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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.

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<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	
<ul style="list-style-type: none"> • 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:		
<ul style="list-style-type: none"> • 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. 		

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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		

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<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)