PE 0603174C - SBL (BMDO) and 0603876F - SBL (AF). For completeness, the program plans/accomplishments of these PE's are included here.</p> <p>Space-Based Laser (0603174C and 0603876F): Conduct Integrated Test Unit (ITU)/IFX System Requirements Review (SRR). Continue fabrication, risk reduction, and design validation efforts for the laser, beam control project, beam expander, and ATP/Fire Control (FC). Perform mission definition and requirements analysis. Continue operational concept definition and alternate technology roadmap development. Update the operational project baseline minimum technical data set. Continue operational concept and objectives development with AF Space Command. Continue lethality and project effectiveness assessments.</p>		
Total	0	
FY 2002 Planned Program:		
•	15000	Space-Based BPI Concept of Operations and Space-Based KE BPI Concept Definition.
•	5000	SBL Deployable Optics analysis, planning and experiment design.
•	165000	SBL IFX: SBL Integrated Flight Experiment – Conduct IFX System Design Review (SDR). Continue fabrication, risk reduction, and design validation efforts for the laser, beam director structural test bed fabrication and ATP/FC demonstration. Mission definition and requirements analysis: continue operational project concept definition and technology roadmap development; create a baseline IFX cost analysis requirements document; continue operations concept and objectives development with AF Space Command; continue lethality and project effectiveness assessments; government IFX support-provides programmatic support. Complete performance test facility construction design.
•	5000	SBX experiment design, hardware and software requirement definition, and risk reduction initiation.
Total	190000	
Project 4040	Page 11 of 17 Pages	Exhibit R-2A (PE 0603883C)

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4040
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B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
1000 BMD System			779584						CONT	CONT
2000 Terminal Defense System			988180						CONT	CONT
3000 Midcourse Defense System			3940534						CONT	CONT
5000 Sensors			495600						CONT	CONT
6000 Technology			112890						CONT	CONT
BMDO SBL (PE 0603174C)		73712								
BMDO Supp Tech/Adv Tech Dev (PE 0603173C)	89290									
Airborne Laser Technology (PE 0603319F)	296903	231494								
Air Force Space-Based Laser (PE 0603876F)	68926	67414								

C. Acquisition Strategy:

Space-Based Laser IFX: The IFX is an experiment supporting SBL development and is focused on demonstrating in the space environment the feasibility of an operational project for boost phase defense. As such, the program does not have a formal milestone-based program baseline. The experiment will proceed from a component development phase from 2002 through 2006, to an integrated ground test phase from 2007 through 2010, to an on-orbit test phase from 2011 through 2013. The current acquisition strategy is to accomplish the IFX under a Joint Venture teaming arrangement between three major aerospace contractors. This contract arrangement allows the contractor broad authority and responsibility for program planning, baselining, resource management, etc. This acquisition strategy will be reviewed during FY02 for compliance with the new BMD acquisition philosophy.

The Space-Based Experiment (SBX) will attempt to demonstrate the feasibility of hitting a missile in the boost phase by intercepting an accelerating missile target with a kinetic energy weapon. The acquisition strategy is to develop a space kill vehicle, mate the space kill vehicle onto a well understood booster, procure a representative missile target, and coordinate and integrate all test activities to intercept the accelerating missile with the KV/booster project. The development of related space-based interceptor components (drop stage, life jacket and BMC2I) will be initiated once the space KV and concept definition have matured.

D. <u>Schedule Profile</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
SBL: IFX System Requirements Review	2Q							
SBL: System Definition Review		1Q						
SBI: Space-Based KE Concept Definition Initiation		1Q						
SBX: Experiment & Risk Reduction Initiation		4Q						

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4040
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SBL IFX Joint Venture team	CPAF	Boeing, Lockheed, TRW El Segundo, CA				147500	1 Nov 02			CONT	CONT	
b.												
c.												
Subtotal Product Development:						147500				CONT	CONT	

Remark:

SBL - The Air Force awarded an increment 1 SBL IFX contract on 8 Feb 1999 to the interim Joint Venture (JV) Team composed of Boeing, Lockheed-Martin, and TRW. The increment 2 contract was awarded on 30 Oct 00 to cover the period from 30 Oct 00 through 30 Nov 01. The second increment involves project definition review and continued design validation and risk reduction testing in the areas of laser, beam control, and beam direction.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SBL IFX Technical Support Contracts	Various	Various				16000	1 Oct 02			CONT	CONT	
b. Air Force Research Laboratory (SBL IFX)						1500	1 Oct 02			CONT	CONT	
Subtotal Support Costs:						17500				CONT	CONT	

Remark:

Project Total Cost:						165000				CONT	CONT	
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Remark:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4050
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COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4050 System Engineering and Integration	0	0	15000	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

SYSTEM ENGINEERING AND INTEGRATION

Segment Integration

This effort will integrate the activities for risk reduction, concept development projects, operational concepts, modeling, simulation, and tests to ensure all BDS activities are focused towards a common goal. This integration activity will include: analysis of alternatives, ensuring a cross flow of data among all BDS contractors, maintaining configuration control of the BDS, facilitating management of the BDS efforts through an integrated master plan (IMP) and integrated master schedule (IMS), and implementation of systems engineering practices to ensure a balanced design approach for the BDS.

Data Collection and Phenomenology

Boost Phase Intercept (BPI) concepts require:

- Detection of threat missiles within a few seconds of launch, requiring detection below clouds.
- Accurate typing of the threat to support intercept solution formulation, requiring identification prior to the target breaking the cloud cover.
- Hardbody detection in the presence of the missile plume enabling the KV seeker or directed energy weapon to “handover” from tracking the plume to tracking the hardbody.

The plume data and tools that currently exist to support the development and evaluation of components necessary to conduct these critical functions is not sufficient. This project will conduct an aggressive plume data collection, analysis, and modeling and simulation effort. Data collection tasks are as follows:

- Electro Optic/Infrared data on the temporal and spatial intensities of missile plumes through clouds
- RF data for Over the Horizon (OTH) and conventional radars on missile launches and early ascent
- Resolved imagery and high-resolution spectral data on plume structures necessary to develop and validate high fidelity plume models and project simulations
- Transmittance & reflectance of plume at relevant aspect angles and spatial resolution
- Models and simulators will be developed, updated, and validated.

Building upon existing data centers and a virtual data center concept, a central library will be developed to provide timely and accurate plume phenomenology data, analysis, and tools. These projects, made easily accessible through the library, will be integral to the spiral development process of build-test-fix-update data/tools-test.

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4050
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FY 2002 Planned Program:

- 5000 Flight Experiment design, payload integration activities; range assessment and analysis; and advisory and assistance services.
 - 10000 Data collection and phenomenology
- Total 15000

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
1000 BMD System			779584						CONT	CONT
2000 Terminal Defense System			988180						CONT	CONT
3000 Midcourse Defense System			3940534						CONT	CONT
5000 Sensors			495600						CONT	CONT
6000 Technology			112890						CONT	CONT
BMDO SBL (PE 0603174C)		73712								
BMDO Supp Tech/Adv Tech Dev (PE 0603173C)	89290									
Airborne Laser Technology (PE 0603319F)	296903	231494								
Air Force Space-Based Laser (PE 0603876F)	68926	67414								

C. Acquisition Strategy:

N/A

D. <u>Schedule Profile</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
N/A								

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE		June 2001	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT	
4 - Demonstration and Validation				0603883C Boost Defense Segment						4090	
COST (In Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4090	Program Operations	0	0	20363	0	0	0	0	0	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>This project covers personnel and related facility support costs, statutory and fiscal requirements, support service contracts and the BMDO Data Centers Programs.</p> <p>Personnel covers government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support, and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area, as well as BMDO's Executing Agents within the US Army Space & Missile Defense Command, US Army PEO Air and Missile Defense, US Navy PEO for Theater Surface Combatants, US Air Force and the Joint National Test Facility. Related facility costs include rents, utilities, supplies, ADP equipment, and all the associated operation and maintenance activities.</p> <p>Fiscal Requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF) such as accounting services provided by the Defense Finance and Accounting Services (DFAS); reserves for special termination costs on designated contracts; and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.</p> <p>Assistance required to support BMD program-wide management functions is also contained in this project. This assistance ranges from operational contracts to support functions such as ADP operations, Access control offices and graphics support, to efforts required to supplement BMDO and Executing Agent government personnel. Typical efforts include cost estimating, security management, information management, technology integration across BMDO projects and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. The requirements for this area are based on most economical and efficient utilization of contractors versus government personnel.</p> <p>This project also includes the BMDO Data Centers Programs. The BMDO Data Centers Information System Program Manager provides management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. The BMDO Data Centers Program archives, manages, and develops data projects, distributes and provides remote access to all relevant BMD data. Operation and management of Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments for technical/programmatic issues and data center performance, coordinating segment customer program/data management requirements, and cooperative partnership requirements.</p>											
Project 4090			Page 16 of 17 Pages				Exhibit R-2 (PE 0603883C)				

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603883C Boost Defense Segment	PROJECT 4090
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FY 2002 Planned Program:

- 20363 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, supplies and the data centers programs.
- Total 20363

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>

C. Acquisition Strategy:

N/A

D. <u>Schedule Profile</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>
N/A								

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment
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COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	495600						Continuing	Continuing
5020 Space Sensors	0	0	384799						Continuing	Continuing
5030 International Cooperation	0	0	75342						Continuing	Continuing
5050 Systems Engineering and Integration	0	0	10000						Continuing	Continuing
5060 Test And Evaluation	0	0	15000						Continuing	Continuing
5090 Program Operations	0	0	10459						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Sensor Program Element (PE) is responsible for the research and development of technologies and capabilities that enhance ballistic missile detection, midcourse tracking and discrimination. This PE includes five projects: Space Sensors, International Cooperation efforts, sensor specific System Engineering and Integration (SE&I), Test and Evaluation, and Program Operations. The Space Sensor project supports the Block 2010 Space-based Infrared System (SBIRS) Low component including Program Definition and Engineering Development. The International Cooperation project supports the Russian-American Observation Satellite (RAMOS) program, which engages U.S. and Russian developers in early warning satellite technology, providing a forum for information exchange through the joint definition and execution of space experiments. Sensors SE&I project supports Increment 3/Ballistic Missile Defense Project integration. Activities include concept definition, risk reduction, data collection and phenomenology and experiments. The Test and Evaluation project includes developing an advanced radar technology testbed and prove out leap-ahead technologies. The Program Operations project supports the management of the Sensor Segment.

B. <u>Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment
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Adjustments to Budget Years Since <u>FY 2001</u> PB					
Current Budget Submit (<u>FY 2002</u> PB)			495600		

Change Summary Explanation:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5020
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5020 Space Sensors	0	0	384799						Continuing	Continuing

A. Mission Description and Budget Item Justification

This Project funds the Block 2010 SBIRS Low (Low Earth Orbit component of SBIRS) Program Definition activities, which prepare for Engineering Development. SBIRS Low is the Low Earth Orbit (LEO) component of SBIRS. It also funds SBIRS/BMD integrated activities. SBIRS will incorporate new technologies to enhance detection; improve reporting of ICBM, SLBM and tactical ballistic missiles; and provide critical mid-course tracking and discrimination data for Ballistic Missile Defense. SBIRS will consist of satellites in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and LEO; and an integrated centralized ground station serving all SBIRS space projects and Defense Support Program (DSP) satellites.

Block 2010 SBIRS Low primary mission is missile defense. It provides initial warning of a ballistic missile attack on the US, its deployed forces or its allies. SBIRS Low and SBIRS High are the two components, which provides missile warning, missile defense, battlespace characterization and technical intelligence for the United States, its Allies and theater contingents. SBIRS Low satellites provide which continuous tracking from launch to impact or intercept. Functions include booster detection, post boost vehicle tracking, midcourse object tracking, resolved object discrimination and intercept hit/kill assessment. This project will pass data to boost, midcourse and terminal defense projects. The data will be used to cue radars over-the-horizon and provide interceptor handovers.

FY 2000 Accomplishments:

- 0 Project was funded under Program Element 0604442F (SBIRS). Previous projects included: 4598 SBIRS Low Element and 4000 Operational Support.
- Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Element 0604442F (SBIRS). Previous projects included: 4598 SBIRS Low Element and 4000 Operational Support.
- Total 0

FY 2002 Planned Program:

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5020
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- 289955 Block 2010 SBIRS Low contract to support full constellation with deployment by FY 11. Actions include: enhancing software development, procuring and testing engineering model sensor package, and procuring limited LL parts based upon the Preliminary Design Review design. Begin Engineering Development preparation and mitigate program risk through risk reduction demonstrations such as making an engineering model sensor package available before CDR. Provide risk mitigation enhancement to provide full confidence in meeting full constellation by FY 11. Finalize program planning in preparation for CDR. The funds also support Increment 3 Integration into the SBIRS Systems of Systems. These activities support Rolling Evaluation, which culminates in Source Selection in FY 03.
 - 47097 Provided Program Definition Support (Includes studies, integration into SBIRS Increment 3 System of Systems and modeling and simulation)
 - 20719 Accomplished other risk reduction activities (Includes cryocoolers, batteries, algorithms, radiation hardened parts, phenomenology, optical filters, MSX data reduction, contamination control, focal plane arrays (visible and long-wave), and survivability).
 - 27028 Supported Program Office activities
- Total 384799

B. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
PE 0603880C, BMD System			779584						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5030, International Cooperation			75342						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5050, Systems Engineering & Integration			10000						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5060, Test & Evaluation			15000						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5090, Program Operations			10459						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603875C, International Cooperative Program	83984	129699								

C. Acquisition Strategy:

The SBIRS program is managed through a single consolidated System Program Office (SPO) at the Space and Missile Systems Center, Los Angeles Air Force Base, CA. SBIRS Low began Program Definition activities in August 1999 with the award of two firm fixed price contracts. Program Review was continued past CDR to support the Project 5020

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5020
---	--	------------------------

risk reduction activities that mitigate risk for a full constellation in support of BMD by FY11. Additional risk reduction activities include for a more robust software development effort and an engineering model sensor package for testing between PDR and CDR. This continued period of performance (PDR to CDR) is a CPAF contract.

Program Definition will be followed by a competitive CPAF contract award for Engineering Development, scheduled for award in the third quarter of FY03, with the deployment of the SBIRS Low satellites beginning in the fourth quarter of FY06 and a full constellation and ground capability in FY11.

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
D. Schedule Profile								
Preliminary Design Review			2Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5020
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Program Definition	FFP	TRW				96676	Aug 99			Cont.		
b. Program Definition	FFP	Spectrum Astro				96676	Aug 99			Cont.		
c. Program Definition Extension	TBD	TRW				48301	TBD			Cont.		
d. Program Definition Extension	TBD	Spectrum Astro				48301	TBD			Cont.		
e. Program Definition Support	Various					47098				Cont.		
f. Other Risk Reduction	Various					20719				Cont.		
g. Engineering Development										Cont.		
Subtotal Product Development:						357771				Cont.		

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Program Support (OGC)	Various					27028				Cont.	51583	
b.												
Subtotal Support Costs:						27028				Cont.	51583	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5020
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:						384799				Cont		
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5030
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5030 International Cooperation	0	0	75342						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Russian-American Observation Satellite (RAMOS) project is an innovative U.S. – Russian space-based remote sensor research and development program addressing ballistic missile defense and national security. This program engages Russian developers of early warning satellite in the joint definition and execution of aircraft and space experiments. The RAMOS program will design, build, launch, and operate two satellites that will provide stereoscopic observations of the earth’s atmosphere and ballistic missile launches in the short wavelength and mid-to-long wavelength infrared bands. Preliminary experiments designed to support program definition occurred between 1995 and 1999 using existing U.S. and Russian space and aircraft platforms to collect imagery. The U.S. Midcourse Space Experiment (MSX) and the Miniature Sensor Technology Integration (MSTI-3) satellites were used to collect nearly simultaneous stereo imagery with the Russian RESURS 01 satellite. Joint experiments using U.S. and Russian prototype sensors were flown aboard the U.S. Flying Infrared Signatures Technology Aircraft (FISTA), demonstrating our ability to jointly plan, execute, and analyze RAMOS type experiments.

The RAMOS team began Program Design in the Fall of 2000. The RAMOS project consists of two co-orbital satellites each with a sensor suite consisting of an infrared imaging radiometer, a visible wide-angle photometer, and a visible camera. Additionally one satellite will carry a short waveband infrared polarimeter and the other an ultraviolet photometer. Current plans call for Russia to provide the launch capability, satellite platforms, and the ground processing and control equipment while the U.S. will provide the infrared sensors. The satellites are scheduled for launch in FY04 with a nominal two-year on-orbit life expectancy.

FY 2000 Accomplishments:

- 0 Project was funded under Program Element: 0603875C (International Cooperative Programs). Previous projects included: 1161 Advanced Sensor Technology and 4000 Operational Support.
- Total 0

FY 2001 Planned Program:

- 0 Project was funded under Program Element 0603875C (International Cooperative Programs). Previous projects included: 1161 Advanced Sensor Technology and 4000 Operational Support.
- Total 0

FY 2002 Planned Program:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5030
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- 34000 Complete detailed designs of the satellite platforms, ground project, launch vehicle, and all associated projects and instruments to accomplish the space experiment, including build-to-specification, detailed drawings and updated risk mitigation plans. Finalize test plans for system and component testing and perform quality assurance activities during fabrication of the projects. Finalize concept of operations and experiments planning.
 - 30115 Complete detailed designs of the satellite primary sensors and all associated projects and instruments to accomplish the space experiments. Finalize test plans for testing and continue to perform quality assurance activities during fabrication of the sensor project. Design and fabricate sensor prototypes to be used during interface and project tests. Finalize concept of operations and experiments planning. Begin fabrication of long lead items. Begin writing software for sensor. Begin development of models and simulations to test the design and concepts to include computer mass and mathematical models, orbit models of experiment simulations, and simulations to validate hardware and design trades. Prepare concept for management, processing, storage, and analysis of experiment data.
 - 11227 Perform system engineering and configuration control processes for RAMOS project. Monitor and facilitate progress of critical design. Monitor and evaluate subproject and component testing. Provide technical review of exported data. Provided in country administrative, security, and technical support of RAMOS program office.
- Total 75342

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
PE 0603880C, BMD System			779584						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5020, Space Sensors			384799						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5050, Systems Engineering & Integration			10000						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5060, Test & Evaluation			15000						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5090, Program Operations			10459						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603875C, International Cooperative Program	83984	129699								

C. Acquisition Strategy:

Project 5030

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment
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RAMOS is a cooperative experiment program designed to engage the Russians in early warning and theater missile defense related technologies. The tasks to complete the design, fabrication, launch, and operations of the two-satellite constellation will be completed under three major contracts.

The first contract is with Utah State University (USU)/Space Dynamics Laboratory (SDL), a designated University Affiliated Research Center for space sensors. SDL is the current U.S. prime contractor for RAMOS and has a prime/subcontractor relationship with the Russian State Company, Rosvoorouzhenie (now Rosoboronexport), for Russian tasks. This contractual approach will be used for design and development of the RAMOS project through the Preliminary Design Review (PDR) scheduled for 2Q FY02. After PDR, USU will remain as the prime U.S. contractor for the sensor development and fabrication as well as mission planning and data reduction.

The second contract will be a direct contract with the Russian State Company, Rosoboronexport (formerly Rosvoorouzhenie). During FY01, BMDO plans to negotiate a government-to-government agreement with the Russian Federation to govern the RAMOS program. Once this agreement is concluded, BMDO will contract directly with Rosoboronexport for the Russian efforts. Under this contract, Rosoboronexport, through Russian subcontractors, will be responsible for the development and fabrication of the satellite platforms, development and operation of the ground project, and launch services for the two RAMOS satellites.

The third contract is with Ball Aerospace and Technologies Corporation (BATC) of Boulder, CO. As the Systems Engineering and Integration contractor for BMDO, BATC will be primarily responsible for monitoring the Russian effort and facilitating the integration of U.S. and Russian components. BATC will also support preparation of program documentation for technology protection and security and provide in country administrative, security and technical support of RAMOS Program Office.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Preliminary Design Review for U.S. Sensors			1Q					
RAMOS Project Preliminary Design Review			2Q					
Complete Critical Design for U.S. Sensors			4Q					

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5030
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Hardware Development	CPAF	USU/SDL, Logan, UT				29942					29942	
b. Hardware Development	OTAF	Rosoboronexport, RF				34000					34000	
c. Hardware Development	CPAF	BATC, Boulder, CO				10000					10000	
d.												
Subtotal Product Development:						73942					73942	

Remark: Prior to FY99, the RAMOS program was in the BA3 – Advanced Technology Development, PE 0603173C, Support Technologies --ATD

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Development Support	Allot	AFRL, Hanscom AFB				600				TBD	600	
b.												
Subtotal Support Costs:						600					600	

Remark: Prior to FY99, the RAMOS program was in BA3 – Advanced Technology Development, PE 0603173C, Support Technologies --ATD

AFRL technical support will be required in program development, experiment planning and data analysis, with emphasis on earth backgrounds, data certification technology transfer and surveillance

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Security Monitoring Spt	Allot	DTRA				200					200	
b. Program Mgt Spt	CPFF	CSC/NRC, Arlington,				600					600	

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment
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b. Program Mgt Spt	CPFF	CSC/NRC, Arlington, VA and Aerospace, EL segundao, CA				600						600	
c.													
Subtotal Management Services:						800						800	

Remark: Prior to FY99, the RAMOS program was in BA3 – Advanced Technology Development, PE 0603173C, Support Technologies --ATD

Project Total Cost:						75342						75342	
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Remark: Prior to FY99, the RAMOS program was in BA3 – Advanced Technology Development, PE 0603173C, Support Technologies --ATD

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5050
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5050 Systems Engineering and Integration	0	0	10000						Continuing	Continuing

A. Mission Description and Budget Item Justification

System Engineering and Integration will support the integration of SBIRS Increment 3 into the BMD System. This effort includes the definition and risk reduction of SBIRS Increment 3/BMD System interfaces.

Concept Definition

This project performs the necessary engineering, trade studies, and system requirements definition for the sensor project of the BMD system.

Risk Reduction

Provide Simulation and Hardware in the loop demonstrations of SBIRS Low and BMD functionality. Provide exercise support to elicit operator-in-the loop feedback.

Data Collection and Phenomenology

Analyze past IR and Visible Sensor Data collections from previous experiments and test to support algorithm development.

Experiments

Plan and develop pre-on-orbit tests (Integrated Flight Tests, TCMP Flights, Red Crow Experiments, etc...) that provide data for SBIRS Low Risk Reduction Effort.

SBIRS Integration

Perform BMD and SBIRS integration activities.

FY 2000 Accomplishments:

- 0
- Total 0

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5050
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FY 2001 Planned Program:

- 0
- Total 0

FY 2002 Planned Program:

- 10000 Perform systems engineering for SBIRS integration into the Ballistic Missile Defense Architecture. Address interoperability issues and interface features (data flow rate, volume, format, and data content), data fusion/sensor synergy and architecture analysis).
- Total 10000

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To Compl	Total Cost
PE 0603880C, BMD System			779584						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5020, Space Sensors			384799						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5030, International Cooperation			75342						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5060, Test & Evaluation			15000						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5090, Program Operations			10459						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603875C, International Cooperative Program	83984	129699								

C. Acquisition Strategy:

D. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5050
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Engineering & Integration	Various					10000					10000	
b.												
Subtotal Support Costs:						10000					10000	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:						10000					10000	
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5060
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COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5060 Test And Evaluation	0	0	15000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Radar technology testbed will capitalize on recent advances in radar and computational technologies to enable leap-ahead advances in radar capabilities. These capabilities are required to make projects more affordable while providing capabilities against counter-measures and advanced threats. This project will employ an open system architecture to permit infusion of new components from throughout the radar technology community.

FY 2000 Accomplishments:

- Total 0

FY 2001 Planned Program:

- Total 0

FY 2002 Planned Program:

- 15000 FY02 new start. Initiate concept studies with major radar contractors. Develop systems engineering methodology to identify and refine system requirements to ensure open systems concept to enable infusing innovative concepts.
- Total 15000

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
PE 0603880C, BMD System			779584						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5020, Space Sensors			384799						Cont.	Cont.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5060
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PE 0603884C, Sensors Segment; Project 5030, International Cooperation			75342							Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5050, Systems Engineering & Integration			10000							Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5060, Test & Evaluation			15000							Cont.	Cont.
PE 0603175C, Technology			112890							Cont.	Cont.
PE 0603875C, International Cooperative Program	83984	129699									

C. Acquisition Strategy: The program will be managed by BMDO with support from the U.S. Army Space and Missile Defense Command and the Navy PEO for Theater, Air and Missile Defense. Concept studies will be initiated in FY02 with major radar project contractors and separate supporting concept studies for innovative components from radar component technology contractors. Concurrently a system engineering methodology will define the system requirements based on capabilities that can be achieved. A down-select to the best one or two concepts will be made in FY03 with continued refinement of the concepts and risk reduction activities. In FY04 a single concept will be defined.

D. Schedule Profile	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Contract Award			3Q					

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
---	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5060
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Major System Contractors	CP	TBD				10000					10000	
b. Component Contracts	CP	TBD				5000					5000	
c.												
Subtotal Test and Evaluation:						15000					15000	

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:						15000					15000	
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5090
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COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
5090 Program Operations	0	0	10459						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project covers personnel and related facility support costs, statutory and fiscal requirements, support service contracts and the BMDO Data Centers Programs.

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

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

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

This project also includes the BMDO Data Centers Programs. The BMDO Data Centers Information System Program Manager provides management, oversight, technical assistance, and expertise for the BMDO Data Centers Program. The BMDO Data Centers Program archives, manages, and develops data products, distributes and provides remote access to all relevant BMD data. Operation and management of Data Center activities is accomplished at several sites, each site specializing in a particular discipline. Taskings include providing assessments for technical/programmatic issues and data center performance, coordinating segment customer program/data management requirements, and cooperative partnership requirements.

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
--	--------------------------

BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5090
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FY 2000 Accomplishments:

- Project was funded under Program Elements: 0604442F (SBIRS) and 0603875C (International Cooperative Programs). Previous projects included: 1161 Advanced Sensor Technology, 4598 SBIRS Low Element, and 4000 Operational Support.

Total 0

FY 2001 Planned Program:

- Project was funded under Program Elements: 0604442F (SBIRS) and 0603875C (International Cooperative Programs). Previous projects included: 1161 Advanced Sensor Technology, 4598 SBIRS Low Element, and 4000 Operational Support.

Total 0

FY 2002 Planned Program:

- 12829 Provides management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities, supplies and the data centers programs.

Total 12829

B. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>
PE 0603880C, BMD System			779584						Cont.	Cont.
PE 0603881C, Terminal Defense Segment			988180						Cont.	Cont.
PE 0603882C, Midcourse Defense Segment			3940534						Cont.	Cont.
PE 0603883C, Boost Defense Segment			685363						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5020, Space Sensors			384799						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5030, International Cooperation			75342						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5050, Systems Engineering & Integration			15000						Cont.	Cont.
PE 0603884C, Sensors Segment; Project 5090, Program Operations			10459						Cont.	Cont.
PE 0603175C, Technology			112890						Cont.	Cont.
PE 0603875C, International Cooperative Program	83984	129699								

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment
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C. Acquisition Strategy:

D. <u>Schedule Profile</u>	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007

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BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0603884C Sensors Segment	PROJECT 5090
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 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 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
Subtotal Management Services:												

Remark:

Project Total Cost:												
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 4 - Program Definition and Risk Reduction	PE NUMBER AND TITLE 0901585c PENTAGON RESERV MAINT RESERVE FUND	PROJECT 4151
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COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4151 PENTAGON RESERV MAINT RESERVE FUND	0	4729								

A. Mission Description and Budget Item Justification

This is a new DoD-directed Program Element starting in FY 2001 to separately identify costs for the Pentagon Reservation Maintenance Reserve Fund (PRMRF). The PRMRF finances the following: real property operation and maintenance costs of the Pentagon and Federal Office Building 2, the renovation of the Pentagon, the Remote Delivery Facility, and the Metro Entrance Facility Projects.

FY 2000 Accomplishments:

- 0 FY 2000 funding was previously included in Program Element 0603872C Project 4000.
- Total 0

FY 2001 Planned Program:

- 4729 Continue program as described in Block A.
- Total 4729

B. <u>Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (FY 2001 PB)	0	4772		
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions		-43		
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since FY 2001 PB				
Current Budget Submit (FY 2002 PB)	0	4729		

Change Summary Explanation: Across -the- board undistributed reductions

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001		
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604861C THAAD System - EMD				PROJECT 2260		
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense (THAAD)	81614	540998								
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>The Theater High Altitude Area Defense (THAAD) program has been transferred to PE 0603881C Terminal Defense. The THAAD System Engineering and Manufacturing Development (EMD) phase will refine and mature the Program Definition and Risk Reduction (PDRR) system design to ensure component and system performance, producibility, and supportability. The mission of the THAAD System is to defend against short and medium range Theater Ballistic Missiles (TBMs) at long ranges and high altitudes. THAAD's long range capability will protect U. S. and allied Armed Forces, broadly dispersed assets and population centers against TBM attacks. THAAD's capability to intercept at high altitudes allows multiple intercept opportunities and will significantly mitigate the effects of weapons of mass destruction. The THAAD System consists of missiles, launchers, and radar(s), Battle Management/Command, Control, Communications, and Intelligence (BM/C³I) units, and support equipment.</p> <p>The acquisition philosophy for Engineering and Manufacturing Development (EMD) results in a First Unit Equipped (FUE) for an initial configuration (C1) in FY 2007. C1 will include the capability to defeat all expected upper tier threats in that timeframe, and will meet the key performance parameters outlined in the Operational Requirements Document. Enhanced survivability and battalion operational software are deferred to the next configuration (C2).</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 81614 Awarded EMD prime contract, (Aug 2000), and brought on major subcontracts and suppliers. <p>Total 81614</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 459763 Continue hardware and software development for the missile, radar, BM/C³I, and launcher. Conduct radar hardware Critical Design Review (CDR); conduct breadboard testing, conduct Preliminary Design Reviews (PDRs) for launcher and BMC³I. • 18100 In-house support: Fund government salaries and benefits, travel, training, etc. • 1307 Establish operational test & evaluation (OT&E) support. • 3700 Test Planning • 33971 Support contracts: Continue software independent verification and validation. Continue hardware in the loop (HWIL), general engineering analysis and independent assessment, simulation over live driver (SOLD). Continue nuclear environment survivability analysis. Continue discrimination, navigation and control algorithm development. • 24157 Other Government Agencies (OGAs), Government Furnished Equipment (GFE)/other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios. Continue BM/C³I, and simulation efforts. Continue system threat vulnerability assessment. Maintain integrated logistics and product assurance efforts. Continue support for development of adaptive algorithms with BMDO. <p>Total 540998</p>										
Project 2260			Page 1 of 5 Pages				Exhibit R-2 (PE 0604861C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604861C THAAD System - EMD	PROJECT 2260
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B. Program Change Summary	<u>FY2000</u>	<u>FY2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001 PB</u>)	79462	549945		
Congressional Adjustments				
Appropriated Value		549945		
BMDO Adjustments				
Adjustments to Appropriated Value				
a. Congressional Reductions	-208	-8947		
b. OSD Reductions	-1750			
c. Gov't wide Realignment (OSD)	4110			
Adjustments to Budget Years Since <u>FY 2001 PB</u>				
Current Budget Submit (<u>FY 2002 PB</u>)	81614	540998		

Change Summary Explanation:

FY2001 (-7447): Congressional general reductions.
 (-1500): SIAP Reprogramming.

C. Other Program Funding Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>To Compl</u>	<u>Total Cost</u>
THAAD Dem/Val – 0603861C	506221									
THAAD SYS PROCUREMENT – 0208861C										

D. Acquisition Strategy: The EMD contract was a sole source award to the Dem/Val contractor team (as approved September 15, 1995 by Under Secretary of Defense for Acquisition, Technology, and Logistics utilizing the DoD Acquisition Streamlining approach) with Lockheed Martin Space Systems Company being the prime and Raytheon Company being the major subcontractor. The EMD contractor team will become the contractor team for the Low Rate Initial Production (LRIP) and Full Rate Production (FRP) phases. This single prime contractor will have total system performance responsibility for the EMD, LRIP, and FRP phases.

E. Schedule Profile	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Radar CDR (HW/SW)	4Q						

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604861C THAAD System - EMD
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Launcher PDR	3Q						
BM/C ³ I PDR (HW)	3Q						
Launcher CDR							
BM/C ³ I CDR (SW/HW)							
System PDR							
Missile CDR							
System CDR							
Configuration 2 PDR							
EMD Radar 1 Integration & Test Complete							
Component Test Flights Begin							
C2 Authority to Proceed (ATP)							
Developmental Tests -Begin							
Award 14 Missile Option							
Production Qualification Test Ready							
Production Readiness Review Assessment							
Long Lead Award							
EMD Radar 2 Integration & Test Complete							
LRIP-1 Award							
FUE							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604861C THAAD System - EMD	PROJECT 2260
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. THAAD System EMD	CPAF/FF	LMSSC	81614	427431	Aug 00						509045	
Subtotal Product Development:			81614	427431							509045	

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA	Various		0	33971							33971	
b. OGAs	MIPR		0	20945							20945	
c. Program Mgmt	Various		0	18100							18100	
Subtotal Support Costs:				73016							73016	

Remark:

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	TBD
a. Test Planning	MIPR		0	3700							3700	
b. OT&E			0	1307							1307	
c. Lethality			0	0								
Subtotal Test and Evaluation:				5007							5007	

Remark:

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604861C THAAD System - EMD	PROJECT 2260
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. MIT/LL	MIPR/FFRDC	LEXINGTON,MA	0	1300							1300	
b. MITRE	MIPR/FFRDC	FT.MONMOUTH, NJ	0	1912							1912	
c.												
d.												
e.												
f.												
Subtotal Management Services:				3212							3212	

Remark:

V. Other Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
b. SBIR				11316								
c. OSD/Undistributed cuts				21016								
Subtotal Other Categories				32332								

Remark:

Project Total Cost:				540998							81235	
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Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604865C PAC3 - EMD	PROJECT 2257
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COST <i>(In Thousands)</i>	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
2257 Patriot	220674	79851								

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 types at varying ranges. The PATRIOT Advanced Capability 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 short to medium range theater ballistic missiles (TBM's), cruise missiles (CM's), unmanned aerial vehicles (UAVs) and other air breathing threats as part of the Theater Missile Defense (TMD) family of systems, a multilayered Theater Air and Missile Defense Architecture. 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 U.S. Army developments that can be incorporated into the PATRIOT program.

The PATRIOT Program (PE 0604865C) to include Programmatic and funding is being transferred to the Army beginning in FY02.

FY 2000 Accomplishments:

- 202924 Continued PAC-3 missile Engineering and Manufacturing Development (EMD) program.
 - 9712 Continued PAC-3 Target and Test Support.
 - 8038 Continued operational test and evaluation efforts.
- Total 220674

FY 2001 Planned Program:

- 65218 Continue PAC-3 missile Engineering and Manufacturing Development (EMD) program.
 - 9333 Continue PAC-3 Target and Test Support.
 - 5300 Continue Operational Test Support.
- Total 79851

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604865C PAC3 - EMD	PROJECT 2257
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B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001 PB</u>)	179139	81016		
Appropriated Value		81016		
a. Congressional Reductions (FFRDC, Inflation, etc)		-1165		
b. OSD Reductions				
c. Congressional Reprogramming				
d. FY 00 Emergency Supplemental	40000			
e. Below Threshold Reprogramming	1535			
Adjustments to Budget Years Since <u>FY 2001 PB</u>				
President's Budget (<u>FY 2002 PB</u>)	220674	79851		

Change Summary Explanation:

Funding: FY 2000 (+41535):	Project increased (+2535) to meet program funding requirements. Project decremented (-1000) for common PATRIOT requirements. Congressional adjustment of (+40000) allocated from FY00 Emergency Supplemental.
FY 2001 (-1165)	Congressional general reductions (-1165).

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604865C PAC3 - EMD	PROJECT 2257
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C. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	To <u>Compl</u>	Total <u>Cost</u>
2257, PAC3 Procurement, PE 0208865C	375331	362101								

D. Acquisition Strategy: The design objective of the PATRIOT system is to provide a system capable of being modified to cope with the evolving threat. This strategy minimizes technological risks and provides a means of enhancing system capability through planned upgrades of deployed systems. The PATRIOT program consists of two interrelated acquisition programs – the PATRIOT PAC-3 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 are determined for each configuration in order to provide benchmarks for configuration testing and for the development of user doctrine and tactics. The PAC-3 Missile Program focuses on developing, fabricating and testing the high velocity, hit to kill, surface to air missile and associated ground support equipment to provide essential increases in battle space, accuracy, lethality and firepower to counter and destroy evolving air defense threats. The missile performance is demonstrated through a series of flight tests and modeling and simulation activities. A PAC-3 Follow-on Test Program will supplement EMD by demonstrating system and missile improvements and capabilities not verified during EMD flight tests. Evolutionary development efforts will further improve system capabilities against emerging and reactive threats.

E. <u>Schedule Profile</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
Configuration 3 Initial Operational Test & Evaluation (IOT&E)		1-4Q					
PAC-3 FUE	4Q						
Milestone III		4Q					
IOC							

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)										DATE June 2001		
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	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. PAC-3 Missile EMD	SS-CPIF	LMMFC/TX	941818	17700	Oct 00							
b. PAC-3 Missile Integration	SS-CPIF	Raytheon/MA	166433	8500	Nov 00							
c. RDEC	MIPR	MRDEC/AL	67603	1396	Nov 00							
d. PAC-3 Missile FOT	SS-CPIF	LMMFC/TX										
e. RSC Integration	SS-CPIF	Raytheon/MA										
f. PAC-3 Evolutionary Development			9500									
Subtotal Product Development:			1185354	27596								
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SETA	C-CPAF	CAS/AL	43340	5343	Oct 00							
a. OGA/In-House	PO		70772	8273	Nov 00							
b. Engineering Support	SS-CPIF	Raytheon/MA	74090	7485								
Subtotal Support Costs:			188202	21101								
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	<u>FY 2001</u> Cost	<u>FY 2001</u> Award Date	<u>FY 2002</u> Cost	<u>FY 2002</u> Award Date	<u>FY 2003</u> Cost	<u>FY 2003</u> Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. White Sands Missile Range	MIPR	WSMR/NM	87377	12154	Oct 00							
b. ADSAM			4668									
c. Impact				3467								
d. Operational Test Support	MIPR		29989	6200	Nov 00							
e. Targets	MIPR	SMDC/AL	92668	9333	Nov 00							
f. Lethality	MIPR	SMDC/AL	37628									
Subtotal Test and Evaluation:			252330	31154								

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604865C PAC3 - EMD	PROJECT 2257
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IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a.												
b.												
c.												
d.												
e.												
f.												
Subtotal Management Services:												

Remark:

Project Total Cost:			1625886	79851								
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UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001		
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604867C Navy Area - EMD				PROJECT 2263		
COST (In Thousands)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
2263 Navy Area	303479	269552								
<p>The Navy Area Program (PE 0604867C) to include programmatics and funding is being transferred to the Navy beginning in FY02.</p> <p>A. <u>Mission Description and Budget Item Justification</u> The Navy Area Theater Ballistic Missile Defense (TBMD) program 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 ARLEIGH BURKE-class destroyers. Navy Area TBMD will take advantage of the attributes of naval forces including overseas presence, mobility, flexibility, and sustainability in order to provide lower tier protection to debarkation ports, coastal airfields, amphibious objective areas, Allied forces ashore, and other high value sites. Navy assets will provide an option for initial TBMD allowing the insertion of additional land-based TBMD assets and other expeditionary forces in an opposed environment. Navy Area TBMD is designed to be fully interoperable within the Theater Missile Defense (TMD) Family of Systems (FoS) architecture, will complement the land-based PAC-3 system, the Navy Theater Wide (NTW) and Theater High Altitude Area Defense (THAAD) upper tier TBMD systems.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 271053 Began SM-2 Block IVA missile land based testing at WSMR by successfully conducting two Control Test Vehicle Flight Tests of the SM-2 Block IVA Missile. Completed exit criteria to support Low Rate Initial Production (LRIP) Long Lead Material (LLM) decision. Continued Engineering/Manufacturing Development (EMD) of the SM-2 Block IVA missile. Continued fabrication and delivery of White Sands Missile Range (WSMR) flight test and LINEBACKER missiles. Continued fabrication and delivery of Inert Operational Missile (IOM)/Engineering Design Model (EDM) test rounds. Continued Aegis Weapon System (AWS) Baseline 6 Phase III (B/L 6.3) full capability (tactical) computer program development and initiated computer program testing at Combat Systems Engineering Development Site (CSEDS). Continued follow-on AWS Baseline 7 Phase I (B/L 7.1) computer program development. Continue implementation of modifications to Navy Command and Control systems to maintain consistency with the Joint Planning Network (JPN), Joint Data Network (JDN), and Joint Composite Tracking Network (JCTN). • 4700 Continued Live Fire Test & Evaluation (LFT&E) ground test program activities. Continued required lethality analyses and lethality model refinements. • 27726 Continued building and delivery of targets to support Navy TBMD flight tests and maintain infrastructure to support Theater Missile Defense (TMD) targets. <p>Total 303479</p>										
Project 2263	Page 1 of 5 Pages						Exhibit R-2 (PE 0604867C)			

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604867C Navy Area - EMD	PROJECT 2263
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FY 2001 Planned Program:

- 227839 Continue EMD of the SM-2 Block IVA missile. Continue WSMR missile flight testing. Continue fabrication and delivery of EMD test rounds. Complete AWS Baseline 6 Phase III full capability (tactical) computer program coding and computer program testing at CSEDS. Begin preparations for delivery of AWS tactical computer program to Developmental Testing/Operational Testing (DT/OT) test ship. Continue follow-on AWS Baseline 7 Phase I computer program development. Continue implementation of modifications to Navy Command and Control systems to maintain consistency with the JPN, JDN, and JCTN. Gain LRIP LLM decision and awarded LRIP LLM contract December 01.
 - 1810 Complete LFT&E ground test program activities. Continue required lethality analyses and lethality model refinements.
 - 39903 Continue building and delivery of targets to support Navy TBMD flight tests.
- Total 269552

B. Program Change Summary	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001 PB</u>)	303479	271648		
Congressional Adjustments				
Appropriated Value		274234		
Adjustments to Appropriated Value				
a. Congressional Reductions (FFRDC, Inflation, etc)		-3182		
b. OSD Reductions				
c. Emergency Supplemental				
d. SIAP Reprogramming		-1500		
Adjustments to Budget Years Since <u>FY 2001 PB</u>				
Current Budget Submit (<u>FY 2002 PB</u>)	303479	269552		

Change Summary Explanation:

Funding: The FY01 decrease of \$3182K represents this program's portion of the Congressional reductions and \$1500 was reprogrammed for SIAP.

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604867C Navy Area - EMD	PROJECT 2263
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C. <u>Other Program Funding Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY2007</u>	<u>To Compl</u>	<u>Total Cost</u>
DWP Navy Area – AEGIS TBM Upgrades	7839	0								
DWP Navy Area – SM-2 Blk IVA Procurement	10123	0								
WPN BLI: 223400 -SM-2 BLK IVA	93346	68141								
WPN 229000er Missile Support Mk 21 Mod 1 VLS Canisters for SM-2 BLK IVA	2114	2342								

D. Acquisition Strategy:
Navy Area Defense. The Navy Area program builds on the existing Aegis air defense system to achieve a sea-based lower-tier BMD capability. The program includes a phased development with early demonstration of AEGIS Theater Ballistic Missile detection capability. This strategy consists of a Navy Area TBMD Program evolving to a Theater-Wide Defense TBMD program. The Navy Area Program strategy will build on existing force structure by modifying the SM-2 Block IV missile and AEGIS Combat System to achieve TBMD capability.

E. <u>Schedule Profile</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
White Sands Missile Range Develop Testing/Operational Assessment – Start	3Q							
Long Lead Material for Low Rate Initial Production Decision		1Q						
AWS Baseline 6 Phase 3 Demonstration (CSEDS)		4Q						
Low Rate Initial Production Decision								
WSMR Developmental Testing/Operational Assessment - Complete								
Tactical Developmental Testing At Sea – Start								
AEGIS Linebacker Developmental Testing At-Sea Tests								
Low Rate Initial Production Delivery								
Tactical Operational Testing At Sea – Start								
Tactical First Unit Equipped								
Acquisition Milestone III								

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604867C Navy Area - EMD	PROJECT 2263
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I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SM-2 Blk IVA Missile	CPAF	RAYTHEON	459611	98370	Cont							
b. SM-2 Blk IVA Missile	WR	CHINA LAKE	6100	2025	Cont							
c. AWS/BMC41	CPAF	LOCKHEED MARTIN	190390	55145	Cont							
d. AWS/BMC4I/SM-2	WR	NSWC/DD	32196	7713	Cont							
e. AWS/BMC4I/SM-2	CPFF	JHU/APL	40231	13858	Cont							
f. AEGIS Weapon System	MIPR	MIT/LL	3585	1354	Cont							
g. AWS/BMC41	CPFF	TSC	1600	100	Cont							
h. AWS/SM-2	WR	NWAS	2759	855	Cont							
i. Vertical Launch System	CPAF	UNITED DEFENSE	7707	341	Cont							
j. BMC4I	RCP	SPAWAR	17348	1770	Cont							
k. BMC41	CPFF	ANTEON	7495	2984	Cont							
l. SM-2/AWS/VLS	VARIOUS	VARIOUS	37912	6163	Cont							
Subtotal Product Development:			806934	190678	Cont							

Remark:

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Architecture	CPFF	JHU/APL	2927	1670	Cont							
b. SM-2/AWS/Sys Arch	WR	NSWC/DD	14379	4937	Cont							
c. VLS/Sys Arch/BMC4I	VARIOUS	VARIOUS	8159	1528	Cont							
d. AWS		TSC	3582	1350	Cont.							
e. AWS	WR	NWAS/CORONA	2830	1000	Cont.							
f. AWS	MIPR	MIT/LL	5200	1300	Cont.							
Subtotal Support Costs:			37077	11785	Cont							

Remark:

UNCLASSIFIED

BMDO RDT&E COST ANALYSIS (R-3)	DATE June 2001
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604867C Navy Area - EMD	PROJECT 2263
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III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Test & Evaluation	CPFF	JHU/APL	4688	1965	Cont							
b. Test & Evaluation	WR	WSMR	8697	3859	Cont							
c. Test & Evaluation	WR	PMRF	1235	676	Cont							
d. T&E/IMPACT/Lethality	WR	NSWC/DD	31777	3799	Cont							
e. VLS/T&E	WR	NSWC/PHD	5540	2481	Cont							
f. Test & Evaluation	MIPRE	MIT/LL	430	200	Cont							
g. Test & Evaluation	WR	COTF	850	696	Cont							
h. Targets	N/A	SMDC Army	62986	39903	Cont							
i. T&E/VLS/BMC4I	Various	Various	5867	2421	Cont							
Subtotal Test and Evaluation:			122070	56000	Cont							

Remark:

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	FY 2003 Cost	FY 2003 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. SM-2 Blk IVA Missile	CPAF	BAE SYSTEMS	5806	3629	Cont							
b. AEGIS Weapon System	CPFF	PCI	1450	1275	Cont							
c. Systems Architecture	PD	NAVSEA	8900	2100	Cont							
d. T&E/Sys Architecture	CPFF	ANTEON	3218	2218	Cont							
e. SM/BMC4I/SysArch/VLS	Various	Various	4874	1867	Cont							
Subtotal Mgmt Services:			24248	11089	Cont							
Project Total Cost:			990329	269552								

Remark:

UNCLASSIFIED

BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)								DATE June 2001																																																									
BUDGET ACTIVITY 6 - Management and Support				PE NUMBER AND TITLE 0901585C PENTAGON RESERV MAINT RESERVE FUND				PROJECT 1094																																																									
COST <i>(In Thousands)</i>	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost																																																							
1094 PENTAGON RESERV MAINT RESERVE FUND	0	0	6571	0	0	0	0	0	Continuing	Continuing																																																							
<p>A. <u>Mission Description and Budget Item Justification</u> This is a new DoD-directed Program Element starting in FY 2001 to separately identify costs for the Pentagon Reservation Maintenance Reserve Fund (PRMRF). The PRMRF finances the following: real property operation and maintenance costs of the Pentagon and Federal Office Building 2, the renovation of the Pentagon, the Remote Delivery Facility, and the Metro Entrance Facility Projects.</p> <p>FY 2000 Accomplishments:</p> <ul style="list-style-type: none"> • 0 FY 2000 funding was previously included in Program Element 0603872C Project 4000 <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 0 FY 2001 funding was previously included in this Program Element but under Project 4151 <p>FY 2002 Planned Program:</p> <ul style="list-style-type: none"> • 6571 Continue program as described in Block A. <p>Total 6571</p>																																																																	
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 35%;"><u>B. Program Change Summary</u></td> <td style="width: 10%; text-align: center;"><u>FY 2000</u></td> <td style="width: 10%; text-align: center;"><u>FY 2001</u></td> <td style="width: 10%; text-align: center;"><u>FY 2002</u></td> <td style="width: 10%; text-align: center;"><u>FY 2003</u></td> </tr> <tr> <td>Previous President's Budget (<u>FY 2001</u> PB)</td> <td style="text-align: center;">0</td> <td></td> <td style="text-align: center;">3771</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>a. Congressional General Reductions</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. SBIR / STTR</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>c. Omnibus or Other Above Threshold Reductions</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>d. Below Threshold Reprogramming</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>e. Rescissions</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Budget Years Since <u>FY 2001</u> PB</td> <td></td> <td></td> <td style="text-align: center;">+2800</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Current Budget Submit (<u>FY 2002</u> PB)</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">6571</td> <td style="text-align: center;">0</td> </tr> </table> <p>Change Summary Explanation: FY-02: PBD 816 adjustments.</p>											<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	Previous President's Budget (<u>FY 2001</u> PB)	0		3771	0	Appropriated Value					Adjustments to Appropriated Value					a. Congressional General Reductions					b. SBIR / STTR					c. Omnibus or Other Above Threshold Reductions					d. Below Threshold Reprogramming					e. Rescissions					Adjustments to Budget Years Since <u>FY 2001</u> PB			+2800	0	Current Budget Submit (<u>FY 2002</u> PB)	0	0	6571	0
<u>B. Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>																																																													
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Project 1094			Page 1 of 1 Pages			Exhibit R-2 (PE 0901585c)																																																											

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BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE June 2001
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BUDGET ACTIVITY 6 - Management and Support	PE NUMBER AND TITLE 0901598C MGMT HQ - BMDO	PROJECT 1095
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COST (<i>In Thousands</i>)	FY2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY2006 Estimate	FY2007 Estimate	Cost to Complete	Total Cost
1095 PERSONNEL AND RELATED COSTS	0	0	27758	0	0	0	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification

As directed by the DoD Directive 5100.73, "Major DoD Headquarters Activities", signed by the Deputy Secretary of Defense on 13 May 1999, starting in FY 2002, this new Program Element is established to separate the Management Headquarters support costs.

This project funds the following basic areas: personnel and related costs; and service support contracts.

Personnel and related costs covers payroll and benefits of government civilians performing program-wide oversight functions such as financial management, contracting, security, information systems support and legal services at the Ballistic Missile Defense Organization located within the Washington D.C. area. This project also funds related costs such as civilian benefits, travel, rents & utilities, supplies and equipment and service support contracts for operational and maintenance activities. Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, training, rents and utilities, service contracts and supplies and equipment.

B. <u>Program Change Summary</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Previous President's Budget (<u>FY 2001</u> PB)	0	0	0	0
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional General Reductions				
b. SBIR / STTR				
c. Omnibus or Other Above Threshold Reductions				
d. Below Threshold Reprogramming				
e. Rescissions				
Adjustments to Budget Years Since <u>FY 2001</u> PB			27758	0
Current Budget Submit (<u>FY 2002</u> BES)	0	0	27758	0

DATE

June 2001

BUDGET ACTIVITY

6 - Management and Support

PE NUMBER AND TITLE

0901598C MGMT HQ - BMDO

FY 2000 Accomplishments:

- 0 This project has no funding in this fiscal year under this PE.
- Total 0

FY 2001 Planned Program:

- 0 This project has no funding in this fiscal year under this PE.
- Total 0

FY 2002 Planned Program:

- 23978 Civilian Pay & Benefits
 - 1574 Travel and Transportation
 - 875 Training
 - 630 Rents & Utilities
 - 349 Service Contracts
 - 352 Supplies & Equipments
- Total 27758

1. COMPONENT BMDO		FY 2002 RDT&E CONSTRUCTION PROJECT			2. DATE June 2001	
3. INSTALLATION AND LOCATION USA Kodiak Island, Alaska			4. PROJECT TITLE Missile Defense System Test Bed - Kodiak Facilities Ph I			
5. PROGRAM ELEMENT 0603880C 0603882C		6. CATEGORY CODE 312	7. PROJECT NUMBER BMDO		8. PROJECT COST (\$000) Auth 26,270 Approp 8,200	
9. COST ESTIMATES						
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)	
PRIMARY FACILITIES					17,250	
Test Missile Launch Silos		EA	2	4,801,000	(10,660)	
BMC3 IDT Complex for Kodiak Test Site		LS			(1,739)	
DSCS Complex at Kodiak Test Site		LS			(869)	
Telemetry Facility		LS			(2,485)	
Launch Silo Chiller Facilities		EA	2	56,000	(112)	
Total from Continuation Page					(1,385)	
SUPPORTING FACILITIES					6,023	
Electric Service		LS			(1,297)	
Water, Sewer, Gas		LS			(669)	
Paving, Walks, Curbs and Gutters		LS			(521)	
Site Imp (602) /Demo ()		LS			(602)	
Information Systems		LS			(251)	
Antiterrorism Force Protection		LS			(1,925)	
Other (Mob/Demob)		LS			(758)	
ESTIMATED CONTRACT COST					23,273	
CONTINGENCY PERCENT (5%)					1,164	
SUBTOTAL					24,436	
Supervision, Inspection & Overhead (7.5%)					1,833	
TOTAL REQUEST					26,269	
TOTAL REQUEST (ROUNDED)					26,270	
INSTALLED EQPT-OTHER					66,390	
10. Description of Proposed Effort: Construct a Missile Defense System Test Bed Launch Complex at Kodiak, Alaska. This project is submitted for full Authorization in FY2002 with multi-year Appropriations phased and distributed over more than one fiscal year. This project requests funding of \$5.40 million in FY2002 and additional requirements of \$0.98 million in FY2003; \$2.71 million in FY2004 for PE No. 0603880C and \$2.80 million in FY2002 and additional requirements of \$13.90 million in FY2003; \$0.48 million in FY2004 for PE No. 0603882C*. This project upgrades facilities at an existing launch test site, constructs additional test missile launch capabilities and provides for the installation of test Battle Management Command and Control (BMC3) capability with In-Flight Interceptor Communications System Data Terminals (IDT), and Defense Satellite Communication System (DSCS) Test Facilities. This Test Missile Launch site includes construction of 2 Launch Silos, Telemetry Facility, Launch Silo Chiller Facilities, alterations to existing launch control facilities, alterations to existing missile assembly building, Booster Storage Area, Missile Hypergolic Fuel and Oxidizer Storage Buildings, Diesel Transfer Point and mission electrical power. Construct BMC3 Test Facilities consisting of facilities to house the installation of IDT and DSCS satellite communications equipment. Supporting facilities include utilities, pavements, buried power and communication lines, fire detection and suppression systems, security and site infrastructure.						

1. COMPONENT BMDO	FY 2002 RDT&E CONSTRUCTION PROJECT	2. DATE June 2001
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3. INSTALLATION AND LOCATION
USA KODIAK ISLAND ALASKA

4. PROJECT TITLE Missile Defense System Test Bed - Kodiak Facilities, Ph I	5. PROJECT NUMBER BMDO
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9. COST ESTIMATES (CONTINUED)				
<u>Item</u>	<u>U.M (M/E)</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost (000)</u>
PRIMARY FACILITIES (CONTINUED)				1,385
Add/Alter Launch Control Center	LS			(248)
Add/Alter Missile Assembly Building	LS			(248)
Booster Storage Area	LS			(93)
Missile Fuel Storage Buildings	LS			(93)
Diesel Transfer Point	LS			(93)
Mission Electrical Power Facilities	LS			(609)

11. **REQ:** 1 - EA **ADQT:** NONE **SUBSTD:** NONE

PROJECT: Construct Launch, Operations and Support Facilities to support the Missile Defense System Test Bed. (New Mission)

REQUIREMENT: This project is required to provide essential facilities to conduct and support a robust operational test bed in an environment that simulates actual operational conditions.

CURRENT SITUATION: The Ballistic Missile Defense Organization (BMDO) is developing a missile defense system and planning for a Missile Defense System Test Bed to ensure operational equipment and missiles adequately meet technological and threat assessments. One of the major criticisms of the BMDO Test Programs has been a lack of operationally realistic testing. An upgrade of the Kodiak Launch Complex is proposed to reduce, or eliminate, this issue. The Missile Defense System Test Bed program can use some of the existing facilities but will have to construct launch silos and modify some of the existing facilities.

IMPACT IF NOT PROVIDED: If this project is not provided, flight testing of the Missile Defense System Test Bed system and its components against challenging, realistic targets will be limited, so that some development shortfalls might not be resolved prior to any future fielding. The full potential under current technology to develop, integrate and test a system to protect against a limited attack from a nation of concern may not be achieved.

ADDITIONAL: Cost estimates are based on parametric estimates and similar experience gained during construction of test facilities at Kwajalein Missile Range. This project is being coordinated with the appropriate physical security plans, and all required physical security and/or combating terrorism (CBT/T) measures are being included. Environmental analysis is being accomplished. Project specific environmental documentation is being prepared as necessary. This project is in support of other Missile Defense System Test Bed construction being accomplished by BMDO.

1. COMPONENT BMDO	FY 2002 RDT&E CONSTRUCTION PROJECT	2. DATE June 2001
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3. INSTALLATION AND LOCATION
USA KODIAK ISLAND ALASKA

4. PROJECT TITLE
Missile Defense System Test Bed - Kodiak Facilities,
Ph I

5. PROJECT NUMBER
BMDO

12. SUPPLEMENTAL DATA

A Estimated Design Date

(1) Status

(a) Date Design Started:	Oct 2001
(b) Percent Complete As of January 2002	25%
(C) Date 35% Designed	Mar 2002
(d) Date Design Complete:	Oct 2002
(e) Parametric Cost Estimating Used to Develop Costs	Yes
(f) Type of Design Contract: design-build	

(2) Basis of Design

(a) Standard or Definitive Design	No
(b) Where Design was most recently used:	

(3) Total Cost (000) (c)= (a)+(b) or (d)+(e)

(a) Production of Plans and Specifications:	\$ 739
(b) All other Design Costs:	\$ 661
(c) Total Design Costs	\$ 1,400
(d) Contract	N/A
(e) In-house	N/A

(4) Construction Contract Award Dec 2001

(5) Construction Start Jul 2002

(6) Construction Complete Oct 2004

B Equipment associated with this project which will be provided from other appropriations:

<u>Equipment Nomenclature</u>	<u>Procuring Appropriation</u>	<u>Fiscal Year Appropriated Or Requested</u>	<u>Cost (\$000)</u>
Test Equipment	RDT&E	2002	22,500
Test Equipment	RDT&E	2003 *	30,400
Test Equipment	RDT&E	2004 *	13,490
		TOTAL	66,390

* This administration has not addressed FY2003-2007 requirements. All FY2003-2007 budget estimates included in this book are notional and subject to change.

1. COMPONENT DEFENSE BMDO		FY 02 RDT&E FACILITY PROJECT DATA			2. DATE June 2001			
3. INSTALLATION AND LOCATIONS NASA JOHN C. STENNIS SPACE CENTER, MS				4. PROJECT TITLE GAS STORAGE FACILITIES FOR SPACE BASED LASER TEST FACILITY				
5. PROGRAM ELEMENT 0603883C		6. CATEGORY CODE 411-139		7. PROJECT NUMBER BMDO 220-C		8. PROJECT COST (\$000) \$270		
9. COST ESTIMATES								
					U/M	QUANTITY	UNIT COST	COST (\$000)
ITEM								
GAS STORAGE FACILITIES FOR SPACE BASED LASER TEST PRIMARY FACILITIES								
REACTANT STORAGE 2 FACILITIES (UNITS IN ENGLISH SYSTEM)					SM	334.45	427.57	143
(UNITS IN ENGLISH SYSTEM)					SF	(3600)	(39.72)	
CONTROL FACILITY					SM	18.58	645.84	12
(UNITS IN ENGLISH SYSTEM)					SF	(200)	(60.00)	
SUPPORTING FACILITIES								
SITE PREPARATION, ACCESS ROADS, UTILITIES, ETC.					LS			78
TOTAL FACILITIES CONTRACT COST					LS			233
CONTINGENCY (5%)					LS			12
SUBTOTAL					LS			245
SUPERVISION, INSPECTION, AND OVERHEAD (10%)					LS			25
TOTAL REQUEST					LS			270
TOTAL REQUEST (ROUNDED)					LS			270
GAS MONITORING EQUIPMENT (NON-ADDITIVE)					LS			(40)
10. DESCRIPTION OF PROPOSED CONSTRUCTION:								
Provide two new gas storage facilities to house laser chemicals and control facility for remote monitoring. Use reinforced concrete for foundations, metal walls, lighting, heating ventilation and air conditioning, and blast resistant doors.								
Provide control and monitoring facility to support transfer of fuels and monitoring of gas and fire detection systems. Provide reinforced concrete pad, a metal building, heating ventilation and air conditioning system and lighting system.								
Install new access ways, fire suppression systems, alarms, and tie into existing base fire/security systems.								
REQUIREMENT: 352.05 SM ADEQUATE 0 SM SUBSTANDARD 0 SM								
PROJECT: Gas Storage Facilities For Space Based Laser Test Facility								
REQUIREMENT: Provide adequate gas storage facilities, and control room properly sized and configured, to meet SBL project ground testing and demonstration requirements. The minor construction of this separate facility will be accomplished under the authorities of 10 U.S.C. 2805(c). This is a companion project to the SBL Performance Test Facility (PTF) and Space Based Laser Test Auxiliary Facilities. These three projects make-up the SBL Test Facility Complex.								
To support the RDT&E development phase the described facilities are needed by Jan 2004.								
CURRENT SITUATION: Currently SBL laser research and development testing is being done at the Capistrano Test Site (CTS) Capistrano, CA with some support testing at selected contractor's laboratories and at Kirtland AFB test laboratories. The existing laser test facility at Capistrano, CA and those at supporting contractor's sites and other DoD and NASA sites are inadequate to support the present SBL Project large-scale laser test firing requirements and lack space vehicle payload integration capabilities. There are no existing facilities that have the required combination of capabilities to allow this scale of integration and ground demonstration testing.								
IMPACT IF NOT PROVIDED: If not provided there would be no means of supporting or conducting the full power testing of the laser payload element and no means of performing large scale integration testing and checkout of the complete space vehicle. A delay in the construction of these project critical support facilities will have an adverse effect on early testing and resultant Department of Defense decision on this weapon concept.								
PHYSICAL SECURITY: this project is being coordinated with the installation physical security plan, and all required physical security and/or combating terrorism (CBT/T) measures are being included.								

ENVIRONMENTAL COMPLIANCE: Environmental analysis has been accomplished.

ADDITIONAL: Costs are based upon pre-concept design estimates

12. SUPPLEMENTAL DATA:

a. Estimated Design Date

(1) Status

- (a) Estimated Start Date May 2001
- (b) 30% Complete as of Aug 2001
- (c) 90% Complete as of Apr 2001
- (d) Estimated Completion Date Jul 2002
- (e) Type of Design Contract:

(2) Basis of Design

- (a) Standard or Definitive Design = No
- (b) Where Design was most recently used: N/A
- (c) Total Cost (000) (c) [below]= (a) + (b) = (d) + (e)

- (a) Production of Plans and Specifications: \$ 0.020M
- (b) All other Design Costs: \$ 0.005M
- (c) Total Design Costs: \$.025M
- (d) Contract: \$ 0.020M
- (e) In-house \$ 0.005M

(3) Construction Start

Aug 2002

b. Installed Equipment – Other Appropriations: RDT&E

\$ 0.040M

1. COMPONENT DEFENSE BMDO		FY 02 RDT&E FACILITY PROJECT DATA			2. DATE June 2001			
3. INSTALLATION AND LOCATIONS NASA JOHN C. STENNIS SPACE CENTER, MS			4. PROJECT TITLE SPACE BASED LASER PERFORMANCE TEST FACILITY					
5. PROGRAM ELEMENT 0603883C		6. CATEGORY CODE 310-400	7. PROJECT NUMBER BMDO 220-A		8. PROJECT COST (\$000) \$35,000 (Authorization) \$ 3,230 (Appropriation)			
9. COST ESTIMATES								
ITEM					U/M	QUANTITY	UNIT COST	COST (\$000)
SPACE BASED LASER TEST FACILITY								
PRIMARY FACILITIES								
PERFORMANCE TEST FACILITY (PTF)					SM	9,565.5	2,855.40	27,314
(UNITS IN ENGLISH SYSTEM)					SF	(102,963)	(265.27)	
REMOTE CONTROL FACILITY (RENOVATE BLDG 4210)					SM	390.2	193.32	75
(UNITS IN ENGLISH SYSTEM)					SF	(4,200)	(17.96)	
SUPPORTING FACILITIES								
SITE PREPARATION, ACCESS ROADS, UTILITIES, ETC.					LS			2,870
TOTAL FACILITIES CONTRACT COST					LS			30,259
CONTINGENCY (5%)					LS			1,513
SUBTOTAL					LS			31,772
SUPERVISION, INSPECTION, AND OVERHEAD (10%)					LS			3,178
TOTAL REQUEST					LS			34,950
TOTAL REQUEST (ROUNDED)					LS			35,000
GROUND SUPPORT EQUIPMENT (GSE) (NON-ADDITIVE)					LS			(95,193)
SYSTEM FURNITURE (NON-ADDITIVE)					LS			(158)
10. DESCRIPTION OF PROPOSED CONSTRUCTION: New construction to consist of research and development facilities with accompanying infrastructure. Provide a large high bay test facility including a large crane system, with class 10,000 clean room requirements. This facility will have a large vacuum chamber with a pressure recovery system. The vacuum chamber and pressure recovery system will be provided as ground support equipment (GSE). Construct the PTF with steel columns and trusses, reinforced concrete floors and foundations, special vibration isolation foundations, isolated floor slabs, and roof and wall systems. Parking, sidewalks, roadways and utilities will be provided to support the project. Renovate Building 4210 by minor demolition of interior walls, ceiling tiles, flooring, etc. Install new gypsum board and metal stud wall systems, new dropped ceilings, new lighting systems, new carpeting and tile flooring, and upgrade the existing electrical distribution and communication systems. The remaining project funding is projected as follows: FY03 - \$10,000, FY04 - \$10,000, FY05 - \$9,000, FY06 - \$3,000. This administration has not addressed FY2003-2007 requirements. All FY 2003-2007 budget estimates included in this book are notional only and subject to change.								
REQUIREMENT:		9,955.68 SM	ADEQUATE	0 SM	SUBSTANDARD	390.18 SM		
PROJECT: Space Based Laser Performance Test Facility								
REQUIREMENT: These facilities are required by an RDT&E contractor to perform Contract No. F04701-99-C0026 and are in compliance with Title 10 USC 2353. Provide adequate facilities, properly sized and configured, to meet SBL project ground testing and demonstration requirements. The SBL project requires specialized test facilities to support the integration and end-to-end ground testing of the SBL Laser and Integrated Flight Experiment (IFX). The SBL project is based on a chemical laser system. There is a requirement for a facility to perform full power laser testing and combined integration tests and checkout for the full-scale laser/payload system including the Space Vehicle (SV). End-to-end performance testing prior to launch was identified as a major risk reduction effort and is critical to project success. The special facilities requirements for laser integration and testing of a large SBL space vehicle size and its handling constraints are key requirements for the design of these facilities. Ground testing requires a large test and integration test area to include high-bays with a cleanliness requirement of class 10,000, a performance vacuum chamber and pressure recovery system, and a remote control facility. The test chambers will include specialty optical systems to allow diagnostic data collection during testing. The remote control facility will support the high-energy laser testing operations. Due to safety considerations (potential chemical releases and explosive conditions) a 0.7 mile radius safety zone is required around the PTF during laser testing. (continued)								
DD FORM 1391, DEC 76						Page No. 1		

REQUIREMENT (continued):

To support the RDT&E development phase the described facilities are needed by Jan 2006.

This DD 1391 is a companion project to the SBL Test Auxiliary Facilities and the Gas Storage Facilities for SBL Test Facility. These three projects make-up the SBL Test Facility Complex.

CURRENT SITUATION: Currently SBL laser research and development testing is being done at the Capistrano Test Site (CTS) Capistrano, CA with some support testing at selected contractor's laboratories and at Kirtland AFB test laboratories. The existing laser test facility at Capistrano, CA and those at supporting contractor's sites and other DoD and NASA sites are inadequate to support the present SBL Project large-scale laser test firing requirements and lack space vehicle payload integration capabilities. There are no existing facilities that have the required combination of capabilities to allow this scale of integration and ground demonstration testing.

IMPACT IF NOT PROVIDED: If not provided there would be no means of conducting the full power testing of the laser payload element and no means of performing large scale integration testing and checkout of the complete space vehicle. A delay in the construction of these project critical facilities will have an adverse effect on early testing and resultant Department of Defense decisions on this weapon concept.

PHYSICAL SECURITY: this project is being coordinated with the installation physical security plan, and all required physical security and/or combating terrorism (CBT/T) measures are being included.

ENVIRONMENTAL COMPLIANCE: Environmental analysis has been accomplished.

ADDITIONAL: Costs are based upon pre-concept design estimates.

12. SUPPLEMENTAL DATA:

a. Estimated Design Date

(1) Status

(a) Estimated Start Date	May 2001
(b) 30% Complete as of	Aug 2001
(c) 90% Complete as of	Apr 2001
(d) Estimated Completion Date	Jul 2002
(e) Type of Design Contract:	

(2) Basis of Design

(a) Standard or Definitive Design = No	
(b) Where Design was most recently used: N/A	
(c) Total Cost (000) (c) [below]= (a) + (b) = (d) + (e)	
(a) Production of Plans and Specifications:	\$ 3.026M
(b) All other Design Costs:	\$ 0.500M
(c) Total Design Costs:	\$.3.526M
(d) Contract:	\$ 3.026M
(e) In-house	\$ 0.500M

(3) Construction Start	Aug 2002
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b. Installed Equipment – Other Appropriations: RDT&E	\$ 95.351M
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1. COMPONENT DEFENSE BMDO		FY 02 RDT&E FACILITY PROJECT DATA			2. DATE June 2001			
3. INSTALLATION AND LOCATIONS NASA JOHN C. STENNIS SPACE CENTER, MS				4. PROJECT TITLE SPACE BASED LASER TEST AUXILIARY FACILITIES				
5. PROGRAM ELEMENT 0603883C		6. CATEGORY CODE 610-287	7. PROJECT NUMBER BMDO 220-B		8. PROJECT COST (\$000) \$1,500			
9. COST ESTIMATES								
ITEM					U/M	QUANTITY	UNIT COST	COST (\$000)
SPACE BASED LASER TEST AUXILIARY FACILITIES								
PRIMARY FACILITIES								
SPACE VEHICLE AND GSE STORAGE (REPAIR BLDG 5001)					SM	650.3	201.07	131
(UNITS IN ENGLISH SYSTEM)					SF	(7,000)	(18.68)	
SPACE VEHICLE BONDED STORAGE (REPAIR BLDG 5005)					SM	278.7	201.07	56
(UNITS IN ENGLISH SYSTEM)					SF	(3,000)	(18.68)	
CONTROL/SHOP/STORAGE FACILITY (REPAIR BLDG 5008)					SM	1,370.4	201.07	276
(UNITS IN ENGLISH SYSTEM)					SF	(14,751)	(18.68)	
PROGRAM/ENGINEERING OFFICES (REPAIR BLDG 1100)					SM	3,251.6	252.52	821
(UNITS IN ENGLISH SYSTEM)					SF	(35,000)	(23.46)	
SUPPORTING FACILITIES								
SITE PREPARATION, ACCESS ROADS, UTILITIES, ETC.					LS			0
TOTAL FACILITIES CONTRACT COST					LS			1,284
CONTINGENCY (5%)					LS			64
SUBTOTAL					LS			1,348
SUPERVISION, INSPECTION, AND OVERHEAD (10%)					LS			135
TOTAL REQUEST					LS			1,483
TOTAL REQUEST (ROUNDED)					LS			1,500
SYSTEM FURNITURE (NON-ADDITIVE)					LS			(1,013)
10. DESCRIPTION OF PROPOSED CONSTRUCTION:								
Repair Buildings 5001 and 5005 by installing new lighting, installing storage shelving/racks and upgrades to the climate control systems and fire suppression systems. Relocate Building 5001 to the east end of its trackway.								
Repair Building 5008 by minor demolition of interior walls, ceiling tiles, flooring, etc. Install new gypsum board and metal stud wall systems, new dropped ceilings, new lighting systems, new carpeting and tile flooring, and upgrade the existing electrical distribution and communication systems.								
Repair Building 1100 by minor demolition of interior walls, ceiling tiles, flooring, etc. Install new gypsum board and metal stud wall systems, new dropped ceilings, new lighting systems, new carpeting and tile flooring, and upgrade the existing electrical distribution and communication systems.								
REQUIREMENT: 5,551 SM ADEQUATE 0 SM SUBSTANDARD 5,551 SM								
PROJECT: Space Based Laser Test Auxiliary Facilities								
REQUIREMENT: Provide adequate facilities, properly sized and configured, to meet SBL project ground testing and demonstration requirements. These major repairs will be accomplished under the authorities of 10 U.S.C. 2811. This DD1391 covers the requirement for GSE and SV bonded and regular storage, an control/shop/storage facility, and provides engineering office space for operational and support personnel to meet the requirements of the SBL project. This is a companion project to the SBL Performance Test Facility (PTF) and Gas Storage Facilities for SBL Test Facility. These three projects make-up the SBL Test Facility Complex.								
To support the RDT&E development phase the described facilities are needed by Jan 2004.								
CURRENT SITUATION: Currently SBL laser research and development testing is being done at the Capistrano Test Site (CTS) Capistrano, CA with some support testing at selected contractor's laboratories and at Kirtland AFB test laboratories. The existing laser test facility at Capistrano, CA and those at supporting contractor's sites and other DoD and NASA sites are inadequate to support the present SBL Project large-scale laser test firing requirements and lack space vehicle payload integration capabilities. There are no existing facilities that have the required combination of capabilities to allow this scale of integration and ground demonstration testing.								
DD FORM 1391, DEC 76					Page No. 1			

IMPACT IF NOT PROVIDED: If not provided there would be no means of supporting or conducting the full power testing of the laser payload element and no means of performing large scale integration testing and checkout of the complete space vehicle. A delay in the construction of these project critical support facilities will have an adverse effect on early testing and resultant Department of Defense decisions on this weapon concept.

PHYSICAL SECURITY: This project is being coordinated with the installation physical security plan, and all required physical security and/or combating terrorism (CBT/T) measures are being included.

ENVIRONMENTAL COMPLIANCE: Environmental analysis has been accomplished.

ADDITIONAL: Costs are based upon pre-concept design estimates

12. SUPPLEMENTAL DATA:

a. Estimated Design Date

(1) Status

(a) Estimated Start Date	May 2001
(b) 30% Complete as of	Aug 2001
(c) 90% Complete as of	Apr 2001
(d) Estimated Completion Date	Jul 2002

(e) Type of Design Contract:

(2) Basis of Design

(a) Standard or Definitive Design = No	
(b) Where Design was most recently used: N/A	
(c) Total Cost (000) (c) [below]= (a) + (b) = (d) + (e)	
(a) Production of Plans and Specifications:	\$ 0.178M
(b) All other Design Costs:	\$ 0.050M
(c) Total Design Costs:	\$ 0.228M
(d) Contract:	\$ 0.178M
(e) In-house	\$ 0.050M

(3) Construction Start

Aug 2002

b. Installed Equipment – Other Appropriations: RDT&E

\$ 1.013M

1. COMPONENT BMDO	FY 2002 RDT&E CONSTRUCTION PROJECT DATA			2. DATE June 2001
3. INSTALLATION AND LOCATION6 Various Alaska Locations		4. PROJECT TITLE Missile Defense System Test Bed Facilities, Ph I		
5. PROGRAM ELEMENT 0603882C	6. CATEGORY CODE 312	7. PROJECT NUMBER BMDO	8. PROJECT COST (\$000) Auth 404,687 Approp 273,121	
9. COST ESTIMATES				
ITEM	U/M (M/E)	QUANTITY	UNIT COST	COST (\$000)
PRIMARY FACILITIES				
Upgrade Elec Power Gen Plant	LS			242,786
Fuel Storage Tank	KL (MGAL)	8,896 (2.35)	403.00 (1.53)	(28,087)
Add/Alt Test Support Facilities	LS			(3,585)
Missile Launch Silos	EA	5	8,878,000	(716)
Mechanical-Electrical Building	M2 (SF)	1,225 (13,190)	10,455 (971)	(44,390)
Total from Continuation pages				(12,812)
SUPPORTING FACILITIES				
Electric Service	LS			115,742
Water, Sewer, Gas	LS			(33,304)
Paving, Walks, Curbs and Gutters	LS			(13,770)
Site Imp (22,584) /Demo ()	LS			(17,032)
Information Systems	LS			(22,584)
Antiterrorism Force Protection	LS			(1,407)
Other (Mob/Demob)	LS			(7,003)
ESTIMATED CONTRACT COST				
CONTINGENCY PERCENT (5%)				358,528
SUBTOTAL				17,926
SUPERVISION, INSPECT'N & OH (7.5 %)				376,454
TOTAL REQUEST				28,233
INSTALLED EQPT-OTHER				404,687
APPROPRIATIONS				74,088
10. DESCRIPTION OF PROPOSED CONSTRUCTION: Construct Missile Defense System Test Bed facilities at various sites. Single year authorization with multi-year appropriation is required due to the complex nature and overall cost of this project. This request is for \$273.12 million in FY 2002. Additional requirements are: Phase II \$128.75 million in FY2003; and Phase III \$2.82 million in FY2004*. This project provides for the initial construction of test facilities in support of a robust Missile Defense System Test Bed. This project upgrades facilities at an existing radar site, constructs test missile launch complex and provides for the installation of Battle Management Command, Control and Communication (BMC3) with In-Flight Interceptor Communication System Data Terminals (IDTs), and Communications Network (CN). The Radar Site facilities include upgrade to an existing Electrical Power Generation Plant, construction of Fuel Oil Storage Tank, and alterations to existing test support facilities at Eareckson Air Station, Shemya, AK. The Test Missile Launch Site facilities include a test Missile Field with Mechanical/Electrical Building, Missile Storage Igloos, a Missile Assembly Building, Missile Fuel and Oxidizer Storage Buildings, a Readiness/Control/BMC2 Station, an Entry Control Station, a Electrical Substation, a Site Heating Plant, a Water Distribution Building and alterations to existing test support and maintenance buildings at Fort Greely, AK. Construct a Missile Transfer Facility at Eielson AFB, AK, for the transshipment of booster missile components. Construct BMC3 Test Facilities consisting of facilities to house the installation of IDTs and CN equipment at Eareckson AS and Fort Greely. Supporting facilities include utilities, pavements, buried power and communications lines, fire detection and suppression systems, security systems and site infrastructure.				

1. COMPONENT BMDO	FY 2002 RDT&E CONSTRUCTION PROJECT DATA		2. DATE June 2001																																																																																										
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<table border="0"> <thead> <tr> <th>9. <u>COST ESTIMATES (CONTINUED)</u></th> <th>U/M (M/E)</th> <th><u>QUANTITY</u></th> <th><u>Unit</u></th> <th><u>Cost</u></th> </tr> <tr> <th><u>Item</u></th> <th></th> <th></th> <th><u>COST</u></th> <th><u>(000)</u></th> </tr> </thead> <tbody> <tr> <td colspan="4">PRIMARY FACILITIES (CONTINUED)</td> <td>153,196</td> </tr> <tr> <td>Missile Assembly Building</td> <td>LS</td> <td></td> <td></td> <td>(36,900)</td> </tr> <tr> <td>Missile Fuel Storage Buildings</td> <td>LS</td> <td></td> <td></td> <td>(1,299)</td> </tr> <tr> <td>Readiness/Control/BMC2 Station</td> <td>m2 (SF)</td> <td>2,178 (23,439)</td> <td>10,267 (954)</td> <td>(22,357)</td> </tr> <tr> <td>Site Heating Plant</td> <td>LS</td> <td></td> <td></td> <td>(1,390)</td> </tr> <tr> <td>Electrical Substation</td> <td>LS</td> <td></td> <td></td> <td>(10,158)</td> </tr> <tr> <td>Missile Storage Igloos</td> <td>EA</td> <td>2</td> <td>2,695,500</td> <td>(5,391)</td> </tr> <tr> <td>Add/Alt Test Support Facility</td> <td>LS</td> <td></td> <td></td> <td>(1,015)</td> </tr> <tr> <td>Add/Alt Test Maintenance Building</td> <td>LS</td> <td></td> <td></td> <td>(1,121)</td> </tr> <tr> <td>Entry Control Station</td> <td>m2 (SF)</td> <td>363 (3,910)</td> <td>7,926 (736)</td> <td>(2,879)</td> </tr> <tr> <td>Water Supply Building</td> <td>LS</td> <td></td> <td></td> <td>(4,184)</td> </tr> <tr> <td>Missile Transfer Facility</td> <td>LS</td> <td></td> <td></td> <td>(3,959)</td> </tr> <tr> <td>Building Information Systems</td> <td>LS</td> <td></td> <td></td> <td>(1,313)</td> </tr> <tr> <td>BMC3 IDT Complex at Radar Site</td> <td>LS</td> <td></td> <td></td> <td>(30,232)</td> </tr> <tr> <td>BMC3 IDT Complex at GBI Site</td> <td>LS</td> <td></td> <td></td> <td>(27,182)</td> </tr> <tr> <td>BMC3 Communication Network</td> <td>LS</td> <td></td> <td></td> <td>(3,817)</td> </tr> </tbody> </table>				9. <u>COST ESTIMATES (CONTINUED)</u>	U/M (M/E)	<u>QUANTITY</u>	<u>Unit</u>	<u>Cost</u>	<u>Item</u>			<u>COST</u>	<u>(000)</u>	PRIMARY FACILITIES (CONTINUED)				153,196	Missile Assembly Building	LS			(36,900)	Missile Fuel Storage Buildings	LS			(1,299)	Readiness/Control/BMC2 Station	m2 (SF)	2,178 (23,439)	10,267 (954)	(22,357)	Site Heating Plant	LS			(1,390)	Electrical Substation	LS			(10,158)	Missile Storage Igloos	EA	2	2,695,500	(5,391)	Add/Alt Test Support Facility	LS			(1,015)	Add/Alt Test Maintenance Building	LS			(1,121)	Entry Control Station	m2 (SF)	363 (3,910)	7,926 (736)	(2,879)	Water Supply Building	LS			(4,184)	Missile Transfer Facility	LS			(3,959)	Building Information Systems	LS			(1,313)	BMC3 IDT Complex at Radar Site	LS			(30,232)	BMC3 IDT Complex at GBI Site	LS			(27,182)	BMC3 Communication Network	LS			(3,817)
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<p>11. REQ: 1 EA ADQT: NONE SUBSTD: NONE</p> <p>PROJECT: Construct Launch, Operations, Maintenance and Support Facilities to support the Missile Defense System Test Bed. (New Mission).</p> <p>REQUIREMENT: This project is required to provide essential facilities to conduct and support a robust operational test bed in an environment that simulates actual operational conditions.</p> <p>CURRENT SITUATION: The Ballistic Missile Defense Organization (BMDO) is developing a missile defense system and Missile Defense System Test Bed to ensure operational equipment and missiles adequately meet technological and threat assessments. Currently, no facility capable of supporting realistic testing of system components and elements is available.</p> <p>IMPACT IF NOT PROVIDED: If this project is not provided, flight testing of the Missile Defense System Test Bed system and its components against challenging, realistic targets will be limited, so that some development shortfalls might not be resolved. The full potential under current technology to develop, integrate and test a system to protect against a limited attack from a nation of concern may not be achieved.</p> <p>ADDITIONAL INFORMATION: Cost estimates are based upon parametric estimates. This project is being coordinated with the installation physical security plan, and all required physical security and/or combating terrorism (CBT/T) measures are being included. Environmental analysis is being accomplished. Project specific environmental documentation is being prepared as necessary. This project will be executed in conjunction with the Kodiak Facilities of the Missile Defense System Test Bed.</p>																																																																																													

1. COMPONENT BMDO	FY 2002 RDT&E CONSTRUCTION PROJECT DATA	2. DATE June 2001
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3. INSTALLATION AND LOCATION
Various Alaska Locations

4. PROJECT TITLE Missile Defense System Test Bed Facilities, Ph I	5. PROJECT NUMBER BMDO
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12. Supplemental Data:

A Estimated Design Date

- (1) Status
 - (a) Date Design Started: Mar 2000
 - (b) Percent Complete As of January 2001 35%
 - (c) Date 35% Designed Jan 2001
 - (d) Date Design Complete: Apr 2002
 - (e) Parametric Cost Estimating Used to Develop Costs Yes
 - (f) Type of Design Contract: design-bid-build/design-build
- (2) Basis of Design
 - (a) Standard or Definitive Design No
 - (b) Where Design was most recently used:
- (3) Total Cost (000) (c) = (a)+(b) or (d)+(e)
 - (a) Production of Plans and Specifications: \$ 9,703
 - (b) All other Design Costs: \$ 8,681
 - (c) Total Design Costs \$ 18,384
 - (d) Contract \$ 13,052
 - (e) In-house \$ 5,332
- (4) Construction Contract Award Nov 2001
- (5) Construction Start Feb 2002
- (6) Construction Complete Oct 2004

B Equipment associated with this project which will be provided from other appropriations:

<u>Equipment</u>	<u>Procuring</u>	<u>Fiscal Year</u>	<u>Cost</u>
<u>Nomenclature</u>	<u>Appropriation</u>	<u>Appropriated</u> <u>Or Requested</u>	<u>(\$000)</u>
CN Comm Equipment	RDT&E	2002	9,568
GBI Launch Equipment	RDT&E	2002	47,301
IDT Tracking Equipment	RDT&E	2002	17,219
Furniture	RDT&E	2003 *	<u>TBD</u>
		TOTAL	74,088

* This administration has not addressed FY2003-2007 requirements. All FY2003-2007 budget estimates included in this book are notional and subject to change.

