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MDA Exhibit R -2RDT&EBudgetItemJustification	Date February 2003
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APPROPRIATION/BUDGETACTIVITY 3. Advanced Technology Development (ATD)	R-1 NOMENCLATURE 0603175C Ballistic Missile Defense Technology
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COST (\$ in Thousands)	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Total PECost	145021	151130	240820	205791	200956	247990	287864	306472
6010/0502 Advanced Technology Development	141510	148297	189056	154439	147699	194075	232137	249123
0503 Laser Technology	0	0	47130	47002	48863	48797	49734	50676
6090/0602 Program Operations	3511	2833	4634	4350	4394	5118	5993	6673

A. Mission Description and Budget Item Justification

NOTE:

Beginning in FY2004, the BMD Technology PE projects change , as follows:

- Project 6010 change to 0502
- Project 6090 change to 0602
- New Project 6020 change to 0503

All projects will continue to employ their previous names. Project numbers more accurately reflect the Missile Defense Agency's (MDA's) desired management structure.

Based on Presidential direction, MDA is developing an initial defensive operational capability that is based on the BMD Test Bed and augmented with additional development assets. MDA will continue to employ the Test Bed for testing beyond initial fielding to evolve an integrated, layered Ballistic Missile Defense capability.

The Ballistic Missile Defense System (BMDS) requires constantly improving technology and new concepts in order to implement its strategy of Block -by-Block capability improvements on two -year cycles. The Program Element (PE) 0603175C serves two major roles in this strategy. It funds component technologies that feed into larger systems, thereby delivering the enabling technologies for new systems or product improvement technologies for deployed systems. Additionally, the PE funds the initial demonstration of innovative new concepts that, if successful, can enhance the BMDS in a particular Block improvement.

The Ballistic Missile Defense (BMD) Technology program demonstrates new system concepts and develops key components needed to keep pace with the constantly evolving ballistic missile threat. The program focuses on developing enhanced capabilities to support block upgrades to the BMDS System and places its remaining emphasis on maturing a select group of next -generation technologies that could lead to new, revolutionary BMDS System elements.

The flowdown of BMDS System capability specifications resulting from Missile Defense National Team efforts in Command Control Battle Management and Systems Engineering & Integration now guide the integration of new technology into the BMDS System and Test Bed. The FY2004 MDA Technology budget reflects an integrated strategy to provide new and better technologies to the BMD System when and where they are most needed. Focused by MDA's architectural and engineering processes, the program enhances MDA's capability -based acquisition strategy that emphasizes testing, spiral development, and evolutionary acquisition through the use of two -year capability blocks. The program seeks to identify high -payoff technologies with a risk level commensurate to the payoff.

Many of today's baseline BMD projects are viable due to previous investments in technology research, development, and maturation. Examples include: the Lightweight Exoatmospheric Projectile for Sea -Based Midcourse Defense, indium antimonide and mercury cadmium telluride focal plane arrays, used (respectively) on the Theater High Altitude Area Defense (THAAD) and Space -Based Infrared Systems, among others systems; 32 -bit radiation -hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight aerospace vehicle structures; cooled window capability; interferometric fiber optic gyroscopes for miniaturized guidance and control; master frequency generator for PAC -3RF seeker and solid -state gallium arsenide transmitter/receivers for advanced missile defense (XBR, THAAD, AEGIS); and dual wavelength passive imagery for BMD test missions and future elements. There is increased emphasis in the

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BMDTechnologyprogramonlaserandelectro-opticaltechnologiesformissiledetection,tracking,imaging,andotherapplications.Electro-opticalsystemsformissiledefenseprovideasignificant opportunityforalargerreturnoninvestmentandcomplementradarsystems.

ProgramOperationsunderthisprojectcoverspersonnelandrelatedsupportcosts,statutoryandfiscalrequirements.Mayincludefundingforgovernmentciviliansperforming program-wideoversight functions such as contracting, program integration, safety, quality and mission assurance at Missile Defense Agency (MDA); cost estimating; audit; technology integration across all MDA projects; and assessment of schedule, cost and performance, documentation of related programmatic issues and, foreign currency fluctuations on limited number of foreign contracts. Also includes funding for charges on canceled appropriations in accordance with Public Law 101-510.

B.ProgramChangeSummary	FY2002	FY2003	FY2004	FY2005
Previous President's Budget (FY2003 PB)	139340	121751	155056	130299
Current President's Budget (FY2004 PB)	145021	151130	240820	205791
Total Adjustments	5681	29379	85764	75492
Congressional Specific Program Adjustments	0	33200	0	0
Congressional Undistributed Adjustments	-873	-2539	0	0
Reprogrammings	9400	-1282	85764	75492
SBIR/STTR Transfer	-2846	0	0	0

FY2002 changes due to internal realignments to meet program goals.

FY2003 changes due to Congressionally directed interest in increased funding, as well as other directed adjustments.

FY2004 and FY2005 changes due to transfer of the Laser Technology program to the BMD Technology PE. Funding for this effort (previously known as Space Based Laser) was previously part of the Boost Defense PE. Also, new project "Advanced Concepts" has been added to BMD Technology. Work performed under this effort will be geared towards SBIR proposal evaluation, the Advanced Systems Innovation Cell for evaluating industry's latest ideas, and related advanced studies.

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COST (\$ in Thousands)	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
6010/0502 Advanced Technology Development	141510	148297	189056	154439	147699	194075	232137	249123
RDT&E Articles Qty	0	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

The Advanced Technology Development program develops technology to counter missiles in all phases of flight, invests in global surveillance, and matures enabling technologies for the next generation BMDs. Boost Phase Interceptor (BPI) efforts are developing early launch detection and tracking (ELDT) to support the earliest possible commitment of interceptors. In addition, this effort pursues innovative low-mass propulsion concepts to dramatically reduce overall interceptor size and mass. Midcourse defense develops state-of-the-art systems and technologies to increase BMD system fire power and sensor capability.

-The Miniature Kill Vehicle (MKV) program develops multiple, lightweight, sophisticated, and lethal interceptors on a single-carrier vehicle that is compatible with existing launch systems.

-The Radar Systems Technology (formerly: Advanced Radar Technology) program integrates and tests next-generation transmitters, receivers, processors and software to demonstrate new concepts and technologies to insert in future BMD blocks.

-The Advanced Discrimination effort explores novel systems approaches to counter decoys and related adversary countermeasures.

-The Terminal Phase efforts include applied research to extend the footprint of current terminal systems, as well as investigate revolutionary concepts for strategic terminal defense.

-The Airship program portrays MDA's participation in the High Altitude Airship (HAA) Advanced Concept Technology Demonstration (ACTD) and supports the development of uninhabited, long endurance platform to carry a wider range of BMD assets.

-Enabling Technology Support pursues basic technologies in components and materials driven by the capabilities of the BMDs. Examples include:

- Multi-color focal plane arrays
- High-power semiconductor
- Radiation-hardened electronic components

B. Accomplishments/Planned Program

	FY2002	FY2003	FY2004	FY2005
Terminal Missile Defense	12777	2200	33873	2764
RDT&E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:

MANEUVERING THREAT COUNTER COUNTERMEASURES:

-Advanced THAAD Thruster - Demonstrated lightweight high temperature material applicable to multiple missile divert and attitude controls system (DACS). Increased effective DACS thrust and permit use of propellants with burn temperatures of 4,500F (TRL (Technology Readiness Level) 5).

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-PAC-3 Radome -Demonstrated lightweight low cost ceramic radome for PAC -3. Met PAC -3 weight objective of less than 2.0kg (TRL7).

EXTENDED FOOTPRINT:

-Next Generation THAAD Seeker -the Seeker software was delivered, Seeker housing modification was designed, and the controller board for the steering mirrors was designed and fabricated (TRL4).

-Next Generation THAAD Window -Window material test coupons were procured. Coupon material is being getched and will be tested in Nov 02 (TRL3).

-PAC-3 Thermal Battery -PAC -3 prototype batteries were built and tested (TRL5).

LONG RANGE ATMOSPHERIC DEFENSE:

-Initiated Concept Development -Developed a revolutionary concept for terminal defense that will increase the defended area of the system by 3 to 10 times our current terminal systems (TRL1).

FY2003 PLANNED PROGRAM:

-Refine long -range atmospheric defense concept (TRL2).

FY2004 and FY2005 PLANNED PROGRAM:

-Refine long -range atmospheric defense concept (TRL2).

	FY2002	FY2003	FY2004	FY2005
Midcourse Defense	55761	66348	76228	88336
RDT&E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:

DISCRIMINATING SEEKER:

-Angle Laser Radar (LADAR) -Angle -Angle Range (AAR) LADAR -Brassboard hardware integrated and characterized at reduced power levels in a laboratory environment. This is a direct detect LADAR that measures angles and range -to-target and is applicable to Boost Phase and Midcourse (TRL4).

-Range LADAR -Range Resolved Doppler Imaging (RRDI) LADAR -Breadboard components have been procured, fabricated and are being tested individually. Initiated brassboard design to move LADAR. In addition to angle and range, the RRDI LADAR also provided velocity measurements on the target. Fabricated and tested first -ever simultaneous, three -band long wave infrared (LWIR) FPA (TRL3).

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-Advanced Focal Plane Arrays (FPA) -Five FPA efforts were funded during FY2002. These efforts focused on demonstrating simultaneous multi-waveband infrared FPAs. Leading interceptor application FPA material is Mercury Cadmium Telluride (TRL2 -3).

TRANSPORTABLE DISCRIMINATING RADAR:

-Militarized Analog -to-Digital Controller -Completed development and transferred a 100 Megahertz analog to digital convert (A/D) to the PATRIOT for insertion into their existing radar (TRL7 -8).

-Gallium Arsenide Transmitter/Receiver Modules -Initiated contracts for the development of both Xband and Sband high power amplifiers (TRL2).

-Transportable Discriminating Radar -The Next Generation Radar Concept Definition Team developed a baseline concept for a "proof of concept" Test Bed for the BMDS. The desired attributes of the system are: 1) moveable to allow relocation in approximately 30 days; 2) scalable to support increased sensitivity; 3) developed with an open system architecture approach to support subsystem refresh, insertion of new hardware and software technology, and advanced discrimination data collection and testing in a parallel non-intrusive manner (TRL1).

MINIATURE KILL VEHICLE (MKV):

-Optics Design and Demo -Fabricated and demonstrated a low cost MKV electroformed optics/telescope assembly (TRL3).

-Propulsion Static Fire Test -Demonstrated through static fire test a low cost, lightweight divert system for MKV (TRL3).

-Concept Definition -Initiated MKV/Carrier Vehicle integrated concept designs with three prime contractors. With downselect to two prime contractors during 2003 (TRL2).

Sidenote: The MKV concept was initiated by the SBIR (Small Business Innovative Research) process starting in 1990.

ADVANCED DISCRIMINATION:

-Concept A -Initiated contract award for advanced discrimination.

FY2003 PLANNED PROGRAM:

-This program supports the BMDS Interceptor.

-Continue MKV program, working toward FY2005 flight experiment (TRL3 -5).

-Upgrade range -resolved Doppler imaging LADAR to full power and other discriminating seeker capabilities (TRL3 -5).

-Further mature simultaneous two-color and three-color FPAs (TRL3 -4).

-Continue advanced discrimination development (TRL3 -5).

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FY2004 and FY2005 PLANNED PROGRAM:

- This program supports the BMDS Interceptor.
- Continue MKV program, working toward FY2005 flight experiment (TRL3 -5).
- Upgrade range - resolved Doppler imaging LADAR to full power and other discriminating seeker capabilities (TRL3 -5).
- Further mature simultaneous two -color and three -color FPAs (TRL3 -4).
- Continue advanced discrimination development (TRL3 -5).

	FY2002	FY2003	FY2004	FY2005
Boost Phase Intercept	5035	9330	7570	9994
RDT&E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:

EARLY LAUNCH DETECTION AND TRACKING (ELDT):

- This effort supported Kinetic Energy Boost.
- Concept definition and initial data collection were conducted in FY2001. Of the 12 concepts evaluated in FY2001 seven were funded in FY2002. Of these seven funded in FY2002, three showed promise and will be continued in FY2003: Over the Horizon Radar (OTHR), Hypertemporal Infrared, and First Alert and Cueing (FAC) sensors (TRL1 -4).
- Over the horizon radar (OTHR) - Initiated use of available OTHR asset to collect data on three target of opportunity launches demonstrating capability to detect missile launch event soon after liftoff (TRL3).
- Simulated Target Data - Initial proof of principle test. The Hypertemporal Infrared sensor was placed on a Learjet and flown above cloud cover. Using a narrow band short wave infrared (SWIR) a Hot Air Balloon burner was detected through the clouds. The test was conducted on 27 March 2002. This effort was started in FY2001 and will continue in FY2003 (TRL3 -4).
- Titan III Launch Data - Data was collected on operational system launches using Hypertemporal Infrared and First Alert and Cueing (FAC) sensor. This effort was started in FY2001 and will continue in FY2003.

BOOST PHASE INTERCEPT HIGH ENERGY LASER:

- Extended Range Beam Control - Initiated modification of tracking and pointing system algorithm to improve the effective kill range of airborn laser (ABL) system for boost phase applications.

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FY2003 PLANNED PROGRAM:
 -Continued development and test of promising ELDT capabilities including flight tests (TRL4 -6).
 FY2004 and FY2005 PLANNED PROGRAM:
 -Continued development and test of promising ELDT capabilities including flight tests (TRL4 -6).

	FY2002	FY2003	FY2004	FY2005
Global Defense Technology	9705	17152	33336	13267
RDT & E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:
SPACE-BASED PASSIVE SURVEILLANCE:
 -Focal Plane Arrays -Continued Mercury Cadmium Telluride and Silicon Arsenide focal plane arrays for space surveillance applications (TRL3 -4).
 -Proof-of-Principle 10 -Kelvin Cryocooler -Continued development of a 10 -Kelvin cryocooler using pulsed tube technology for space surveillance application. Enabled extended tracking range for SBIRS-Low (TRL3 -5).
ACTIVE TRACKING:
 -Relay Mirror Concept -Initiated concept design studies of an advanced relay mirror system to increase the tracking range of Airborne Laser. Concept focused on support of the boost phase intercept mission using a relay mirror on a high altitude airborne platform (TRL3).
AIRSHIP:
 -Airship ACTD -MDA/Advanced Systems is the Executing Agent for the HAA ACTD which includes participation with Army OSD and NORAD. Completed airship platform studies and analysis of alternatives. Initiated power system Test Bed design. (TRL2).
 FY2003 PLANNED PROGRAM:
 -Continued development of space based surveillance FPAs and cryocoolers for Space Tracking and Surveillance System applications (TRL4 -7).
 -Executing Agent for High Altitude Airship ACTDs scheduled for FY2005 demonstration (TRL4 -7). The objective of this ACTD is to demonstrate the engineering feasibility and potential military utility of an unmanned, untethered, gas-filled, solar powered airship that can fly at 70 kilofeet (kft). The prototype airship developed under this effort will be capable of continuous flight for up to a month while carrying a multi-mission payload. The prototype airship will demonstrate all enabling technologies that will be required for one year or more of continuous flight. The demonstration will include multiple launch and recovery operations as well as varied flight profiles to validate and refine airship concepts of operations (CONOPS).

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FY2004 and FY2005 PLANNED PROGRAM:

- Executing Agent for High Altitude Airship ACTD scheduled for FY2005 demonstration (TRL4 -7). The objective of this ACTD is to demonstrate the engineering feasibility and potential military utility of an unmanned, untethered, gas-filled, solar powered airship that can fly at 70 kft. The prototype airship developed under this effort will be capable of continuous flight for up to a month while carrying a multi-mission payload. The prototype airship will demonstrate all enabling technologies that will be required for one year or more of continuous flight. The demonstration will include multiple launch and recovery operations as well as varied flight profiles to validate and refine airship concepts of operations (CONOPS).
- Continued development of space-based surveillance FPAs and cryocoolers for Space Tracking and Surveillance System applications (TRL4 -7).
- Conduct investigations into micro-satellite experiments.

	FY2002	FY2003	FY2004	FY2005
Enabling Technology Support	25257	20019	19058	21695
RDT&E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:

MULTI-APPLICATION FOCAL PLANE ARRAYS:

- Thin Film Ferro-Electric IR Detector Pixel - Successfully produced imaging array; materials system still being optimized. Effort matured to TRL4 in FY2002.
- Type II Superlattice -40x40um InAs/(GaIn)Sb - Mesodiodes of a 256x256 focal plane array. Effort matured to TRL3 in FY2002.

MATERIALS, STRUCTURES, AND POWER:

- Dual-Mode Experiment on Bow Shock Interaction (DEBI) Payload - The purpose was to investigate the properties of seeker windows in the intercept or flight regime of the upper atmosphere and correlate observations with a thermochemistry data. Payload scheduled to fly in FY2003 aboard the DEBI (TRL3 -4).
- Silicon Seeker Focal Plane Cooler Assembly - Initiated the integration of flow-temperature (10 Kelvin) superconducting silicon FPA and processor electronics into an interceptor seeker breadboard (TRL3 -4).

INNOVATIVE SCIENCE AND TECHNOLOGY (IS&T):

- Antenna-coupled focal plane array - By Nanolithography, test structures were deposited on standard Focal Plane Array (FPA) multiplexer chip to fabricate uncooled, antenna-coupled Infrared FPA devices (TRL2 -3).
- Optical Target Characterization - Under the Optical Target Characterization program, the Innovative Science and Technology Experimentation Facility (ISTEF), an Imaging Facility owned by the Missile Defense Agency and operated by Computer Science Corporation (CSC), participated in missile flight tests with telescopic mounts located at Wake Island and Kwajalein (TRL7 -8).

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-True Time Delay -Experiments have progressed to fabricate and test two photonic devices for future radar applications: a polymer based phase shifter and a polymer based True Time Delay (TTD) module to achieve directional steering of a radar beam (TRL3 -4).

-Achieved three gratings in single plane holographic glass combining optical function into a single element useful for beam steering and focusing (TRL3).

INTERNATIONAL:

-Space Technology Research Vehicle II (STRV2) Payload -STRV -2 was a multi-national, highly integrated suite of experiments designed to push the envelope of space based imaging technology, satellite vibrations suppression, and materials science. STRV -2 was sponsored by the MDA and the United Kingdom (UK). The STRV -2 primary objectives included demonstration of operation of optical instruments (Medium Waveband IR (MWIR) and Laser communication (LASERCOM)) on a low-cost, non-precision platform, downlinking of data via Lasercom, obtaining infrared background data in selected wavelength bands at low and high altitudes and assessing performance of candidate components in the space environment.

-Cellular Neural Network - A processing system based on human neural sensing system. It was capable of processing sensor input at an extremely high rate, which makes it suitable for application in target detection, tracking, and discrimination and sensor fusion.

FY2003 PLANNED PROGRAM:

-Continue innovative component technology development at the TRL2 -4 level, IS&T, and international cooperative efforts at TRL2 -5 level.

FY2004 and FY2005 PLANNED PROGRAM:

-Continue innovative component technology development at the TRL2 -4 level and international cooperative efforts at TRL2 -5 level.

	FY2002	FY2003	FY2004	FY2005
Statutory and Mandated	3922	3627	3927	4000
RDT&E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:

-Incrementally funded twelve Historically Black Colleges and Universities/Minority Institutions (HBCU/MI) contracts in the areas of electronics, sensors, materials, and BMC3 selected in FY2001 competition.

-Several grants go to the same HBCU with different Points of Contacts.

-HBCU/MI include:

- *Norfolk State
- *University of Texas, El Paso
- *Grambling

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- *Howard University
- *Fisk University
- *City College of CUNY
- *North Carolina A&T

-The Technology Applications program assisted 128 companies and university-based researchers in scaling up and commercializing their MDA-funded technology for future use in MDA systems.

-Program support for the administration of the SBIR/STTR Program.

FY2003 PLANNED PROGRAM:

- Continue to fund HBCU/MI.
- Continue providing technology maturation techniques, such as commercialization reviews and outreach, which help leverage outside resources and provide a strong foundation essential for scaling up MDA-funded technology to address system capabilities.
- Continue program support for the administration of the SBIR/STTR Program.

FY2004 and FY2005 PLANNED PROGRAM:

- Continue to fund HBCU/MI.
- Continue providing technology maturation techniques, such as commercialization reviews and outreach, which help leverage outside resources and provide a strong foundation essential for scaling up MDA-funded technology to address system capabilities.
- Continue program support for the administration of the SBIR/STTR Program.

	FY2002	FY2003	FY2004	FY2005
Directed Interest	29053	29621	0	0
RDT&E Articles (Quantity)				

FY2002 ACCOMPLISHMENTS:

- Photoconduction on Active Pixels (POAP) -Program was to complete the POAP wafer-based process development and demonstrate this process on a 3-color 2M-pixel HDTV video camera. Work under previous funding was directed to demonstrate the POAP technology and to produce sample cameras using a chip-level process.
- Silicon Thick Films -The objective of this task is to develop the processes, materials, and device technology necessary for implementation of both the optics (Silicon Carbide) and sensor (Silicon) capabilities.

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<p>- Gallium Nitride Microwave Power Amplifier - Program is developing four advanced transistor designs and substrates. Advanced device designs seek to solve current collapse, a problem at high power operation in many modern devices, and increase channel mobility and carrier confinement to increase power capability.</p> <ul style="list-style-type: none">- High Data Rate Wireless Communications- Silicon Brain Architecture- Wafer-Scale Planarization Technology- Advanced RF Technology Development- AEOS MWIR Adaptive Optics- Airborne Infrared Surveillance (AIRS) System <p>FY2003 PLANNED PROGRAM:</p> <ul style="list-style-type: none">- Bottom Anti-reflective Coating- Massively Parallel Optical Interconnects- Wide Bandgap Silicon Carbide Semiconductor Research- Gallium Nitride High Power Microwave- Improved Materials for Optical Memories- Thick Film Silicon Coatings- High Data Rate Communications- Advanced RF Technical Development- AEOS MWIR Adaptive Optics- Wafer Scale Planarization- High Resolution Color Imaging		

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	FY2002	FY2003	FY2004	FY2005
Advanced Concepts	0	0	15064	14383
RDT&E Articles (Quantity)				

FY2004 and FY2005 PLANNED PROGRAM:

-Advanced Systems Innovation Cell (ASIC): The ASIC evaluates all internally and externally generated advanced concepts to prove their technical feasibility and initial capability and maintains cognizance over leading edge concepts. It is the ASIC team's goal to release an annual Broad Agency Announcement (BAA) and to review concepts for integrated systems and for technical improvements in boost, mid-course and terminal phases of missile defense.

-SBIREvaluations: The SBIREvaluation team leads the development of SBIR/STTR (Small Business Technology Transfer) topics, the evaluation, assessment, and recommendation of SBIR/STTR proposals, and monitors SBIR/STTR contracts and the integration of their products into MDA and MDA/AS programs and thrusts.

C. Other Program Funding Summary

	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	To Complete	Total Cost
PE0604867C Navy Area Theater Missile Defense -EMD	96121	0	0	0	0	0	0	0		
PE0605502C Small Business Innovative Research -MDA	145102	0	0	0	0	0	0	0		
PE0901585C Pentagon Reservation	6381	7432	14481	13384	12758	12850	13158	13476		
PE0901598C Management Headquarters - MDA	30191	25365	93441	101373	114107	121743	128972	133499		
PE0603882C Ballistic Missile Defense Midcourse Defense Segment	3655089	3103844	3613266	3841412	2078522	1908511	1482389	1437923		
PE0603883C Ballistic Missile Defense Boost Defense Segment	583463	718036	626264	653612	755163	665772	477109	354346		
PE0603884C Ballistic Missile Defense Sensors	312973	350436	438242	562752	706514	1043454	1152740	1261906		
PE0603886C Ballistic Missile Defense System Interceptors	0	0	301052	541178	1127180	1729613	2558327	2904096		
PE0603888C Ballistic Missile Defense Test and Targets	0	0	611522	711181	661416	643302	639839	672396		
PE0603889C Ballistic Missile Defense Products	0	0	343644	384763	333636	343447	349335	360951		

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PE0603890CBallisticMissileDefense SystemEngi neeringandIntegration	0	0	483996	522458	604445	628594	703055	706501		
PE0604861CTheaterHigh -AltitudeArea DefenseSystem -TMD -EMD	818632	888323	0	0	0	0	0	0		
PE0604865CPatriotPAC -3TheaterMissile DefenseAcquisition -EMD	130630	176155	0	0	0	0	0	0		
PE0603869CMeadsConcepts -Dem/Val	0	114781	0	0	0	0	0	0		
PE0603879CAdvancedConcepts, EvaluationsandSystems	0	0	151696	216778	166308	193949	241947	234484		
PE0603880CBallisticMissileDefense SystemSegment	790535	1046652	0	0	0	0	0	0		
PE0603881CBallisticMissileDefense TerminalDefenseSegment	195800	136399	810440	924356	985514	805785	558071	371649		

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COST (\$ in Thousands)	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
0503 Laser Technology	0	0	47130	47002	48863	48797	49734	50676
RDT&E Articles Qty	0	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

The Laser Technology program is a new program derived from the former Space-Based Laser (SBL) program. The Laser Technology program focuses on developing lasers and related component technology for low power applications including tracking, weapon guidance, and imaging, while investing in high-energy laser technologies that could lead to a future SBL effort. The emphasis on low-power systems is driven by their considerable potential to improve and support MDA's hit-to-kill weapons. The Agency plans to select concepts and award contracts for six focused technology projects in FY2003, continue these through FY2004, and initiate two of four new projects in FY2004. These projects will be drawn from proposals solicited from the laser and electro-optics industry.

B. Accomplishments/Planned Program

	FY2002	FY2003	FY2004	FY2005
Laser Technology			47130	47002
RDT&E Articles (Quantity)				

FY2004 and FY2005 PLANNED PROGRAM:

All projects below were selected in FY2003 and are planned for continuation through FY2005. Funding levels are approximately \$10M/year for major projects and \$2.5M/year for technology base projects.

The major projects are:

- Strategic Illuminator; multi-kilowatt brassboard illuminator system that will significantly advance the state of the art in high-power laser illuminator brightness, reliability, and packaging.
- An additional major project is anticipated for selection in FY2004.

The technology base projects are:

- Hydrogen-Fluorine Overtonelaser; initial development of a candidate laser for a future SBL.
- Electro-Chemical Oxygen Iodine Laser; electrically rechargeable multi-use high-energy laser.
- Compact Laser Radar Amplifier; powerful small laser transmitter (hundreds of watts) suitable for insertion on a missile defense platform with tight weight and volume constraints.
- Inertial Reference Unit; device for highly accurate laser pointing and tracking.
- Advanced Detectors; improved detectors for laser radars, with better sensitivity and bandwidth.

One to three technology base projects are anticipated for selection in FY2004. In addition to these projects, in FY2004, approximately \$9M is planned to cover costs associated with SBL facilities closeout.

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MDA Exhibit R -2 ARDT & E Project Justification							Date February 2003			
APPROPRIATION/BUDGET ACTIVITY 3. Advanced Technology Development (ATD)					R-1 NOMENCLATURE 0603175C Ballistic Missile Defense Technology					
C. Other Program Funding Summary										
	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	To Complete	Total Cost
PE0603886C Ballistic Missile Defense System Interceptors	0	0	301052	541178	1127180	1729613	2558327	2904096		
PE0603890C Ballistic Missile Defense System Engineering and Integration	0	0	483996	522458	604445	628594	703055	706501		
PE0603888C Ballistic Missile Defense Test and Targets	0	0	611522	711181	661416	643302	639839	672396		
PE0603889C Ballistic Missile Defense Products	0	0	343644	384763	333636	343447	349335	360951		
PE0604861C Theater High -Altitude Area Defense System -TMD -EMD	818632	888323	0	0	0	0	0	0		
PE0604865C Patriot PAC -3 Theater Missile Defense Acquisition -EMD	130630	176155	0	0	0	0	0	0		
PE0604867C Navy Area Theater Missile Defense -EMD	96121	0	0	0	0	0	0	0		
PE0605502C Small Business Innovative Research -MDA	145102	0	0	0	0	0	0	0		
PE0901585C Pentagon Reservation	6381	7432	14481	13384	12758	12850	13158	13476		
PE0901598C Management Headquarters - MDA	30191	25365	93441	101373	114107	121743	128972	133499		
PE0603869C Meads Concepts -Dem/Val	0	114781	0	0	0	0	0	0		
PE0603879C Advanced Concepts, Evaluations and Systems	0	0	151696	216778	166308	193949	241947	234484		
PE0603880C Ballistic Missile Defense System Segment	790535	1046652	0	0	0	0	0	0		
PE0603881C Ballistic Missile Defense Terminal Defense Segment	195800	136399	810440	924356	985514	805785	558071	371649		
PE0603882C Ballistic Missile Defense Midcourse Defense Segment	3655089	3103844	3613266	3841412	2078522	1908511	1482389	1437923		
PE0603883C Ballistic Missile Defense Boost Defense Segment	583463	718036	626264	653612	755163	665772	477109	354346		
PE0603884C Ballistic Missile Defense Sensors	312973	350436	438242	562752	706514	1043454	1152740	1261906		

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APPROPRIATION/BUDGET ACTIVITY 3. Advanced Technology Development (ATD)	R-INOMENCLATURE 0603175C Ballistic Missile Defense Technology
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COST (\$ in Thousands)	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
6090/0602 Program Operations	3511	2833	4634	4350	4394	5118	5993	6673
RDT&E Articles Qty	0	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

Fiscal Years 2002 and 2003 are reflected in Project 6090 and Fiscal Years 2004 and out are in Project 0602.

This project covers personnel and related support costs, statutory and fiscal requirements.

Personnel covers government civilians performing program -wide oversight functions such as contracting, program integration, safety, quality and mission assurance at Missile Defense Agency (MDA), Executing Agents within the US Army Space & Missile Defense Command, US Army Program Executive Officer (PEO) Air and Missile Defense, US Navy PEO for Theater Surface Combatants, Office of Naval Research, and US Air Force.

Assistance required to support Missile Defense Agency program -wide management functions is also contained in this project. Typical efforts include cost estimating; audit; technology integration across MDA projects; and assessment of schedule, cost and performance, with attendant documentation of the many related programmatic issues. Therequirements for this area are based on most economical and efficient utilization of contractors versus government personnel.

Fiscal Requirements include reimbursable services acquired through the Defense Working Capital Fund (DWCF) 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. MDA has additional requirements to provide for foreign currency fluctuation on its limited number of foreign contracts. Also includes funding for charges to canceled appropriations in accordance with Public Law 101 -510.

Note that these funds are allocated across multiple Program Elements (PE) in accordance with the Fiscal Year 1996 Authorization Act, which directed these funds be allocated to the programs being supported rather than managed from a single source. This structure often makes it difficult to level -fund all PEs while maintaining an orderly fiscal structure for executing the individual Program Operation efforts.

B. Accomplishments/Planned Program

	FY2002	FY2003	FY2004	FY2005
Personnel			2215	1974
RDT&E Articles (Quantity)				

Provides funding for government salaries and benefits at the Missile Defense Agency that are associated with program -wide support.

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MDA Exhibit R -2 ARDT&E Project Justification	Date February 2003
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APPROPRIATION/BUDGET ACTIVITY 3. Advanced Technology Development (ATD)	R-1 NOMENCLATURE 0603175C Ballistic Missile Defense Technology
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	FY2002	FY2003	FY2004	FY2005
Management Support	2580	1570	1720	1631
RDT&E Articles (Quantity)				

Funds the contract SETA support costs directly associated with Missile Defense Agency program-wide support organizations. This effort provides the funding for the Missile Defense Agency's executing agents (Army Space and Missile Defense Command, Army PEO -AMD, Air Force, and Navy) including government salaries & benefits, setas support, and various management/overhead costs

	FY2002	FY2003	FY2004	FY2005
Fiscal Requirements	86	750	699	745
RDT&E Articles (Quantity)				

This effort funds various requirements at the Missile Defense Agency, to include accounting services, special termination costs, foreign currency fluctuations, and charges from cancelled appropriations.

	FY2002	FY2003	FY2004	FY2005
IM/IT Operations	845	513		
RDT&E Articles (Quantity)				

This effort pays for Information Management/Information Technology requirements within the Missile Defense Agency. These requirements are moved to the Management Headquarters Program Element in Fiscal Years 2004 -2009.

C. Other Program Funding Summary										
	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	To Complete	Total Cost
PE0603869C Meads Concepts -Dem/Val	0	114781	0	0	0	0	0	0		
PE0603879C Advanced Concepts, Evaluations and Systems	0	0	151696	216778	166308	193949	241947	234484		
PE0603880C Ballistic Missile Defense System Segment	790535	1046652	0	0	0	0	0	0		
PE0603881C Ballistic Missile Defense Terminal Defense Segment	195800	136399	810440	924356	985514	805785	558071	371649		

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MDAExhibitR -2ARDT&EProjectJustification							Date February2003			
APPROPRIATION/BUDGETACTIVITY 3.AdvancedTechnologyDevelopment(ATD)				R-INOMENCLATURE 0603175CBallisticMissileDefenseTechnology						
PE0603882CBallisticMissileDefense MidcourseDefenseSegment	3655089	3103844	3613266	3841412	2078522	1908511	1482389	1437923		
PE0 603883CBallisticMissileDefenseBoost DefenseSegment	583463	718036	626264	653612	755163	665772	477109	354346		
PE0603884CBallisticMissileDefense Sensors	312973	350436	438242	562752	706514	1043454	1152740	1261906		
PE0603886CBallisticMissileDef ense SystemInterceptors	0	0	301052	541178	1127180	1729613	2558327	2904096		
PE0603888CBallisticMissileDefenseTest andTargets	0	0	611522	711181	661416	643302	639839	672396		
PE0603889CBallisticMissileDefense Products	0	0	343644	384763	333636	343447	349335	360951		
PE0603890CBallisticMissileDefense SystemEngineeringandIntegration	0	0	483996	522458	604445	628594	703055	706501		
PE0604861CTheaterHigh -AltitudeArea DefenseSystem -TMD -EMD	818632	888323	0	0	0	0	0	0		
PE0604865CPatri otPAC -3TheaterMissile DefenseAcquisition -EMD	130630	176155	0	0	0	0	0	0		
PE0604867CNavyAreaTheaterMissile Defense -EMD	96121	0	0	0	0	0	0	0		
PE0605502CSmallBusinessInnovative Research -MDA	145102	0	0	0	0	0	0	0		
PE0901585CPentagonRes ervation	6381	7432	14481	13384	12758	12850	13158	13476		
PE0901598CManagementHeadquarters - MDA	30191	25365	93441	101373	114107	121743	128972	133499		