

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 shutdown 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
---	--------------------------

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				PE NUMBER AND TITLE						PROJECT	
4 - Demonstration and Validation				0603883C Boost Defense Segment						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
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p><u>SEA-BASED BOOST</u></p> <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> <p><u>Concept Definition</u> 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> <p><u>Risk Reduction</u> 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> <p>FY 2002 Planned Program:</p> <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 <p>Total 50000</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 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						

UNCLASSIFIED

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 **0603883C Boost Defense Segment** PROJECT **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						

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 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:

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						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.

UNCLASSIFIED

<p align="center">BMDO RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)</p>		<p>DATE June 2001</p>
<p>BUDGET ACTIVITY 4 - Demonstration and Validation</p>	<p>PE NUMBER AND TITLE 0603883C Boost Defense Segment</p>	<p>PROJECT 4040</p>
<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>		
<p>Project 4040</p>	<p align="center">Page 10 of 17 Pages</p>	<p align="right">Exhibit R-2A (PE 0603883C)</p>

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						

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 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. 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>
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. 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>
N/A								

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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 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								