MDA Exhibit R-2 RDT&E Budget Item Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

COST ($ in Thousands)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0	117,719	511,262	1,118,599	1,717,480	2,196,531	2,449,322
0013 Ballistic Missile Defense Interceptor Block 2010	0	112,209	451,383	971,306	1,275,132	1,215,064	670,235
R113 Ballistic Missile Defense Interceptor Block 2012	0	0	47,475	130,856	421,608	946,953	1,739,069
0602 Program-Wide Support	0	5,510	12,404	16,437	20,740	34,514	40,018

Note: The Missile Defense Agency created the Ballistic Missile Defense System Interceptors Program Element (PE) in FY 2004. PE 0603883C, Projects 4010, 4020, and 4040 describe the budget documentation for FY 2003 Kinetic Energy Interceptors program. PE 0603886C consolidates all kinetic energy interceptor efforts (land, sea, space and experimentation) into one BMDS Interceptor program. This documentation addresses Blocks 2010 and 2012.

A. Mission Description and Budget Item Justification

Our goal is to defend the United States and our allies, friends, and deployed forces from ballistic missiles of all ranges in all phases of flight. By the beginning of FY 2005, we will put the Ballistic Missile Defense System (BMDS) on alert and, for the first time, we will have a capability to defeat a ballistic missile threatening the United States. In FY 2005 and the remainder of the FYDP, we will increase the breadth and depth of our defense by adding forward-deployed, networked sensors, by adding interceptors at sea and on land, and by adding layers of increasingly capable weapons and sensors. Throughout this documentation, therefore, every activity can be tied to one of our four objectives: complete, verify and test the Initial Defensive Capability; put the BMDS on alert; develop procedures and logistics to perform and sustain concurrent testing and operations; and enhance the BMDS capability.

Over the years, the Anti-Ballistic Missile (ABM) treaty shaped the nation's missile defense program, permitting only the development of theater missile defense systems and a limited number of silo-based national missile defense interceptors, confined to a single site in the continental United States. These ABM treaty constraints strictly limited the BMDS architecture options and drove us to focus on systems like the Standard Missile-3 (SM-3), Theater High Altitude Area Defense (THAAD) and Ground Based Interceptor that target the enemy's missiles during the mid-course and terminal portions of their trajectories.

With treaty constraints removed, the Missile Defense National Team (MDNT) identified the addition of a mobile, high performance kinetic boost/ascent layer as the highest priority weapon enhancement to the BMDS. A Missile Defense Agency (MDA) investment analysis considered all possible interceptor upgrade alternatives prior to reaching this conclusion. The MDNT studies prove, and the Defense Science Board (DSB) agrees, that a fast burn, high velocity, mobile interceptor, roughly two to three times as fast as the SM-3 and THAAD interceptors respectively, is a very effective weapon in the boost/ascent phase. Specifically, the DSB panel recommended the Secretary of Defense: 1) Direct R&D/engineering to expand surface-based capabilities with higher velocity/high acceleration missiles and supporting sensor network and 2) Initiate a boost/ascent phase development program against Intermediate Range Ballistic Missiles (IRBM) and Intercontinental Ballistic Missiles (ICBM). The Kinetic Energy Interceptor (KEI) and Airborne Laser (ABL) complement each other in defeating threat missiles in the boost phase of flight. The KEI booster vehicle and mobile launcher capabilities resulting from the boost/ascent development provide a critical building block for future midcourse and terminal phase upgrades. A foundation piece of the agency's BMDS block evolution strategy is to mate advanced payloads with the KEI common booster/mobile launcher.

In April 2003 we awarded Concept Design (CD) contracts to two U.S. industry teams (Northrop Grumman and Lockheed Martin) to use a capability based acquisition approach to competitively design a mobile, kinetic boost/ascent element and develop a detailed, low risk Development and Test (D&T) phase program plan. Industry's response to our capability-based solicitation surpassed our expectations. Northrop Grumman's winning proposal features an innovative integration of mature technologies that offers very high performance and military utility. During the CD phase, the Northrop Grumman team successfully developed high fidelity simulations of the boost element, built and exercised Hardware-in-the-Loop facilities to test kill vehicle seeker alternatives and plume-to-hardbody/homing guidance algorithms, performed a second-stage rocket motor static firing to confirm critical booster and thrust vector control technology readiness levels, and designed and built a prototype mobile launcher. In addition, a separate Northrop Grumman team (fire-walled from the competition) successfully conducted a series of real-time command and control battle management and communication (C2BMC)/fire control experiments utilizing actual solid and liquid ICBM and Satellite Launch Vehicle (SLV) launches to validate the ability to close a KEI fire control loop with overhead non-imaging infrared (ONIR) sensors. In December 2003, we awarded a 98 month contract to Northrop Grumman for Block 10 KEI D&T.

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The Block 10 KEI D&T program takes a non-traditional development approach. The program relies heavily on existing hardware and mature technologies, many of which have been proven in flight test for different missions. This high level of component maturity enables the program to execute a single design cycle with an immediate focus on producibility, manufacturing, quality, and affordability in addition to performance. Our number one D&T program priority is mission assurance, which translates into design for manufacture and assembly combined with an early and robust ground test program. Early proofing of hardware and software products on the actual production line and mandating that the third integrated flight test (IT-3) is production representative in every way are program keystones. To ensure this new approach to capability development gets implemented in a disciplined manner, product design and production maturity will be tracked against structured criteria using MDA-defined Engineering and Manufacturing Readiness Levels (EMRL) and Software Readiness Levels (SWRL). The steep "ramp-up" of funds in FY 2005 and FY 2006 corresponds with this acquisition approach. In FY 2005 and FY 2006, we conduct design reviews with the EMRL and SWRL knowledge points as entrance criteria, complete full scale risk mitigation tests of critical components (e.g. eight rocket motor/thrust vector assembly static firings, kill vehicle hardware-in-the-loop), activate test and integration facilities, design the production lines and evaluate critical tooling and materials, execute two integrated element ground tests, fabricate and test kill vehicle engineering units, and initiate procurement for dedicated target vehicles.

Northrop Grumman is developing a mobile interceptor common to both land and sea basing. They will initially test from a national range using the land based, mobile launcher. Next, they will install the launcher on a containership, permitting testing of a wider spectrum of engagement geometries. In Block 12, Northrop Grumman will complete integration and test on a sea based platform, likely a surface based combatant or submarine. Also in Block 12, they begin testing the inherent mid-course capability of the system against targets in the mid-course and exoatmospheric terminal phase, expanding the military utility of the inherent BMDS interceptor capabilities.

MDA continues to conduct a disciplined approach to collecting data to better understand the physics of boosting flight. This measurements test program exploits existing targets of opportunity flights such as ICBM and space launches through the use of ground, aircraft-borne and space based sensors. The importance of these data products enables improvements to be made to guidance algorithms, scene generation fidelity levels, and modeling and simulation results that are used to analyze interceptor performance capabilities against various threat type characteristics to include plume to hard body discrimination under different scenarios. In FY 2003 we conducted six of these missions against both liquid and solid rocket ICBMs and SLVs. These test results proved we could rely on data provided by overhead non-imaging infrared sensors to give us the accuracy we need to launch and navigate the interceptor through the various stages of tracking and engaging a target to intercept. During FY 2004 and beyond we intend to conduct additional target of opportunity flights, varying the geometries of the flight test scenarios and instrument set-ups to improve our fidelity of data sets to include near field data needs throughout boost. Near field InfraRed measurements of the plume and rocket body during boost are one area where MDA desires additional data to reduce risk. To address this need, MDA plans to launch a space based Near Field InfraRed Experiments (NFIRE) satellite in FY 2006. Results from these experiments will anchor the boost/ascent guidance algorithms and simulations and will verify plume-to-hard body discrimination.

International cooperation in the boost/ascent kinetic energy interceptor program is an important part of MDA's overall strategy on international cooperation and is in accordance with Presidential direction. Our objective is to encourage participation of friends and allies in the development of alternate boost/ascent phase system components such as booster, kill vehicle, or C2BMC system. This approach reduces risk, produces competitive pressure, provides added options for component evolution, and importantly, fosters collaboration with our friends and allies. In FY 2005 we intend to award a contract to start an international industry development program that will produce viable alternate system components for potential insertion into Block 12 and succeeding Blocks. These alternate components will have boost/ascent and mid-course capability and will be compatible with land, sea and space environments.

Building on past technology and architecture studies of space based missile defenses, in FY 2004 we will conduct an analytical effort with the MDNT to identify the benefits of incorporating space based interceptors into a layered ballistic missile defense system. The MDNT will continue this effort by outlining an operations concept, forming a framework for future war-games at the Joint National Integration Center. Beginning in FY 2005 and continuing through FY 2009, the space based program will begin a risk reduction effort. We will initiate development of miniaturized, lightweight interceptor components, with the initial emphasis on developing a liquid axial stage. The program will also focus on the miniaturization and weight reduction of Kill Vehicles (KV) and lifejackets. Building on the MDNT efforts in FY 2004, the program will initiate a modeling and simulation effort to address the risks associated with BMDS integration, battle management and constellation management and control. The program will continually update these simulation and modeling tools throughout the life of the program. Depending on the technology program's progress, the first set of space-based experiments will be on orbit in 2010 - 2011. By 2011 - 2012, our space based test bed will have a thin constellation of 3 to 6 spacecraft on orbit.

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Program-Wide Support under this project covers personnel and related support costs, statutory and fiscal requirements. May include funding for government civilians performing program-wide oversight 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. Program Change Summary	FY 2003	FY 2004	FY 2005
Previous President's Budget (FY 2004 PB)	0	301,052	541,178
Current President's Budget (FY 2005 PB)	0	117,719	511,262
Total Adjustments	0	-183,333	-29,916
Congressional Specific Program Adjustments	0	-182,000	0
Congressional Undistributed Adjustments	0	-1,333	0
Reprogrammings	0	0	-29,916
SBIR/STTR Transfer	0	0	0

The FY 2004 reduction of $182,000,000 was made to BMDS Interceptor program growth.

The FY 2005 decrease of $29,916,000 reflects the Missile Defense Agency's realignment of resources to support higher Agency priorities.

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
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COST ($ in Thousands)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
0013 Ballistic Missile Defense Interceptor Block 2010	0	112,209	451,383	971,306	1,275,132	1,215,064	670,235
RDT&E Articles Qty	0	0	2	5	12	9	4

A. Mission Description and Budget Item Justification

The Missile Defense Agency's (MDA) goal for Block 10 is to add a kinetic energy boost layer to the Ballistic Missile Defense System (BMDS). There are two major efforts to achieve this goal. Development and test of a mobile, land based boost ascent interceptor element and the NFIRE risk reduction activity.

In last year's budget documentation, we described our plan to deliver land based kinetic energy boost capabilities to the BMDS in Block 08. The results of our contracted concept design efforts and the FY 2004 budget reductions forced us to adjust our expectations for delivering these capabilities. We will complete development of a land based, boost/ascent element in Block 10.

In FY 2003 we awarded two contracts to design a mobile, boost/ascent element and develop a detailed plan to achieve this capability. Block 10 program priorities in rank order are mission assurance, schedule, performance and cost. These priorities resulted in the contractors proposing existing hardware, software and proven technologies in their design concept. During the Concept Design phase the Northrop Grumman team completed initial hardware-in-the loop testing of a kill vehicle seeker, built and tested a full-scale prototype launcher, static fired the second-stage rocket motor with trapped-ball thrust vector control, conducted real-time C2BMC/Fire Control experiments with Overhead Non-Imaging Infrared (ONIR) sensors, and built and exercised a high-fidelity simulation of entire Kinetic Energy Interceptor (KEI) element concept. In December 2003, we awarded a follow-on contract for the KEI Development and Test (D&T) Program to Northrop Grumman.

The KEI land based element design is based on mature technologies proven in ground and flight test at the component level. The Raytheon KEI kill vehicle combines the SM-3 seeker/avionics with an Exoatmospheric Kill Vehicle (EKV) liquid divert and attitude control system to achieve a high performance boost/ascent interceptor with inherent midcourse defense capability. The KEI third stage is a production SM-3 third stage rocket motor (TSRM) with a new attitude and control subsystem derived from Ground-based Midcourse Defense (GMD). The Alliant Technology (ATK) first and second stage motors utilize advanced solid axial stage (ASAS) technologies we have been developing and testing incrementally over the last decade. The Northrop Grumman C2BMC component builds upon an extensive suite of concept design phase algorithms and Northrop's substantial investments as lead developer of the GMD C2BMC capability. The mobile launcher is a modification of military-off-the-shelf (MOTS) equipment.

The KEI D&T program is structured much differently than predecessor missile defense programs. The Northrop Grumman D&T integrated master plan/integrated master schedule (IMP/IMS) features an unprecedented mix of program content during the early years of execution. This content is driven by newly defined MDA engineering & manufacturing, software, and operational readiness level criteria. The MDA has defined the new readiness levels as exit criteria (knowledge points) for design reviews and the Block 10 capability milestone. Our objective is to focus early Northrop Grumman development work on manufacturing, producibility, quality, affordability, and operational suitability in addition to the traditional upfront emphasis on technical performance. The FY 2004/FY 2005 D&T program content includes: 1) mitigation of key risks through early build and test of full scale prototypes based on mature technologies, 2) complete definition of all requirements and interfaces by Design Review-1, 3) design of the interceptor, C2BMC, and launcher production lines, 4) establishment of machines and tooling in a laboratory environment for selected items, 5) development of engineering models as flight test unit pathfinders, 6) initiating builds of all integration labs and activating test facilities, 7) initiate procurement of flight test targets and 8) extensive involvement of the User (USSTRATCOM, USNORTHCOM, Army) in KEI capability design and operations concept definition. Northrop Grumman will conduct this work across multiple geographic centers where the integrated product teams are based.

Mobility of the interceptor is an essential characteristic enhancing its military utility. The KEI contractor is developing a canisterized interceptor which is completely common to both land and sea basing and compatible with land and sea environments. These attributes will provide both flexibility and robustness to the test program, and ease the transition to a fully integrated sea based capability. Developing a realistic, robust test program for the BMDS Interceptor element is paramount to the BMDS. Beginning in FY 2008 Northrop Grumman will test the interceptor from both land based ranges and a sea based platform. Launching the interceptor from a sea based platform is critical to providing realistic coverage of the operational envelope and intercept geometries. Based on results of a Military Sealift Command (MSC) market survey, the agency, through MSC, will acquire a containership to support the BMDS interceptor testing. While serving to enhance the flexibility of the BMDS test bed, the containership may be deployed in case of a national emergency.

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We will execute a series of two contractor flight tests (Element Characterization Flight and Ship-launched Risk Reduction Flight) and five Integrated Flight Tests (IT 1-5) against targets during the D&T. These flight tests will be preceded by a robust series of ground testing including multiple static fire tests of all three rocket motor stages and integrated Kill Vehicle hover testing as well as a Booster Flight (BF) test, a Partial Full Scale (PFS) flight test and a Control Test Vehicle (CTV) flight test. Numerous integrated ground tests of the Element C2BMC with the BMDS and the Element C2BMC with the launcher will also be conducted. All five IT missions will have the objective of intercepting the target. Beginning with IT-3, the element will be tested using production hardware and software with IT-5 mission conducted by the user. To support this strategy we will procure nine targets (including two spares).

Block 10 testing focuses on boost/ascent phase intercept. Technical and operational issues resolved during land based development and testing mitigate risks for future evolutions of this mobile and highly effective capability.

MDA continues to conduct a disciplined approach to collecting data to better understand the physics and phenomenology of boosting flight. This measurements test program exploits existing targets of opportunity flights such as ICBM and space launches through the use of ground, aircraft-borne and space based sensors. The importance of these data products enables improvements to be made to guidance algorithms, scene generation fidelity levels, and modeling and simulation results that are used to analyze interceptor performance capabilities against various threat type characteristics to include plume to hard body discrimination under different scenarios. In FY 2003 we conducted six of these missions against both liquid and solid rocket ICBMs and SLVs. These test results proved we could rely on data provided by overhead non-imaging infrared sensors to give us the accuracy we need to launch and navigate the interceptor through the various stages of tracking and engaging a target to intercept. Data from the aircraft sensors validated our approach for guidance and control during interceptor acquisition and track. During FY04 and beyond, we intend to conduct additional target of opportunity flights, varying the geometries of the flight test scenarios and instrument set-ups to improve our fidelity of data sets to include near field data needs throughout boost.

The collection of the near field infrared measurements of boosting targets will be from an on-orbit satellite. Currently, MDA is building the Near Field InfraRed Experiments (NFIRE) satellite. The major objective of this effort is to collect near field long, medium and short wave infrared (LWIR, MWIR, SWIR) measurements of the rocket plume and body in the boost phase of flight to anchor our understanding of the plume phenomenology and plume to rocket body discrimination. MDA will also use this data to validate the models and simulations that are fundamental to developing the navigation, guidance and control and endgame homing algorithms for the KEI D&T program

Two payloads will be integrated onto the satellite to meet this objective. The first is a multi spectral, missile tracking system built by SAIC, San Diego, California, that will provide sub-meter near field infrared (IR) data for two dedicated target flights. This payload consists of sensors spanning the electromagnetic spectrum in the LWIR, MWIR, SWIR and visible wavebands. The second payload, built by Raytheon Systems Company in Tucson, AZ, is a maneuvering kill vehicle that deploys from the spacecraft for a fly-by of a boosting ICBM-like target to collect sub-meter endgame IR imagery.

Over the one-year lifetime of the satellite, we execute four mission types. The first mission set tracks ground targets such as forest fires, volcanoes, and static tests of rocket engines. This mission will verify, on-orbit, the pointing accuracy of the gimbaled system and calibrate the tracking sensors. The second mission set tracks targets of opportunity worldwide that take place regardless of the NFIRE experiment. These might include aircraft flights, space launches and operational missile tests. The two primary missions require the spacecraft to maneuver to view a boosting ICBM closing on the spacecraft. During the second of these two missions, the spacecraft releases the kill vehicle for a fly-by of the burning missile.

Spectrum Astro in Gilbert, AZ will build the spacecraft and integrate the two mission payloads into the spacecraft. An Orbital Sciences Corporation built Minotaur Launch Vehicle will launch the NFIRE satellite in the first quarter FY 2006.

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B. Accomplishments/Planned Program

	FY 2003	FY 2004	FY 2005
Land Based		62,030	375,006
RDT&E Articles (Quantity)			

FY 2003 Accomplishments:
(The funding that corresponds to FY 2003 Accomplishments can be found in PE 0603883C, Project 4010.)

- Awarded two Concept Design contracts for down-select to one capability developer in FY 2004.
- Conducted Boost/Ascent capability Concept Design phase using capability-based acquisition approach
- Conducted high fidelity modeling and technical evaluation of competitor capabilities
- Conducted rolling down select for Development and Test (D&T) phase
- Conducted Sea-Based Commonality/Compatibility evaluation of Land-Based Boost/Ascent Concept
- Initiated operational sea basing platform study
- Selected containership for sea based test bed following Military Sealift Command market survey
- Completed initial hardware-in-the-loop testing of a kill vehicle seeker
- Built and tested a full-scale prototype launcher
- Static fired the second stage rocket motor with trapped ball thrust vector control
- Conducted real time C2BMC/Fire Control experiments with Overhead Non-imaging infrared (ONIR) sensors
- Built and exercised a high-fidelity simulation of entire KEI element concept
- Collected critical boost/ascent phenomenology data with ground, airborne, and space test assets.

FY 2004 Planned Program:

Key Element level FY 2004 activities include:

- Award KEI Block 10 Boost/Ascent capability Development & Test (D&T) contract
- Conduct D&T contract Integrated Baseline Review (IBR) to solidify work packages and cost baseline
- Conduct the System Requirements Review (SRR) and baseline KEI Block 10 Boost/Ascent Capability Specification
- Develop Element Simulations and Models
- Establish D&T contract Risk Mitigation Plans and begin risk mitigation activities
- Conduct Mission Assurance Actions
- Establish Master Developmental Test Plan
- Initiate range and range safety planning and coordination
- Establish target requirements
- Finalize acquisition plans for sea-based test bed platform
- Procure and install special test equipment (STE)
- Initiate Concept of Operations (CONOPS) development with the Navy and USSTRATCOM
- Conduct User Table Top discussions
- Continue collection of critical boost/ascent phenomenology data with ground, airborne, and space test assets
- Evaluate contribution of other BMDS sensors to the KEI boost/ascent element

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Key Interceptor level FY 2004 activities include:
- Conduct Interceptor System Requirements Review and flow down of Interceptor and Canister subcomponent requirements
- Design and fabricate STE for design verification testing
- Establish Manufacturing Process Lab
- LDACS Thruster risk reduction demonstration
- Conduct Static Booster Motor Firing (Tactical Diameter)

Key C2BMC level FY 2004 activities include:
- Conduct C2BMC System Requirements Review and flow down C2BMC subcomponent requirements
- Develop interface requirements between KEI boost/ascent element and the BMDS C2BMC
- Prototype BMDS C2BMC Interface to the KEI C2BMC
- Conduct Algorithm/Timeline Demonstration
- Conduct Static Booster Motor Firing (Tactical Diameter)
- Conduct Direct Downlink Experiment
- Conduct Human Machine Interface (HMI) Demonstration

Key Launcher level FY 2004 activities include:
- Conduct Launcher System Requirements Review and flow down launcher subcomponent requirements
- Initiate Launcher Control Electronic Assembly Development

FY 2005 Planned Program:

Key Element level FY 2005 activities include:

- Continue Block 10 Boost/Ascent capability Development and Test
- Establish Interim System Integration Laboratory (SIL) to allow early integration testing
- Conduct Integrated Ground Test 1
- Continue assessment of Engineering and Manufacturing Readiness Levels and Software Readiness Levels
- Update Element and Simulation Models
- Demonstrate through modeling and simulation boost/ascent phase sensor, fire control, and C2BMC capabilities in BMDS Test Bed.
- Continue collection of critical boost/ascent phenomenology data with ground, airborne, and space test assets.
- Conduct Risk Mitigation Activities and Mission Assurance Actions
- Continue test planning and update Master Developmental Test Plan
- Continue range and range safety planning and coordination
- Initiate target procurement
- Finalize procurement plans for sea based test bed
- Conduct User CONOPS table top exercises
- Finalize operational sea-basing CONOPS development
- Continue operational sea-based platform coordination with the Navy and USSTRATCOM
- Continue User Table Top discussions

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Key Interceptor level FY 2005 activities include:
- Fabricate and deliver COTS SW evaluation station
- Kill Vehicle Bench Testing
- Interstage bench testing
- STE design and fabrication
- Manufacturing process development
- Update HW and SW for SIL
- Begin prototype of production line
- Fabricate production HW (pathfinder)
- Begin fabrication of engineering test HW
- Build and integrate static fire booster HW and prepare for a series of rocket motor static firings
- Conduct engineering and design activities in support of initial design release for ground test hardware
- Establish Interceptor Component Integration Laboratory (CIL)
- Continue bench testing and initiate ground testing of key Interceptor and Canister sub-components
- Define Interceptor and Canister functional and physical interface requirements
- Begin validation of key design algorithms through modeling and simulation and hardware in the loop testing
- Complete Interceptor and Canister test plans and establish developmental HW and SW test plan
- Commence Interceptor and Canister production facility planning and implementation

Key C2BMC level FY 2005 activities include:
- Conduct engineering and design activities in support of initial design release for ground test hardware
- Define C2BMC functional and physical interface requirements
- Baseline interface requirements between KEI Boost/Ascent element and the BMDS C2BMC
- Establish C2BMC Component Integration Laboratory (CIL)
- Interim SIL Operational
- HW/SW procurement for SIL and SIF integration
- Complete KEI Inflight Communication System (KICS) Engineering Bread Board development
- Begin validation key design algorithms through modeling and simulation and hardware in the loop testing
- Continue bench testing and initiate ground testing of key sub-components
- Complete C2BMC test plans and establish developmental HW and SW test plan
- Evaluate and execute sensor change requests in support of improved KEI element performance as deemed appropriate
- Commence C2BMC production facility planning and implementation

Key Launcher level FY 2005 activities include:
- Activate Launcher Production Line
- Complete proof of concept testing
- Upgrade Concept Design prototype launcher to support D&T
- Fabricate 2 launchers to support D&T
- Conduct engineering and design activities in support of initial design release for ground test hardware
- Define Launcher functional and physical interface requirements

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- Establish Launcher Component Integration Laboratory (CIL)
- Begin validation of key design algorithms through modeling and simulation and hardware in the loop testing
- Continue bench testing and initiate ground testing of key sub-components
- Complete Launcher test plans and establish developmental HW and SW test plan
- Commence launcher production facility planning and implementation

	FY 2003	FY 2004	FY 2005
Experimentation & Test		44,516	68,000
RDT&E Articles (Quantity)			2

RDT&E Articles:
FY 2005, 1 NFIRE Space Vehicle, 1 Launch Vehicle

FY 2003 Accomplishments:
(The funding that corresponds to FY 2003 Accomplishments can be found in PE 0603883C, Project 4010.)

- Initiated procurement of spacecraft for the NFIRE
- Initiated procurement for the Launch vehicle for the NFIRE
- Integrated and tested the kill vehicle subcomponents in preparation for an FY 2004 Development Testing
- Conducted real-time fire control/BMC2 exercises and simulated engagements using space launch and ballistic missile targets of opportunity

FY 2004 Planned Program:
- Assemble Integrate and ground test Multi Spectral Tracking Sensor Payload
- Complete Kill Vehicle Ground Based Testing
- Assemble Integrate and Ground Test Flight Kill Vehicle
- Assemble, Integrate and Ground Test Spacecraft bus
- Develop Ground Segment Mission Operations Center
- Initiate procurement for two (2) Multi Stage Boost Targets
- Complete and Deliver Multi-Spectral Tracking Sensor Payload

FY 2005 Planned Program:
- Complete Kill Vehicle Computer-In the-Loop (CIL) facility upgrade
- Complete Space Vehicle Environmental Test
- Complete Space Vehicle Integration and Acceptance Test
- Certify Ground Segment Launch Site Readiness
- Complete Kill Vehicle software
- Complete ground test of flight software

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- Complete and deliver Kill Vehicle Payload
- Complete Ground Segment Mission Operations Center
- Complete delivery and acceptance of Launch Vehicle components
- Accept delivery of two (2) Multi-Stage Boost Target

	FY 2003	FY 2004	FY 2005
Program Management & Engineering		5,663	8,377
RDT&E Articles (Quantity)			

This effort supports the program management and engineering for BMDS interceptors project including contractor support (SETA), continuing risk reduction activities, Federally Funded Research and Development Center (FFRDC) efforts, and National Laboratory efforts.

C. Other Program Funding Summary

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0603890C Ballistic Missile Defense System Core	0	445,356	479,764	492,988	527,541	539,210	568,365	Continuing	Continuing
PE 0604861C Theater High-Altitude Area Defense System - TMD - EMD	887,616	0	0	0	0	0	0	Continuing	Continuing
PE 0604865C Patriot PAC-3 Theater Missile Defense Acquisition - EMD	138,922	0	0	0	0	0	0	Continuing	Continuing
PE 0605502C Small Business Innovative Research - MDA	138,791	0	0	0	0	0	0	Continuing	Continuing
PE 0901585C Pentagon Reservation	7,432	14,327	13,884	12,958	12,850	13,158	13,476	Continuing	Continuing
PE 0901598C Management Headquarters - MDA	35,331	92,449	141,923	146,099	145,112	151,727	154,583	Continuing	Continuing
PE 0603175C Ballistic Missile Defense Technology	151,217	225,268	204,320	199,468	246,291	286,286	305,365	Continuing	Continuing
PE 0603869C Meads Concepts - Dem/Val	101,754	0	0	0	0	0	0	Continuing	Continuing
PE 0603879C Advanced Concepts, Evaluations and Systems	0	149,993	256,159	229,512	232,463	231,583	224,626	Continuing	Continuing

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0603880C Ballistic Missile Defense System Segment	1,028,016	0	0	0	0	0	0	Continuing	Continuing
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	134,093	874,527	937,748	993,048	1,117,657	570,000	410,324	Continuing	Continuing
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	3,056,035	3,744,066	4,404,335	3,067,800	3,087,147	1,881,298	1,802,257	Continuing	Continuing
PE 0603883C Ballistic Missile Defense Boost Defense Segment	705,643	617,270	492,614	555,667	611,736	473,602	455,961	Continuing	Continuing
PE 0603884C Ballistic Missile Defense Sensors	327,013	425,421	591,957	790,265	1,453,679	1,122,189	1,232,893	Continuing	Continuing
PE 0603888C Ballistic Missile Defense Test and Targets	0	635,782	716,427	673,476	656,152	654,015	688,119	Continuing	Continuing
PE 0603889C Ballistic Missile Defense Products	0	305,309	418,608	421,049	445,971	456,339	469,621	Continuing	Continuing

D. Acquisition Strategy

KEI's acquisition strategy is an evolutionary one where the initial mobile land based boost/ascent phase system (Block 10) evolves first to a sea based one (Block 12) and then to one capable of intercepting ballistic missiles in the mid-course phase of flight. A feature distinguishing this acquisition is an early emphasis on engineering and manufacturing readiness as part of the design process. This is in contrast to the usual design process that produces engineering prototypes for test and then has a later, costly redesign to improve reliability and ease of manufacturing. This strategy implies early proofing of critical manufacturing processes as well as early, comprehensive ground subsystem testing as integral parts of the design process. It also implies a heavily, front end-loaded funding profile with the payoff coming in reduced redesign and retest, fewer test failures as well as lowered manufacturing cost. The strategy has event-based knowledge points using Engineering and Manufacturing Readiness Levels (EMRL) and Software Readiness Levels (SWRL) as maturity and risk indicators for proceeding forward with detailed design, building flight hardware and having a production off-ramp.

To implement the strategy we have competitively picked a single contractor team who offered the best balance of mission assurance confidence, technological maturity, mission capability (system performance), managerial and technical team performance and price. That contractor also offered us a competitive price commitment for the hardware we will buy as well as a firm fixed price, 10 year warranty covering virtually any reliability failure or performance shortfall relative to the performance specification. The early commitment to a production price and warranty conditions are integral to our strategy. These give the contractor a huge monetary incentive to promise only what he is certain he can deliver, to design in features that enhance reliability and lower production cost and to have a robust ground test program to uncover any systemic issues before flight test.

MDA Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603886C Ballistic Missile Defense System Interceptors

I. Product Development Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Land Based										
Capability Development	C/Various	Northrop Grumman		56,000	1Q	328,658	1Q	CONT.	384,658	TBD
MDA Service Systems Engineering	Various	Various		6,030	3/4Q	46,348	3/4Q	CONT.	52,378	TBD
Subtotal Product Development			0	62,030		375,006		0	437036	

Remarks

II. Support Costs Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Program Management & Engineering										
SETA	C/FFP	MEI		4,463	1/2Q	6,147	1/2Q	CONT.	10,610	TBD
SETA	C/FFP	PENTA		300	1Q	330	1Q	CONT.	630	TBD
SETA	C/FFP	SPARTA, Inc/ Arlington, VA		250	1Q	275	1Q	CONT.	525	TBD
Engineering & Technical Spt	MIPR	NSWC/DD/ Dahlgren, MD		400	1Q	1,000	1Q	CONT.	1,400	TBD
Engineering & Technical Spt	MIPR	NSWC/PHD		250	1Q	625	1Q	CONT.	875	TBD
Subtotal Support Costs			0	5,663		8,377		0	14040	

Remarks

III. Test and Evaluation Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Experimentation & Test										
Experimentation & Test-NFIRE	C/CPAF	Spectrum Astro		13,221	1/2Q	13,009	1/2Q	CONT.	26,230	TBD
Experimentation & Test - NFIRE	Various	PMS422/Raytheon		13,046	1/2Q	10,350	1/2Q	CONT.	23,396	TBD
Experimentation Test -NFIRE	Various	AFRL/SAIC		7,658	1/2Q	1,500	1/2Q	CONT.	9,158	TBD

MDA Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603886C Ballistic Missile Defense System Interceptors

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Experimentation Test -NFIRE	Various	SMC Det 12		6,400	1/2Q	35,116	1/2Q	CONT.	41,516	TBD
Experimentation & Test - NFIRE	MIPR	ComSec Gear		511	1Q	500	1Q	CONT.	1,011	TBD
Experimentation & Test - NFIRE	MIPR	Aerospace		200	1Q	200	1Q	CONT.	400	TBD
Experimentation & Test - NFIRE	Various	JNIC Mission Operations		2,500	1/2Q	6,740	1/2Q	CONT.	9,240	TBD
Experimentation & Test	MIPR	AEDC		420	2Q	55	1Q	CONT.	475	TBD
Experimentation & Test	Various	JCTE		50	1Q			CONT.	50	TBD
Experimentation & Test	Various	VAFB		10	2/3Q	30	1Q	CONT.	40	TBD
Subtotal Test and Evaluation			0	44,016		67,500		0	111516	

Remarks

IV. Management Services Cost ($ in Thousands)

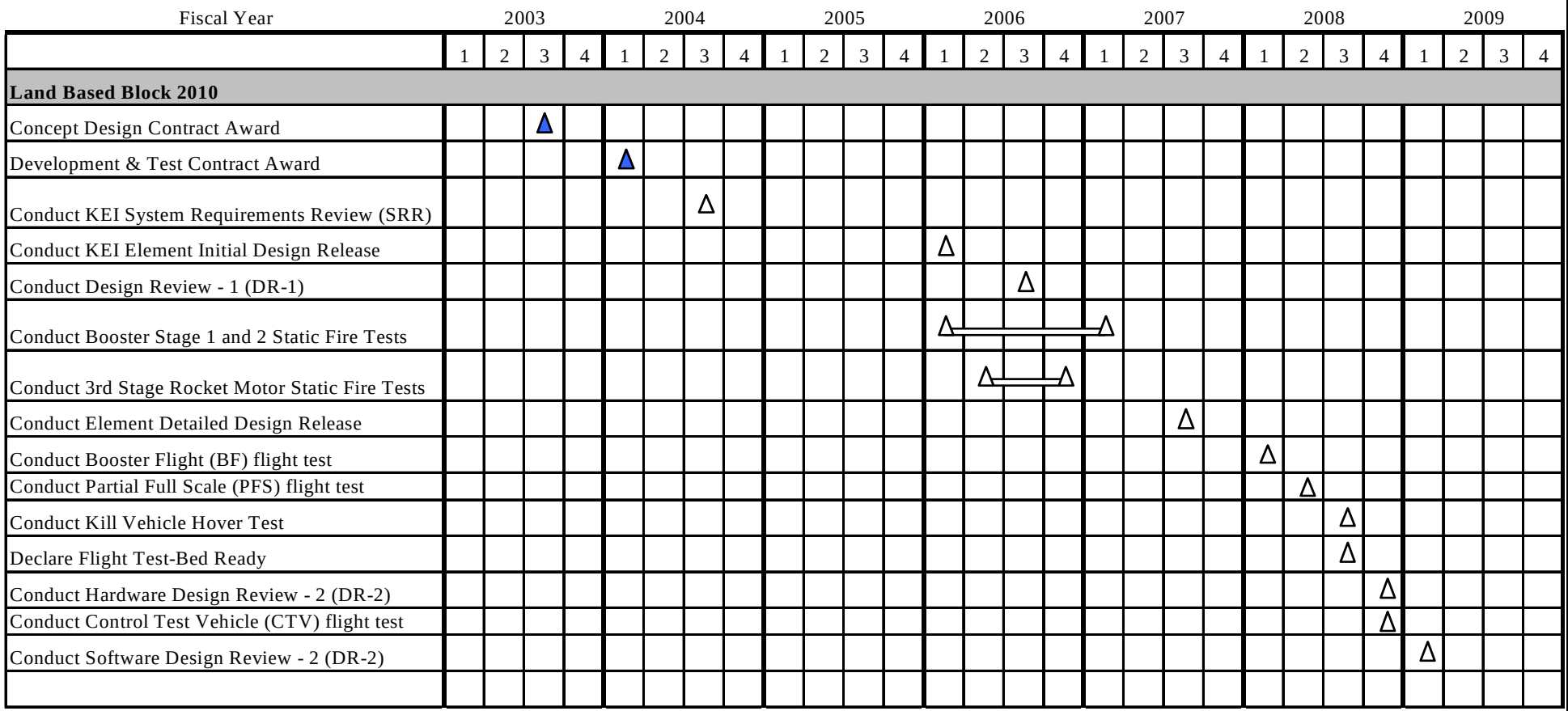
Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Experimentation & Test										
FFRDC/National Laboratory	MIPR	MIT/LL		500	1Q	500	1Q	CONT.	1,000	TBD
Subtotal Management Services			0	500		500		0	1000	

Remarks

Project Total Cost			0	112,209		451,383			563,592	

Remarks

MDA Exhibit R-4 Schedule Profile	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**



MDA Exhibit R-4 Schedule Profile	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

Fiscal Year	2003				2004				2005				2006				2007				2008				2009			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Land Based Block 2010																												
Conduct Element Characterization Flight (ECF) Test																										Δ		
Conduct Ship-Launched Risk Reduction Flight test																												Δ
Near Field Infrared Experiment																												
NFIRE Launch													Δ															
NFIRE Experiment													Δ	—	—	Δ												
Type 1&4 Missions - Targets of Opportunity													Δ	—	—	Δ												

MDA Exhibit R-4A Schedule Detail	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

Schedule Profile	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Land Based Block 2010							
Concept Design Contract Award	3Q						
Development & Test Contract Award		1Q					
Integrated Baseline Review (IBR) completed		2Q					
Conduct KEI System Requirements Review (SRR)		3Q					
Conduct Interceptor SRR		4Q					
Conduct C2BMC SRR		4Q					
Conduct Launcher SRR			1Q				
C2BMC Software Version 0 Delivered			2Q				
C2BMC Component Integration Laboratory (CIL) Est			2Q				
Launcher (CIL) Established			3Q				
Interim System Integration Laboratory (SIL) Est.			3Q				
Conduct Integrated Ground Test-1 (IGT-1)			4Q				
Conduct Launcher Initial Design Release			4Q				
Interceptor CIL Operational			4Q				
Conduct Interceptor Initial Design Release			4Q				
Conduct C2BMC Initial Design Release			4Q				
Conduct KEI Element Initial Design Release				1Q			
Conduct Integrated Ground Test-2 (IGT-2)				2Q			
Conduct Design Review - 1 (DR-1)				3Q			
Conduct Booster Stage 1 and 2 Static Fire Tests				1Q-4Q	1Q		
Conduct 3rd Stage Rocket Motor Static Fire Tests				2Q-4Q			
Conduct Integrated Ground Test - 3 (IGT-3)					1Q		
Conduct Element Detailed Design Release					3Q		
Conduct Booster Flight (BF) flight test						1Q	
Conduct Partial Full Scale (PFS) flight test						2Q	
Conduct Kill Vehicle Hover Test						3Q	
Declare Flight Test-Bed Ready						3Q	
Conduct Hardware Design Review - 2 (DR-2)						4Q	
Conduct Control Test Vehicle (CTV) flight test						4Q	
Conduct Software Design Review - 2 (DR-2)							1Q

MDA Exhibit R-4A Schedule Detail	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

Schedule Profile	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Conduct Element Characterization Flight (ECF) Test							2Q
Conduct Integrated Ground Test - 5 (IGT-5)							3Q
Conduct Ship-Launched Risk Reduction Flight test							4Q
Near Field Infrared Experiment							
Complete Space Vehicle (SV) Bus Integration		3Q					
Deliver Multi-Spectral Sensor Payload		4Q					
Complete Kill Vehicle CIL facility upgrade			2Q				
Complete Space Vehicle Environmental Test			2Q				
Complete SV Integration and Acceptance Testing			2Q				
Certify Ground Segment Launch Site Readiness			3Q				
Complete KV Boost Phase engagement software			3Q				
Complete ground test of flight software			4Q				
Complete and deliver KV Payload			4Q				
Complete Ground Segment Mission Operations Center			4Q				
Complete delivery of Launch Vehicle components			4Q				
Deliver 2 Multi-Stage Boost Target			4Q				
Complete Launch Vehicle Integration				1Q			
NFIRE Launch				1Q			
NFIRE On-orbit Operational Checks				1Q			
NFIRE Experiment				1Q-4Q			
Type 1&4 Missions - Targets of Opportunity				1Q-4Q			
Complete Multi-Stage Boost Target 1 Integration				1Q			
Type 2 Mission - Flyby				1Q			
Complete Multi-Stage Boost Target 2 Integration				2Q			
Type 3 Mission - Deploy KV During Target Flyby				2Q			

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

COST ($ in Thousands)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
R113 Ballistic Missile Defense Interceptor Block 2012	0	0	47,475	130,856	421,608	946,953	1,739,069
RDT&E Articles Qty	0	0	0	0	0	1	11

A. Mission Description and Budget Item Justification

Land and Sea Basing:

The Agency's goal for Block 12 leverages the Block 10 capability, improving the effectiveness against all phases and all ranges of the enemy's offense. In Block 12, we complete the transition from land to sea, inaugurating this capability from a Navy vessel, likely a surface combatant or a submarine. We also begin testing the system's inherent midcourse capability during Block 12, expanding the range and flexibility of the new BMDS interceptor.

Operating in international waters obviates basing restrictions that reduce the effectiveness of the land mobile interceptor element in some scenarios. Our plan leverages the completely common canisterized interceptor system built in Block 10, developing and testing those interfaces necessary for launch from a naval platform. During Block 10 containership testing, we mitigate many of the issues for transition to naval platforms.

The platform options for our Block 12 sea based capability are 1) baseline 2-4 Aegis Cruiser, 2) SSBN submarine and 3) a SSGN submarine. The Agency will work closely with the Navy and USSTRATCOM in FY 2004 to define an acquisition strategy and platform for operational integration of the interceptor. Northrop Grumman will complete a series of sea based, boost/ascent intercept flight tests in Block 2012 to demonstrate this integrated sea based capability. We will modify our contract to begin activities for integration of the interceptor into the Navy-approved platform.

International cooperation in the boost/ascent kinetic energy interceptor program is an important part of MDA's overall strategy on international cooperation and is in accordance with Presidential direction. Our objective is to encourage participation of friends and allies in the development of alternate boost/ascent phase system components such as booster, kill vehicle, or command and control battle management and communication (C2BMC) system. This approach reduces risk, produces competitive pressure, provides added options for component evolution, and importantly, fosters collaboration with our friends and allies. In FY 2005 we intend to award a contract to start an international industry development program that will produce viable alternate system components for potential insertion into Block 12 and succeeding Blocks. These alternate components will have boost/ascent and mid-course capability and will be compatible with land, sea and space environments.

We will release a Request for Information (RFI) in FY 2004. The RFI will go to both US and international contractors with the explanation that we plan to use the results from the RFI to craft an acquisition strategy involving significant industrial participation from our friends and allies. We intend that the participation include substantial development responsibilities, but not either standalone technology maturation or prototype demonstration activities. Our expectation is that the development will involve international participation and funding.

During the Block 2012 timeframe, we will continue boost/ascent testing over the full range of adversary threat space while adding intercept flight tests in the midcourse and exoatmospheric terminal phase. In support of Block 14, the contractor will modify the boost/ascent C2BMC component to incorporate additional BMDS sensor interfaces, new midcourse discrimination algorithms and an extended range in-flight communications data link. The contractor will also develop and test kill vehicle upgrades yielding enhanced BMDS exoatmospheric discrimination and/or the ability to intercept in the terminal phase high in the earth's atmosphere. Missile Defense National Team (MDNT) studies will guide the payload upgrade priorities.

Space Basing:

The KEI Block 12 strategy includes the development of a space based interceptor test bed. The Defense Science Board (DSB) has examined past space-based interceptor efforts including the Brilliant Pebbles and Space Based Interceptor programs and identified a number of technical challenges remaining unresolved. Some of the areas include: BMDS integration, battle management, kill vehicle miniaturization to reduce weight, constellation management and control, and affordability.

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603886C Ballistic Missile Defense System Interceptors

The terrestrial development and test program along with the Near Field Infrared Experiment will lay the groundwork for the space based effort. These efforts along with other MDA programs, including the miniature kill vehicle program, will also address some of the technical challenges identified by the DSB. Other challenges, including BMDS integration, battle management, and constellation management and control, are amenable to simulation. In FY 2004 we will initiate an analytical effort with the MDNT to identify the benefits of incorporating space based interceptors into a layered ballistic missile defense system. The MDNT will continue this effort by outlining an operational concept, forming a framework for future war-games at the Joint National Integration Center.

Beginning in FY05 and continuing through FY 2009, the space based program will begin a ground based risk reduction effort. We will initiate development of miniaturized, lightweight interceptor components, with the initial emphasis on developing a liquid axial stage. The program will also focus on the miniaturization and weight reduction of KVs and lifejackets. Building on the MDNT efforts in FY 2004, the program will initiate a modeling and simulation effort to address the risks associated with BMDS integration, battle management and constellation management and control. The program will continually update these simulation and modeling tools throughout the life of the program.

Based on the results of these ground based risk reduction efforts, the Director, Missile Defense Agency, will make a decision in 2008 to transition to development of satellites to conduct on orbit experiments. In 2012, the space based test bed will have on orbit a thin constellation of 3 to 6 spacecraft to test the functionality of a space based BMDS.

B. Accomplishments/Planned Program

	FY 2003	FY 2004	FY 2005
Land Based			26,375
RDT&E Articles (Quantity)			

FY 2005 Planned Program:
- Finalize International Cooperation Plans for Boost/Ascent Program
- Finalize International Cooperation Agreements
- Issue RFP and award contract(s) for Boost/Ascent component projects
- Initiate Design of Alternate Component

	FY 2003	FY 2004	FY 2005
Sea Based			10,550
RDT&E Articles (Quantity)			

FY 2005 Planned Program:
- Finalize concept of operations for Navy platforms
- Complete platform coordination with Navy and begin defining platform allocation strategy
- Initiate sea-based launcher design and ship integration plan
- Initiate hypergolic fuel risk mitigation project
- Cooperatively fund the development of a flexible solid divert and attitude control system

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

	FY 2003	FY 2004	FY 2005
Space Based			10,550
RDT&E Articles (Quantity)			

FY 2005 Planned Program:
- Concept analysis and wargaming
- Initiate technology development and testing of advanced, lightweight space-based interceptor components.
  -- Lightweight, high performance kill vehicle.
  -- High mass fraction, space-qualified liquid and solid axial stages

C. Other Program Funding Summary

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0603175C Ballistic Missile Defense Technology	151,217	225,268	204,320	199,468	246,291	286,286	305,365	Continuing	Continuing
PE 0603869C Meads Concepts - Dem/Val	101,754	0	0	0	0	0	0	Continuing	Continuing
PE 0603879C Advanced Concepts, Evaluations and Systems	0	149,993	256,159	229,512	232,463	231,583	224,626	Continuing	Continuing
PE 0603880C Ballistic Missile Defense System Segment	1,028,016	0	0	0	0	0	0	Continuing	Continuing
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	134,093	874,527	937,748	993,048	1,117,657	570,000	410,324	Continuing	Continuing
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	3,056,035	3,744,066	4,404,335	3,067,800	3,087,147	1,881,298	1,802,257	Continuing	Continuing
PE 0603883C Ballistic Missile Defense Boost Defense Segment	705,643	617,270	492,614	555,667	611,736	473,602	455,961	Continuing	Continuing
PE 0603884C Ballistic Missile Defense Sensors	327,013	425,421	591,957	790,265	1,453,679	1,122,189	1,232,893	Continuing	Continuing
PE 0603888C Ballistic Missile Defense Test and Targets	0	635,782	716,427	673,476	656,152	654,015	688,119	Continuing	Continuing
PE 0603889C Ballistic Missile Defense Products	0	305,309	418,608	421,049	445,971	456,339	469,621	Continuing	Continuing
PE 0603890C Ballistic Missile Defense System Core	0	445,356	479,764	492,988	527,541	539,210	568,365	Continuing	Continuing

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0604861C Theater High-Altitude Area Defense System - TMD - EMD	887,616	0	0	0	0	0	0	Continuing	Continuing
PE 0604865C Patriot PAC-3 Theater Missile Defense Acquisition - EMD	138,922	0	0	0	0	0	0	Continuing	Continuing
PE 0605502C Small Business Innovative Research - MDA	138,791	0	0	0	0	0	0	Continuing	Continuing
PE 0901585C Pentagon Reservation	7,432	14,327	13,884	12,958	12,850	13,158	13,476	Continuing	Continuing
PE 0901598C Management Headquarters - MDA	35,331	92,449	141,923	146,099	145,112	151,727	154,583	Continuing	Continuing

D. Acquisition Strategy

The contractor for the Block 10, land-based interceptor will evolve the element to a sea-based capability in Block 12. Because the land-based system's design fully contemplates sea-basing, the bulk of the development activity will be to mechanically, electrically and logically integrate the canisterized interceptor into the sea platform. Depending upon technology readiness, sea-based integration may also include the substituting of a solid or non-hazardous liquid divert and attitude control section in the kill vehicle. Also as a part of Block 12 the contractor will begin testing the capability of the system to intercept missiles in the mid course phase of flight as well as missiles in the exoatmospheric terminal flight phases. Block 12 will also include development of alternate boost/ascent phase system components such as booster, kill vehicle or C2BMC system involving substantial international participation. This approach reduces risk, produces competitive pressure, provides added options for component evolution, and importantly, fosters collaboration with our friends and allies. We will develop this alternate component source as an international partnership in accordance with the President's policy to foster international cooperation in the developing of the BMDS.

For Block 12, our KEI acquisition strategy includes the development of a space-based interceptor test bed. The Defense Science Board (DSB) has examined past space-based interceptor efforts including the Brilliant Pebbles and Space Based Interceptor programs and identified a number of technical challenges remaining unresolved. Therefore, we are taking a slow and deliberate approach to better understand and resolve some of these challenges.

In FY 2004 we will initiate an analytical effort with the MDNT to identify the benefits of incorporating space-based interceptors into a layered ballistic missile defense system. The MDNT will continue this effort by outlining a concept of operations (CONOPS), forming a framework for future war-games at the Joint National Integration Center. We will also build on the foundation laid by the land based Block 2010 program along with NFIRE.

Beginning in FY 2005 and continuing through FY 2009, the space program will begin a ground based risk reduction effort. We will initiate development of miniaturized, lightweight interceptor components, with the initial emphasis on developing a liquid axial stage.

Based on the results of these risk reduction efforts, the Director, Missile Defense Agency, will make a decision in 2008 to begin the transition to develop satellites to conduct on orbit experiments. These experiments will exercise the functionality of a space-based BMDS. By 2012, the space-based test bed will have a thin constellation of 3 to 6 spacecraft on orbit.

MDA Exhibit R-3 RDT&E Project Cost Analysis	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603886C Ballistic Missile Defense System Interceptors

I. Product Development Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Land Based										
International Cooperation	C/Various	TBD				26,375	2Q	CONT.	26,375	TBD
Sea Based										
Sea Development & Test Contract	C/Various	TBD				10,550	1/4Q	CONT.	10,550	TBD
Space Based										
Concept Design	C/Various	TBD				10,550	2Q	CONT.	10,550	TBD
Subtotal Product Development			0	0		47,475		0	47475	

Remarks

II. Support Costs Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Subtotal Support Costs										

Remarks

III. Test and Evaluation Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Subtotal Test and Evaluation										

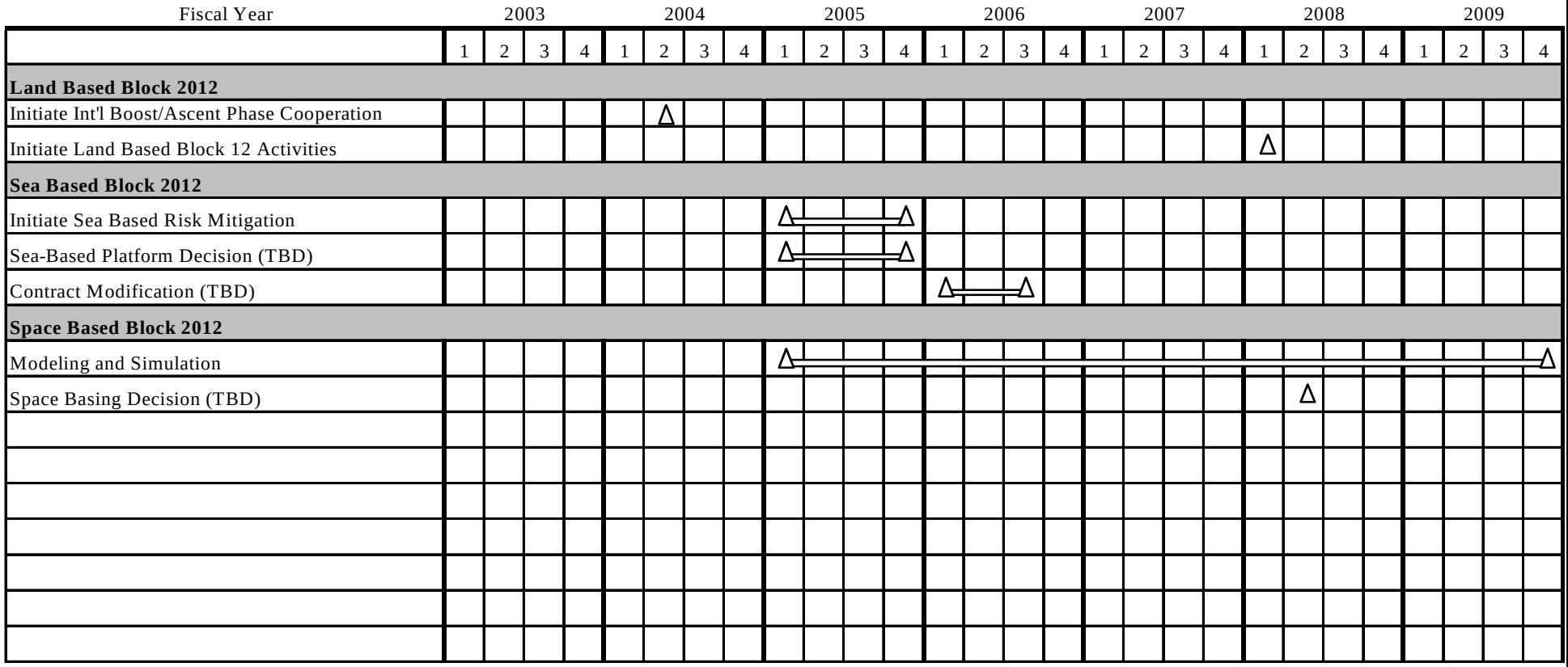
Remarks

IV. Management Services Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Subtotal Management Services										
Remarks										
Project Total Cost			0	0		47,475			47,475	

Remarks

MDA Exhibit R-4 Schedule Profile	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603886C Ballistic Missile Defense System Interceptors



MDA Exhibit R-4A Schedule Detail	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

Schedule Profile	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Land Based Block 2012							
Initiate Int'l Boost/Ascent Phase Cooperation		2Q					
Initiate Land Based Block 12 Activities						1Q	
Sea Based Block 2012							
Initiate Sea Based Risk Mitigation			1Q-4Q				
Sea-Based Platform Decision (TBD)			1Q-4Q				
Contract Modification (TBD)				1Q-3Q			
Space Based Block 2012							
Develop Liquid Axial Stage (TBD)			1Q-4Q	1Q-4Q	1Q-2Q		
Development of First Space Based Experiment (TBD)						1Q-4Q	1Q-4Q
Initiate KV and Lifejacket Weight Reduction (TBD)			3Q-4Q	1Q-4Q	1Q-2Q		
Modeling and Simulation			1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Space Basing Decision (TBD)						2Q	

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

COST ($ in Thousands)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
0602 Program-Wide Support	0	5,510	12,404	16,437	20,740	34,514	40,018
RDT&E Articles Qty	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

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 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. The requirements 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 fluctuations 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 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 PE's while maintaining an orderly fiscal structure for executing the individual Program-Wide Support efforts.

B. Accomplishments/Planned Program

	FY 2003	FY 2004	FY 2005
Civilian Salaries and Support	0	5,510	12,404
RDT&E Articles (Quantity)			

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

Management Support:
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, SETA support, and various management/overhead costs.

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603886C Ballistic Missile Defense System Interceptors**

Fiscal Requirements:
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.

IM/IT Operations:
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

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0901598C Management Headquarters - MDA	35,331	92,449	141,923	146,099	145,112	151,727	154,583	Continuing	Continuing
PE 0603175C Ballistic Missile Defense Technology	151,217	225,268	204,320	199,468	246,291	286,286	305,365	Continuing	Continuing
PE 0603869C Meads Concepts - Dem/Val	101,754	0	0	0	0	0	0	Continuing	Continuing
PE 0603879C Advanced Concepts, Evaluations and Systems	0	149,993	256,159	229,512	232,463	231,583	224,626	Continuing	Continuing
PE 0603880C Ballistic Missile Defense System Segment	1,028,016	0	0	0	0	0	0	Continuing	Continuing
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	134,093	874,527	937,748	993,048	1,117,657	570,000	410,324	Continuing	Continuing
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	3,056,035	3,744,066	4,404,335	3,067,800	3,087,147	1,881,298	1,802,257	Continuing	Continuing
PE 0603883C Ballistic Missile Defense Boost Defense Segment	705,643	617,270	492,614	555,667	611,736	473,602	455,961	Continuing	Continuing
PE 0603884C Ballistic Missile Defense Sensors	327,013	425,421	591,957	790,265	1,453,679	1,122,189	1,232,893	Continuing	Continuing
PE 0603888C Ballistic Missile Defense Test and Targets	0	635,782	716,427	673,476	656,152	654,015	688,119	Continuing	Continuing
PE 0603889C Ballistic Missile Defense Products	0	305,309	418,608	421,049	445,971	456,339	469,621	Continuing	Continuing
PE 0603890C Ballistic Missile Defense System Core	0	445,356	479,764	492,988	527,541	539,210	568,365	Continuing	Continuing

MDA Exhibit R-2A RDT&E Project Justification	Date: February 2004
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	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0604861C Theater High-Altitude Area Defense System - TMD - EMD	887,616	0	0	0	0	0	0	Continuing	Continuing
PE 0604865C Patriot PAC-3 Theater Missile Defense Acquisition - EMD	138,922	0	0	0	0	0	0	Continuing	Continuing
PE 0605502C Small Business Innovative Research - MDA	138,791	0	0	0	0	0	0	Continuing	Continuing
PE 0901585C Pentagon Reservation	7,432	14,327	13,884	12,958	12,850	13,158	13,476	Continuing	Continuing