Department of Defense
Fiscal Year (FY) 2011 President's Budget

February 2010

Missile Defense Agency

Justification Book Volume 2c

Research, Development, Test & Evaluation, Defense-Wide - 0400

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Introduction & Explanation of Contents

The Department of Defense FY2011 President's Budget RDT&E, Defense-wide Volume 2, Missile Defense Agency (MDA) justification materials consists of three books titled, Volume 2a, 2b, and 2c. Apart from the Table of Contents and list of Acronyms provided in each book, justification documents are provided in the book listed below.

Volume 2a

- R-1 Comptroller Exhibit
- RDTE&E Exhibits in BA-03 (PEs: 0603175C, 0603901C)
- RDTE&E Exhibits in BA-04 (PEs: 0603881C, 0603882C, 0603883C, 0603884C, 0603886C, 0603888C, 0603890C)

Volume 2b

- R-1 Comptroller Exhibit
- RDT&E Exhibits in BA-04 continued (PEs: 06033892C, 0603893C, 0603894C, 0603895C, 0603896C, 0603897C, 0603898C, 0603904C, 0603907C, 0603908C, 063909C, 0603911C, 0603912C, 0603913C, 0604880C, 0604881C, 0604883C, 0604484C)
- RDT&E Exhibits in BA-06 (PEs: 0605502C, 0901585C, 0901598C)

Volume 2c

- MDA Appropriation Summary
- MDA FY 2011 Budget Estimate Overview
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Missile Defense Agency
Fiscal Year (FY) 2011 Budget Estimates

ACRONYMS AND ABBREVIATIONS

A	
A&AS	Advisory and Assistance Services
AADC	Area Air Defense Commander
AIRU	Advanced Inertial Reference Unit
AAMDC	Army Air Missile Defense Command
ABIR	Airborne Infrared Radar
ABL	Airborne Laser
ABS	American Bureau of Shipping
ACCS	Air Command and Control System
ACS	Attitude Control System, Auxillary Communication Shelter
ACD	Adversary Capability Document
ACD&P	Component Development and Prototypes
ACL	Achievable Capabilities List
ADAC	Applied Data Analysis Center
ADP	Arrow Deployability Program; Automated Data Processing; Adversary Delta Package
AEP	Analysis Execution Plans
AFB	Air Force Base
AFC2ISRC	Air Force Command and Control Intelligence Surveillance Reconnaissance Center
AFS	Avionics Flight Software
AFSCN	Air Force Satellite Control Network
AIRS	Airborne Infrared Surveillance
AIS	Automated Information System
AKV	Agile Kill Vehicle
ALTBMD	Active Layered Theater Ballistic Missile Defense
ALHTK	Air Launch Hit to Kill
AMOR	Army Missile Optical Range, Redstone Arsenal, AL
AMPP	Arrow Missile Production Program
AN/TPY	Army Navy/Trasportable Radar Surveillance
AoA	Analysis of Alternatives
AOC	Air Operations Center
AOP	Airborne Optics Platform; Advanced Optical Processor
AOR	Area of Responsibility
APL	Applied Physics Laboratory
ARAV	Aegis Readiness Assessment Vehicles
ARO	All Reflective Optics
ARS	Active Ranging System
ASIP	Arrow System Improvement Program; Application Specific Integrated Circuit
ASP	Advanced Signal Processor
AST	Airborne Surveillance Test Bed; Arrow System Test
ATH	Above the Horizon
ATIC	Advanced Technology Innovation Cell
ATILL	Advanced Tracking Illuminator Laser
AT&L	Acquisition, Technology and Logistics
ATO	Authority To Operate
ATT	Algorithm-to-Test Reviews
AVIT	Air Vehicle Integration and Test
AWS	Arrow Weapon System; AEGIS Weapon System

ACRONYMS AND ABBREVIATIONS

B	
BAA	Broad Agency Announcement
BCA	Business Case Analysis; BMDS Capability Assessment
BCER	BMDS Combined Element Reviews
BC/FC	Beam Control/Fire Control
BCSC-T	BMDS Communication System Complex Transportable
BITC	Battle Management Integration Center
BLOS	Beyond Line-of-Sight
BM	Battle Management; Ballistic Missile
BM/C3	Battle Management, Command, Control, and Communications
BM/C4I	Battle Management, Command, Control, Communications, Computers, and Intelligence
BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
BMDSM	BMD System Manager
BNOSC	BMDS Network Operations and Security Center
BOA	BMDS Overhead Non-imaging Infrared (ONIR) Architecture
BOIP	Basis of Issue Plan
BPRRA	Baseline Production Readiness Risk Assessments
BQT	Block Qualification Testing
BRAC	Base Realignment and Closure
BSC	Battery Support Center
BSO	BMDS Safety Officers
BSOC	BMDS System Operability Check
BSP	BMD Signal Processor
BTH	Below the Horizon
BTEC	BMDS Training and Education Center
BVT	Booster Verification Test
BWO	BMDS Watch Officers
C	
C2BMC	Command and Control, Battle Management, and Communications
CAIG	Cost Analysis Improvement Group
CAPS	Commanders Analysis and Planning System
CaT	Characterization and Transition Reviews
CCC	C2BMC Control Center
CCAR	Comprehensive Cost and Requirement System
CCM	Counter Counter-Measures
CCMWG	Common Cost Methodology Working Group
CCWG	Corporate Clutter Working Group
CD	Concept Descriptions; Cobra Dane
CDA	Core Depot Assessment; Coherent Distribution Aperture
CDR	Critical Design Review
CDU	Cobra Dane Upgrade
CE	Capability Enhanced
CEM	Carrier Electronics Module
CI	Counterintelligence
CIFC	Cyber Intelligence Fusion Cell
CLE	Command and Launch Equipment
CLS	Contractor Logistics Support
CMART	Consolidated Missile Asset Reused for Targets
CMOC	Cheyenne Mountain Operations Center

ACRONYMS AND ABBREVIATIONS

CNE	Communications Node Equipment
CNIP	C2BMC Network Interface Processor
COCOM	Combatant Commander
COCOM C2	Combatant Command-Command and Control
COIL	Chemical Oxygen-Iodine Laser
COLD	Center for Optical Logic Devices
CONOPS	Concept of Operations
CONUS	Continental United States
COOP	Calibrated Orbiting Objects Program (COOP)
COTS	Commercial Off-The-Shelf
CPAF	Cost Plus Award Fee
CPI	Continuing Process Improvement
CPIF	Cost-Plus-Incentive-Fee
CR	Capability Release
CRA	Continuing Resolution Authority
CSS	Contracor Support Services
CTEIP	Central Test and Evaluation Investment Program
CTF	Controlled Test Flight; Combined Test Force
CTTO	Concurrent Test, Training and Operations
CTV	Control Test Vehicle
CY	Calendar Year
D	
DACS	Divert and Attitude Control System
DA	Distributed Aperture
DAA	Defense Appropriations Act
DACS	Divert and Attitude Control System
DAD	Discrimination Augmentation Devices
DAG	Director's Action Group
DARPA	Defense Advanced Research Projects Agency
DCMA	Defense Contract Management Agency
DDG	Guided Missile Destroyer
DFAS	Defense Finance and Accounting Service
DFE	Discrimination Fusion Engine
DGSE	Deployable Ground Support Equipment
DGT	Distributed Ground Test
DIACAP	DoD Information Assurance Certification and Accreditation Process
DiD	Defense-in-Depth
DIICOE	Defense Information Infrastructure Common Operating Environment
DISA	Defense Information Systems Agency
DISN	Defense Information Systems Network
DMETS	Distributed, Multi-Echelon Training System
DMTP	Development Master Test Plan
DoD	Department of Defense
DOORS	Dynamic Object Oriented Requirement Systems
DOT&E	Director, Operational Test and Evaluation
DOTMLPF	Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities
DREN	Defense Research Engineering Network
DROIC	Demonstrated Digital Readout Integrated Circuits
DRSN	Defense Red Switch Network
DSE	Distributed Sensing Experiment
DSWS	David's Sling Weapon System

ACRONYMS AND ABBREVIATIONS

DT/OT	Development Test/Operational Test
DTRMC	Defense Test Resource Management Center
DVT	Development Verification Test
E	
E-LRALT	Enhanced Long Range Air Launch Target
E&M	Evaluation and Maturation
EA	Executing Agent
EADSIM	Extended Air Defense Simulation
EAP	Emergence Activation Plan
EBCCD	Electron Bombarded Charge Couple Device
ECI	European Communications Interface
ECCA	Element/Component Characterization for Analysis
ECS	Element Capability Specification
EDM	Engineering Development Model
EE	Engineering Evaluation
EEI	Essential Elements of Information
EHF	Extremally High Frequency
EICO	Element Integration and Checkout
EIS	European Interceptor Site
EKV	Exoatmospheric Kill Vehicle
ELDT	Early Launch Detection and Tracking
ELO	Epitaxial Layer Overgrowth
EMDR	Executive Mission Data Review
EMR	European Midcourse Radar
EMRL	Engineering and Manufacturing Readiness Level
EO	Electro-optical
EO/IR	Electro-Optical/Infrared
EoR	Engage on Remote
EQLB	Executive Quick Look Briefing
ESG	Engagement Sequence Group
ESI	External System Interface; Enterprise Software Initiative
ESL	External Sensors Lab
ETE	Element Test and Evaluation
ET	Embedded Test
EUCOM	European Command
EW SPT	Early Warning Special Product Team
EWR	Early Warning Radar
EWS	Enterprise Work Stations
F	
FAC	First Alert and Cueing
FATC	Feature Aided Track Correlation
FBS	Forward Based Sensor
FBX-T	Forward Based Radar - Transportable
FDE	Force Developers Evaluation
FFP	Firm Fixed Price
FFRDC	Federally Funded Research and Development Center
FIS	Facility Installation Standards
FISMA	Federal Information Security Management Act
FISS	Foreign Intelligence and Security Services

ACRONYMS AND ABBREVIATIONS

FPA	Focal Plane Array
FMA	Foreign Material Acquisition; Foreign Military Asset
FMS	Foreign Military Sales
FPI	Fixed Price Incentive
FS&E	Facilities, Siting & Environment
FT	Flight Test
FTF	Flexibility Target Family
FTG	Flight Test GMD
FTM	Flight Test Mission
FTR	Flight Test Round
FTSBT	Far-Term Sea Based Terminal
FY	Fiscal Year
FUF	Fire Unit Fielding
FYDP	Future Years Defense Program
G	
GAO	Government Accountability Office
GBI	Ground Based Interceptor
GBR-P	Ground Based Radar Prototype
GCC	Geographic Combatant Commanders
GCCS-J	Global Command and Control System - Joint
GCN	Global Command Network; GMD Communications Network
GEM	Global Engagement Manager; Guidance Enhancement Missiles (PATRIOT)
GFC / C	GMD Fire Control and Communications
GFE	Government Furnished Equipment
GGT	Government Ground Test
GIFC	Global Integrated Fire Cotnrol
GM	Ground-based Midcourse
GMD	Ground-based Midcourse Defense
GMAP	Government MDA Assurance Provisions
GNCC	Global Network Operations Center
GN&C	Guidance Navigation and Control
GS	Ground Systems
GTD	Ground Test Distributed
GTI	Ground Test Integrated
GTV	Guidance Test Vehicle
H	
HAA	High Altitude Airship
HACNE	High Availability Comm Node Equipment
HAENS	High Altitude Exoatmospheric Nuclear Survivability
HALO	High Altitude Observatory
HARD	Hardening
HBCN	High Mobility Multipurpose Wheeled Vehicle (HMMWV) Based Communication Node
HBCU/MI	Historically Black Colleges and Universities/Minority Institutions
HC	Hazardous Classification
HEL	High Energy Laser
HEMP	High Altitude Electromagnetic Pulse
HIL	Human-in-the-Loop; Hardware-in-the-Loop
HITL	Hardware-in-the-Loop
HMI	Human-Machine Interface

ACRONYMS AND ABBREVIATIONS

HPSI	High Power System Integration
HF	High Frequency
HTI	Hyper temporal Infrared Sensor
HTK	Hit to Kill
HWIL	Hardware-in-the-Loop
HMMWV	High Mobility Multipurpose Wheeled Vehicle
I	
IA	Information Assurance
IADP	Integrated Analysis Data Package
IAI	Israel Aircraft Industries
IAM	Information Assurance Manager
IAMD	Integrated Air and Missile Defense
IAR	Integrated Assessment Review
IAT	Independent Assessment Teams
IBMP	Integrated Ballistic Missile Picture
IBR	Initial Baseline Review
ICAs	Industrial Capability Assessments
ICAR	Interim Capability Assessment Report
ICBM	Intercontinental Ballistic Missile
ICD	Interface Control Document
ICOFT	Institutional Conduct of Fire Trainer
ICSS	Interim Contractor Support System
IDAP	Integrated Data Analysis Plans
IDD	Interface Design Documentation
IDF	Israel's Defense Forces
ID/IQ	Indefinite Delivery/Indefinite Quantity
IDO	Initial Defensive Operations
IDMP	Integrated Data Management Plans
IDT	In-Flight Interceptor Communications System Data Terminal
IET	Integration Event Matrix
IETM	Integrated Electronic Technical Manual
IFT	Integrated Flight Test
IFICS	In-Flight Interceptor Communications System
IGT	Integrated Ground Test
IM	Insensitive Munitions
IM/FHC	Insensitive Munitions / Final Hazard Classification
IM/IT	Information Management/Information Technology
IMDO	Israeli Missile Defense Organization
IMoD	Israeli Ministry of Defense
IMP	Integrated Master Plan
iPOP	International Point of Presence
IMTP	Integrated Master Test Plan
IMU	Inertial Measurement Unit
IP	Integration Phase
IPT	Integrated Product Team
IR	Infrared
IRAD	Institution Research and Application Development
IRBM	Intermediate Range Ballistic Missile
IRFNA	Inhibited Red Fuming Nitric Acid
IRST	Infrared Search and Track
IRT	Independent Review Team

ACRONYMS AND ABBREVIATIONS

ISA&I	Israeli System Architecture and Integration
ISC	Intelligence Support Cell (MDA)
ISCD	Integrated System Configuration Database
ISG	Integration Synchronization Group
ISPAN	Integrated Strategic Planning and Analysis Network
ISSE	Information System Security Engineering
ISTC	Integrated System Test Capability
IRREL	Infrared Radiation Effects Laboratory
ISTS	Integrated Simulation and Tactical Software
IT	Integrated Test; Information Technology
ITB	Israeli Test Bed
ITOP	International Test Operation Procedures
ITP	Interceptor Technology Program
ITW/AA	Initial Threat Warning/Attack Assessment
J	
JADE	Joint Analysis Data Engine
JAT	Joint Analysis Teams
JABMD	Japan BMD
JCIDS	Joint Capabilities Integration and Development System
JCTV	Joint Control Test Vehicle
JCB	Joint Capability Board
JDA	Japan Defense Agency
JDAC	Joint Data Analysis Center
JIAMD	Joint Integrated Air and Missile Defense
JEDA	Joint Engine for Defense Analysis
JEWL	Joint Early Warning Laboratory
JFCC-IMD	Joint Functional Component Command - Integrated Missile Defense
JHU	John Hopkins University
JILSMT	Joint ILS Management Team
JNIC	Joint National Integration Center, Schriever AFB, CO
JRD	Joint National Integration Center Research and Development
JRE	Joint Range Extension
JROC	Joint Requirements Oversight Council
JTAG	Joint Test Action Group
JTAMDO	Joint Theater Air and Missile Defense Organization
JTF-GNO	Joint Task Force-Global Network Operations
JTIDS	Joint Tactical Information Data System
JTOC	JNIC Target Operations Center
JWICS	Joint Worldwide Intelligence Communications System
JWSP	Joint Warfighter Support Program
K	
KE	Kinetic Energy
KEI	Kinetic Energy Interceptor
KKV	Kinetic Kill Vehicle
KLC	Kodiak Launch Complex
KMR	Kwajalein Missile Range
KMRSS	Kwajalein Mobile Range Safety System
KPP	Knowledge Point
KTF	Kauai Test Facility

ACRONYMS AND ABBREVIATIONS

KM	Kilometers
KV	Kill Vehicle
L	
LADAR	Laser Detection and Ranging; Laser Radar
LAN	Local Area Network
LCT	Laser Communications Terminal
LDACS	Liquid Divert and Attitude Control System
LDC	Limited Defensive Capabiltiy
LEO	Low Earth Orbit
LORA	Level of Repair Analysis
LOT	Launch on TADIL
LFT&E	Live Fire Test and Evaluation
LMSSC	Lockheed Martin Space Systems Company
LPSI	Low Pressure Safety Injection
LRALT	Long Range Air Launched Target
LRBM	Long Range Ballistic Missile
LRS&T	Long Range Surveillance and Tracking
LSE	Launch Support Equipment
LTP	Laser Technology Program
LTPO	Lower Tier Program Office
LUT	Limited User Testing
LWIR	Long Wave Infrared
M	
M&S	Modeling and Simulation; Materials and Structure
MAP	MDA Assurance Plan
MARC	MDA Assurance Representative
MARTI	Missile Alternative Range Target Instrument
MASINT	Measures and Signals Intelligence
MCS	Management Control System
MCCF	Mission Control Center Facility
MD	Missile Defense
MDA	Missile Defense Agency
MDDC	Missile Defense Data Center
MDE	Missile Defense Element
MDEB	Missile Defense Executive Board
MDIOC	Missile Defense Integrated Operations Center
MDR	Mission Data Review
MDSE	Missile Defense System Exerciser
MDSEC	Missile Defence Space Experimentation Center
MEB	Missile Equipment Building; Mechanical Electrical Building
MEIT	Multi-Element Integration Testing
MER	Manpower Estimate Report
MET	Modernization Enterprise Terminal
M-FASP	Midcourse Fly Along Sensor Package
MHC/BLEA-GV	Multi-hypothesis correlation/BMDS Launch Event Association-Global Vision
MILCON	Military Construction
MILSATCOM	Military Satellite Communiattions
MIL-STD	Military Standards
MIMO	Multiple-Input Multiple-Output

ACRONYMS AND ABBREVIATIONS

MIP	Master Integration Plan
MIPS	Missile Defense Planning System
MIPR	Military Interdepartmental Purchase Request
MIS	MDSEC Interchange System
MIT	Miniature Interceptor Technology; Massachusetts Institute of Technology
MIT/LL	Massachusetts Institute of Technology, Lincoln Laboratory, Lexington, MA
MKV	Multiple Kill Vehicle
MLP	Mobile Launch Platform
MMIC	Multi-Mission Integration Cell; Microwave Monolithic Integrated Circuits
MOA	Memorandum of Agreement
MOC	Missile Defense Agency Operations Center
MOST	Multiple Target Tracking Optical Sensor Array Technology
MOU	Memorandum of Understanding
MPAT	Producibility and Manufacturing Technology
MR	Modificaiton Request
MRBM	Medium Range Ballistic Missile
MRL	Multiple Rocket Launcher; Mission Requirements Letter
MRP	Missile Round Pallet
MRSS	Mobile Range Safety System
MRT	Medium Range Target
MRTF	Missions Readiness Task Force
MSCI	Missile Space Intelligence Center
MSK	Mechanical Steering Kit
MSTAR	Missile Defense Science, Technology & Research
MTEPP	Master Test and Evaluation Program Plan
MTSC	Micro Satelite Target System
MUA	Military Utility Assessment
N	
NASIC	National Air and Space Intelligence Center
NATO	North Atlantic Treaty Organization
NAVSEA	Naval Sea Systems Command
NAWC	Naval Air Warfare Center
NCA	National Command Authority
NCADE	Net Centric Airborne Defense Element
NCES	Net-Centric Enterprise Services
NCR	National Capital Region
NECC	National Enabled Command Capability
NECS	Network Enterprise Centric Services
NFIRE	Near Field Infrared Experiment
NFR	Near Field Range
NGST	Northrop Grumman Space Technology
NORAD	North American Aerospace Defense Command
NORTHCOM	Northern Command
NIPRNET	Non-Secure Internet Protocol Router Network
NMCC	National Military Command Center
NMT	Navy Multi Band Terminal
NRL	Naval Research Laboratory, Washington, DC
NTD	Near-Term Discrimination
N-UCAS	Navy-Unmanned Combat Aerial System

ACRONYMS AND ABBREVIATIONS

NSWC-Corona	Naval Surface Warfare Center Corona
NT-ECCM	Near Term-Electronic Counter Counter-Measure
O	
O&M	Operations and Maintenance
OBV	Objective Boost Vehicle
ODA	Optical Data Analysis
ODI	Offensive/defensive Intergration
OEM	Original Equipment Manufacturers
OGA	Other Government Agency
OIS	Orbital Insertion Stage
OI&S	Operational Integration and Support
OPIR	Overhead Persistent Infrared
OPLAN	Operations Plan
OPSCAP	Operations Capabilities
OSC	Operations Support Center
OSS	Off-Shore Support
OTA	Operational Test Agency
OTHR	Over The Horizon Radar
OVA	Operational Viability Assessment
P	
PA	Project Arrangement
PAA	Phased Adaptive Approach
PAM	Planning Allocation Matrix
PACOM	U.S. Pacific Command
PAC-3	Patriot Advanced Capability-3
PB	President's Budget
PBL	Performance Based Logistics
PCB	Program Change Board
PCL	Prioritized Capability List
PCCS	Protected Communication Control System
PCIL	Prime Consolidated Integration Laboratory
PCR	Preliminary Capabiltiy Review
PDM	Program Decision Memorandum
PDR	Preliminary Design Review
PE	Program Element
PFR	Post Flight Reconstruction
PMAP	Process Mission Assurance Plan
PMRF	Pacific Missile Range Facility, Barking Sands, Kauai, HI
PMT	Pre-Mission Test
POAP	Photoconduction On Active Pixels
PPU	Prime Power Unit
PROCAP	Protection Capability
PRST	Pacific Range Support Team
PSN	Parallel Staging Area
PTE	Plant Estimates
PTSS	Precision Space Tracking System
PTV	Propulsion Test Vehicle

ACRONYMS AND ABBREVIATIONS

Q	
QLB	Quick Look Briefing
QLRB	Quick Launch Response Boat
QQPR	Qualitative Quantitative Personnel Requirements
QSMA	Qualtiy Safety and Mission Assurance
QWIP	Quantum Well Infrared Photo Detector
R	
RAD	Radiation
RAD HARD	Radiation Hardening
RAM	Reliability, Availability and Maintainability
RCS	Radar Cross Section
RDA	Radar Data Analysis
RDC	Radar Data Collection
RDE	Radar Data Exploitation
RDSIS	Radar Digital Signal Injection System
RDT&E	Research, Development, Test, and Evaluation
REC	Records of Environmental Consideration
REO	Responsible Engineering Organization
RF	Radio Frequency
RFA	Requests for Analysis
RFI	Requests for Information
RFP	Request for Proposal
RIDT	Re-locatable IFICS Data Terminal
RM&A	Reliability, Maintainability and Availability
ROE	Rules of Engagement
ROTHR	Relocatable Over-the-Horizon Radar
RRF	Risk Reduction Flight
RSAP	Range Safety Augmentation Program
RSMT	Range Safety Modeling Toolkit
RST	Radar System Technology
RTO	Responsible Test Organization
RTOS	Real Time Operating System
RTS	Ronald Reagan Test Site, Kwajalein, Marshall Islands
RSA	Redstone Arsenal
RV	Reentry Vehicle
S	
SADBU	Small And Disadvantaged Business Unit
SAPWAN	Special Access Wide Area Network
SAR	Selected Acquisition Report
SATCOM	Satellite Communications
SBAR	Small Business Award
SBIR	Small Business Innovative Research
SBIRS	Space Based Infrared System
SBIRS-LOW	Space Based Infrared System-Low
SBX	Sea Based Test X-Band Radar
SCD	SM-3 Cooperative Development
SCR	System Capability Review
SDACS	Solid Divert Attitude Control System
SDR	System Design Review; Software Design Review

ACRONYMS AND ABBREVIATIONS

SEAR	System Engineering Assessment Report
SEBO	Systems Engineering Behavioral Objectives
SETA	Scientific Engineering and Technical Assistance
SIAR	System Impact Assessment Report
SIPRNET	Secret Internet Protocol Router Network
SIRL	Strategic Illuminator Laser
SIL HWIL	System Integration Lab Hardware-in-the-Loop
SILL	Strategic Illuminator Laser
SIM	Simulation
SIV	Silo Interface Vault
SLAL	Small Laser Amplifier for Ladar
SLC	Super-Lattice Structure
SM	Standard Missile
SM-3	Standard Missile 3
SMDC	Space and Missile Defense Command, U.S. Army
SME	Subject Matter Expert
SMR	System Modification Request
SNL	Sandia National Lab
SOA	Service Oriented Architecture
SOLD	Simulation-Over-Live Driver
SMRTC	Single Missile Round Transportation Container
SPEAR	Scalable Panels for Efficient Affordable Radar
SRALT	Short Range Air Launch Target
SRBM	Short Range Ballistic Missile Defense
SRR	System Requirements Review; Software Readiness Review
SS	Sole Source, Summary Screens
SSAA	System Security Authorization Agreement
SSD	System Specific Documentation
SSKA	Spectral Sensing for Kill Assessment
SSTB	STSS Surrogate Test Bed
STAR	Strategic Threat Assessment Report; System Test Analysis Report
STARS	Strategic Target System
STL	System Test Lab
STRATCOM	US Strategic Command
STP	Sensor Task Plan
STS	Stockpile to Target Sequence
STSS	Satellite Tracking and Surveillance System
STTR	Small Business Technology Transfer
SWIL	Software-in-the-Loop
T	
TACL	Tailored Aperture Ceramic Laser
TADIL-J	Tactical Digital Information Link Joint
TA&R	Test Analysis & Reporting
TBM	Theater Ballistic Missile
TBMCS	Theater Battle Management Core Systems
TBONE	Theater Battle Operations Network Centric Environment
TCCB	Test Configuration Control Board
TCN	Tactical Component Network
TCR	Target Capability Roadmap
TCS	Test Control System
TCWG	Test Configuration Working Group

ACRONYMS AND ABBREVIATIONS

TDACS	Throttleable Divert and Attitude Controls System
TDP	Truth Data Package; Threat Data Packages
TDRD	Truth Data Requirements Document
TDS	Terminal Defense Segment
TEC	Test Execution Control
TEDAC	Test & Evaluation Data Analysis Capability
TEMP	Test and Evaluation Master Plan
TES	Theater Event System
TF	Task Force
TFCC	THAAD Fire Control and Communications
THAAD	Terminal High Altitude Area Defense
TIC	Test Integration Council
TILL	Threat Level Classification Algorithm
TIVS	Thermally Initiated Venting System
TMDD	Target Mission Description Document
TMW	Theater Missile Warning
TOG	Technical Objectives and Goals
TOO	Test of Opportunity; Target of Opportunity
TPFDD	Timed Phased Force Deployment Data
TRIMM	Transmit/Receive Integrated Microwave Modules
TRM	Transmit/Receive Modules
TRMP	Test Resource Master Plan
TRD	Technical Requirement Document
TSG	Tactical Support Groups
TSP	Track Sensor Payload
TTP	Tactics, Techniques, and Procedures
TTS	Transportable Telemetry Systems
T&E	Test and Evaluation
U	
UARC	University Affiliated Research Centers
UDS	Universal Documentation Status
UEWR	Upgraded Early Warning Radar
UHF	Ultra High Frequency
UID	Unique Identification
UK	United Kingdom
UKV	Unitary Kill Vehicle
UMDF	Unifying Missile Defense Functions
USCENTCOM	United States Central Command
USD	Under Secretary of Defense
USD/AT&L	Under Secretary of Defense for Acquisition, Technology, and Logistics
USEUCOM	United States European Command
USFJ	United States Forces Japan
USFK	United States Forces Korea
USNCR	United States National Capital Region
USMTF	United States Message Text Format
USNORTHCOM	United States Northern Command
USPACOM	United States Pacific Command
USSOUTH	United States South
USSTRATCOM	United States Strategic Command

ACRONYMS AND ABBREVIATIONS

V	
V&V	Verification and Validation
VAFB	Vandenberg Air Force Base, CA
VCSEL	Vertical Cavity Surface-Emitting Laser
VECP	Value Engineering Change Proposal
VLS	Vertical Launching System
VTCoIP	Video Teleconferencing Internet Protocol
VV&A	Verification, Validation and Accreditation
W	
WASP	Wide-body Airborne Sensor Platform
WESC	Wargame and Exercise Support Center
WBGS	Wide Bandgap Semiconductor
WG	Wargame
WIP	Warfighter Involvement Process
WMD	Weapons of Mass Destruction
WSC	Warfighter Support Center
WSERB	Weapons System Explosive Safety Review Board
WSMR	White Sands Missile Range, White Sands, NM
WTP	Weapons Task Plan
X	
XBR	X-Band Radar
X-Lab	Experimental Laboratory
XML	Extensible Markup Language
XTR	X-band Transportable Radar

Missile Defense Agency
Fiscal Year (FY) 2011-2015 President`s Budget
FY 2011 through FY 2015 Appropriation Summary
($ Thousands)

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
Operations and Maintenance												
	0208866C		O&M	NA	0	0	0	172,957	188,245	214,081	228,182	803,465
		MD07	THAAD	NA	0	0	0	172,957	188,245	214,081	228,182	803,465
			Budget Activity NA Total	NA	0	0	0	172,957	188,245	214,081	228,182	803,465
			Operations and Maintenance Total	NA	0	0	0	172,957	188,245	214,081	228,182	803,465
Procurement												
	0208866C		PROCUREMENT	NA	206,622	644,629	952,950	1,771,539	1,757,573	1,948,406	2,238,621	8,669,089
32		EX07	THAAD Procurement	NA	104,690	419,004	0	0	0	0	0	0
32		MD07	THAAD	NA	0	0	858,870	772,248	637,271	850,180	894,654	4,013,223
33		EX09	Aegis Block 5 Procurement	NA	101,932	225,625	0	0	0	0	0	0
33		MD09	AEGIS BMD	NA	0	0	94,080	701,877	712,659	681,695	938,977	3,129,288
		MD11	BMDS Radars	NA	0	0	0	297,414	407,643	416,531	404,990	1,526,578
			Budget Activity NA Total	NA	206,622	644,629	952,950	1,771,539	1,757,573	1,948,406	2,238,621	8,669,089
			Procurement Total	NA	206,622	644,629	952,950	1,771,539	1,757,573	1,948,406	2,238,621	8,669,089
RDT&E												
28	0603175C		Ballistic Missile Defense Technology	03	117,602	189,229	132,220	236,875	239,873	197,118	197,852	1,003,938
		WX25	Advanced Technology Development	03	112,003	186,954	0	0	0	0	0	0
		MD25	Advanced Technology	03	0	0	127,236	227,522	231,430	190,066	189,940	966,194
		ZX40	Program-Wide Support	03	5,599	2,275	0	0	0	0	0	0
		MD40	Program Wide Support	03	0	0	4,984	9,353	8,443	7,052	7,912	37,744
64	0603901C		DIRECTED ENERGY RESEARCH	03	0	0	98,688	101,371	103,449	104,572	104,141	512,221
		MD69	Directed Energy Research	03	0	0	95,398	97,900	100,000	101,000	100,400	494,698
		MD40	Program-Wide Support	03	0	0	3,290	3,471	3,449	3,572	3,741	17,523
			Budget Activity 03 Total	03	117,602	189,229	230,908	338,246	343,322	301,690	301,993	1,516,159

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
75	0603881C		Ballistic Missile Defense Terminal Defense Segment	04	951,414	715,732	436,482	250,275	336,711	500,983	521,717	2,046,168
		BX07	Terminal High Altitude Area Defense (THAAD) Block 2.0	04	728,934	552,113	0	0	0	0	0	0
		EX07	Terminal High Altitude Area Defense (THAAD) Block 5.0	04	0	60,126	0	0	0	0	0	0
		XX07	Terminal High Altitude Area Defense (THAAD) Sustainment	04	21,796	49,595	0	0	0	0	0	0
		MD07	THAAD	04	0	0	420,463	240,177	324,264	477,944	498,688	1,961,536
		WX06	Patriot Advanced Capability-3 (PAC-3)	04	11,656	22,177	0	0	0	0	0	0
		MD06	Patriot Advanced Capability-3 (PAC-3)	04	0	0	1,200	1,230	1,270	1,308	1,347	6,355
		WX26	Israeli ARROW Program	04	93,194	0	0	0	0	0	0	0
		WX34	Short Range Ballistic Missile Defense	04	70,786	0	0	0	0	0	0	0
		ZX40	Program-Wide Support	04	25,048	31,721	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	14,819	8,868	11,177	21,731	21,682	78,277
76	0603882C		Ballistic Missile Defense Mid-Course Segment	04	1,472,683	1,027,371	1,346,181	1,112,655	1,291,790	1,099,029	1,033,213	5,882,868
		AX08	Ground Based Midcourse Defense (GMD) Block 1.0	04	32,130	0	0	0	0	0	0	0
		CX08	Ground Based Midcourse Defense (GMD) Block 3.0	04	1,112,792	810,518	0	0	0	0	0	0
		WX08	GM Capability Development	04	0	3,834	0	0	0	0	0	0
		XX08	Ground Based Midcourse Defense (GMD) Sustainment	04	249,519	194,297	0	0	0	0	0	0
		MD08	Ground Based Midcourse	04	0	0	1,300,655	1,071,957	1,249,802	1,064,572	996,981	5,683,967
		ZX40	Program-Wide Support	04	78,242	18,722	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	45,526	40,698	41,988	34,457	36,232	198,901
77	0603883C		Ballistic Missile Defense Boost Defense Segment	04	384,365	182,317	0	0	0	0	0	0
		WX19	Airborne Laser Capability Development	04	368,514	177,501	0	0	0	0	0	0
		ZX40	Program-Wide Support	04	15,851	4,816	0	0	0	0	0	0
79	0603884C		Ballistic Missile Defense Sensors	04	682,754	621,017	454,859	469,589	681,397	650,525	616,342	2,872,712
		AX11	Ballistic Missile Defense Radars Block 1.0	04	2,697	0	0	0	0	0	0	0
		BX11	Ballistic Missile Defense Radars Block 2.0	04	71,950	3,173	0	0	0	0	0	0
		CX11	Ballistic Missile Defense Radars Block 3.0	04	110,486	12,379	0	0	0	0	0	0
		EX11	Ballistic Missile Defense Radars Block 5.0	04	128,838	91,893	0	0	0	0	0	0
		WX11	Ballistic Missile Defense Radars Capability Development	04	194,532	318,854	0	0	0	0	0	0
		XX11	Ballistic Missile Defense Radars Sustainment	04	129,649	159,611	0	0	0	0	0	0
		MD11	BMDS Radars	04	0	0	440,023	452,561	659,538	630,408	595,040	2,777,570
		ZX40	Program-Wide Support	04	44,602	35,107	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	14,836	17,028	21,859	20,117	21,302	95,142

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
80	0603886C		Ballistic Missile Defense System Interceptor	04	308,869	0	0	0	0	0	0	0
		WX13	Ballistic Missile Defense Interceptor Capability Development	04	293,969	0	0	0	0	0	0	0
		ZX40	Program-Wide Support	04	14,900	0	0	0	0	0	0	0
81	0603888C		Ballistic Missile Defense Test and Targets	04	906,952	823,333	1,113,425	1,105,959	951,371	871,929	829,608	4,872,292
		AX04	Test & Evaluation Block 1.0	04	6,934	0	0	0	0	0	0	0
		EX05	Targets & Countermeasures Supports Block 5.0	04	40,393	0	0	0	0	0	0	0
		BX04	Test & Evaluation Block 2.0	04	32,989	792	0	0	0	0	0	0
		CX04	Test & Evaluation Block 3.0	04	32,370	4,633	0	0	0	0	0	0
		EX04	Test & Evaluation Block 5.0	04	20,274	8,784	0	0	0	0	0	0
		WX04	Test & Evaluation Capability Development	04	18,509	71,461	0	0	0	0	0	0
		XX04	Concurrent, Test, Training & Ops (CTTO)	04	36,017	35,526	0	0	0	0	0	0
		YX04	Test & Evaluation	04	278,457	273,491	0	0	0	0	0	0
		MD04	Test Program	04	0	0	559,133	477,588	453,047	435,093	399,100	2,323,961
		BX05	Targets & Countermeasures Supports Block 2.0	04	86,168	0	0	0	0	0	0	0
		CX05	Targets & Countermeasures Supports Block 3.0	04	43,277	0	0	0	0	0	0	0
		WX05	Targets & Countermeasures Supports Capability Development	04	29,587	0	0	0	0	0	0	0
		YX05	Targets and Countermeasures Core	04	258,816	405,905	0	0	0	0	0	0
		MD05	Targets Program	04	0	0	517,065	587,940	467,401	409,499	401,416	2,383,321
		ZX40	Program-Wide Support	04	23,161	22,741	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	37,227	40,431	30,923	27,337	29,092	165,010
82	0603890C		Ballistic Missile Defense Enabling Programs	04	402,776	358,751	402,769	468,673	457,745	473,871	488,799	2,291,857
		YX24	Systems Engineering & Integration	04	107,835	98,684	0	0	0	0	0	0
		MD24	System Engineering & Integration	04	0	0	124,040	155,241	144,571	157,903	167,762	749,517
		YX28	Intelligence & Security	04	20,007	17,789	0	0	0	0	0	0
		MD28	Intelligence & Security	04	0	0	15,905	15,711	15,992	16,276	16,360	80,244
		YX29	Producibility and Manufacturing Technology	04	40,805	44,032	0	0	0	0	0	0
		MD29	Producibility & Manufacturing Technology	04	0	0	36,575	33,659	36,523	37,287	38,065	182,109
		YX30	BMD Information Management Systems	04	103,676	105,536	0	0	0	0	0	0
		MD30	BMD Information Management Systems	04	0	0	111,829	92,926	94,821	94,132	93,315	487,023
		YX31	Modeling & Simulation	04	90,523	48,132	0	0	0	0	0	0
		MD31	Modeling & Simulation	04	0	0	64,623	120,904	120,634	122,531	124,937	553,629
		YX32	Quality, Safety, and Mission Assurance	04	24,674	31,009	0	0	0	0	0	0
		MD32	Quality, Safety, and Mission Assurance	04	0	0	32,881	33,094	30,326	30,885	31,219	158,405
		ZX40	Program-Wide Support	04	15,256	13,569	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	16,916	17,138	14,878	14,857	17,141	80,930

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
83	0603891C		SPECIAL PROGRAMS - MDA	04	182,998	250,185	270,189	269,040	450,645	517,486	601,315	2,108,675
		WX27	Special Programs	04	182,998	250,185	0	0	0	0	0	0
		MD27	Special Programs	04	0	0	270,189	269,040	450,645	517,486	601,315	2,108,675
84	0603892C		BMD AEGIS	04	1,054,323	1,435,717	1,467,278	1,021,878	1,112,668	1,076,739	923,316	5,601,879
		BX09	AEGIS BMD Block 2.0	04	239,644	53,457	0	0	0	0	0	0
		BX18	Sea-Based Terminal BMD Block 2.0	04	33,070	5,663	0	0	0	0	0	0
		EX09	AEGIS BMD Block 5.0	04	525,587	1,045,727	0	0	0	0	0	0
		WX09	AB Capability Development	04	164,532	233,479	0	0	0	0	0	0
		WX18	Far Term Sea Based Terminal Capability Development	04	14,000	0	0	0	0	0	0	0
		XX09	AEGIS BMD Sustainment	04	39,495	45,766	0	0	0	0	0	0
		MD09	Aegis BMD	04	0	0	1,412,560	971,965	1,063,367	1,030,020	885,993	5,363,905
		ZX40	Program-Wide Support	04	37,995	51,625	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	54,718	49,913	49,301	46,719	37,323	237,974
85	0603893C		SPACE TRACKING & SURVEILLANCE SYSTEM	04	209,831	161,609	112,678	98,500	56,424	52,928	34,661	355,191
		WX12	Space Tracking and Surveillance System (STSS) Capability Development	04	203,343	161,609	0	0	0	0	0	0
		MD12	Space Tracking and Surveillance System (STSS)	04	0	0	108,842	94,738	54,331	50,990	33,070	341,971
		ZX40	Program-Wide Support	04	6,488	0	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	3,836	3,762	2,093	1,938	1,591	13,220
86	0603894C		MULTIPLE KILL VEHICLE	04	226,027	0	0	0	0	0	0	0
		WX15	Multiple Kill Vehicles (MKV) Capability Development	04	220,247	0	0	0	0	0	0	0
		ZX40	Program-Wide Support	04	5,780	0	0	0	0	0	0	0
87	0603895C		BMD SYSTEM SPACE PROGRAM	04	23,250	12,492	10,942	11,182	11,347	11,749	12,155	57,375
		MD33	MD Space Exp Center (MDSEC)	04	0	0	10,535	10,842	11,156	11,581	12,017	56,131
		WX16	Near Field Infrared Experiment (NFIRE)	04	10,989	0	0	0	0	0	0	0
		WX23	BMDS Space Test Bed	04	5,000	0	0	0	0	0	0	0
		WX33	MD Space Exp Center (MDSEC)	04	7,142	10,219	0	0	0	0	0	0
		ZX40	Program-Wide Support	04	119	2,273	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	407	340	191	168	138	1,244

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
88	0603896C		BMD C2BMC	04	275,174	334,734	342,625	364,085	289,778	323,922	298,936	1,619,346
		BX01	Ballistic Missile Defense C2BMC Block 2.0	04	83,418	27,454	0	0	0	0	0	0
		CX01	Ballistic Missile Defense C2BMC Block 3.0	04	138,899	248,320	0	0	0	0	0	0
		WX01	BC Capability Development	04	0	772	0	0	0	0	0	0
		XX01	Command & Control, Battle Management, Communications (C2BMC) Sustainment	04	42,465	46,200	0	0	0	0	0	0
		MD01	Command & Control, Battle Management, Communications (C2BMC)	04	0	0	331,155	350,771	280,359	313,766	288,453	1,564,504
		ZX40	Program-Wide Support	04	10,392	11,988	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	11,470	13,314	9,419	10,156	10,483	54,842
89	0603897C		BMD HERCULES	04	51,629	47,932	0	0	0	0	0	0
		WX02	Hercules Capability Development	04	51,413	46,104	0	0	0	0	0	0
		ZX40	Program-Wide Support	04	216	1,828	0	0	0	0	0	0
90	0603898C		BMD JOINT WARFIGHTER SUPPORT	04	66,283	61,098	68,726	62,239	63,451	65,158	67,231	326,805
		YX03	Joint Warfighter	04	57,976	52,059	0	0	0	0	0	0
		XX03	Joint Warfighter Sustainment	04	7,984	6,456	0	0	0	0	0	0
		MD03	Joint Warfighter Support	04	0	0	66,414	59,963	61,389	63,115	64,873	315,754
		ZX40	Program-Wide Support	04	323	2,583	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	2,312	2,276	2,062	2,043	2,358	11,051
91	0603904C		MISSILE DEFENSE INTEGRATION & OPERATIONS CENTER (MDIOC)	04	102,823	86,483	86,198	88,181	78,517	80,410	83,087	416,393
		CX22	Missile Defense Integration & Operations Center (MDIOC) - Block 3.0	04	22,795	23,215	0	0	0	0	0	0
		YX22	Missile Defense Integration & Operations Center (MDIOC) Core	04	77,249	61,201	0	0	0	0	0	0
		MD22	Missile Defense Integration and Operations Center (MDIOC)	04	0	0	83,298	84,956	75,965	77,889	80,173	402,281
		ZX40	Program-Wide Support	04	2,779	2,067	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	0	2,900	3,225	2,552	2,521	2,914	14,112
92	0603906C		REGARDING TRENCH	04	3,159	6,130	7,529	8,295	8,286	8,479	8,675	41,264
		WX35	Regarding Trench	04	3,159	6,130	0	0	0	0	0	0
		MD35	Regarding Trench	04	0	0	7,529	8,295	8,286	8,479	8,675	41,264
93	0603907C		SEA BASED X-BAND RADAR (SBX)	04	143,878	167,153	153,056	150,104	159,832	160,163	197,099	820,254
		XX46	Sea Based X-Band Radar (SBX) Sustainment	04	143,878	167,153	0	0	0	0	0	0
		MD46	Sea-Based X-band (SBX) Sustainment	04	0	0	153,056	150,104	159,832	160,163	197,099	820,254
94	0603908C		BMD EUROPEAN INTERCEPTOR SITE	04	348,722	0	0	0	0	0	0	0
		DX48	European Capability Block 4	04	348,722	0	0	0	0	0	0	0

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
95	0603909C		BMD EUROPEAN MIDCOURSE RADAR	04	73,728	0	0	0	0	0	0	0
		DX48	European Capability Block 4	04	70,452	0	0	0	0	0	0	0
		XX48	European Capability Sustainment	04	3,276	0	0	0	0	0	0	0
96	0603911C		BMD EUROPEAN CAPABILITY	04	0	50,226	0	0	0	0	0	0
		DX48	European Capability Block 4	04	0	50,226	0	0	0	0	0	0
97	0603912C		BMD European Comm Support	04	26,016	0	0	0	0	0	0	0
		DX48	European Capability Block 4	04	26,016	0	0	0	0	0	0	0
98	0603913C		ISRAELI COOPERATIVE	04	0	201,323	121,735	111,100	113,101	116,114	119,172	581,222
		MD20	Israeli Upper Tier	04	0	0	50,766	49,728	50,669	52,613	54,550	258,326
		WX26	Israeli ARROW Program	04	0	121,671	0	0	0	0	0	0
		MD26	Israeli ARROW Program	04	0	0	24,247	18,309	18,338	18,342	18,375	97,611
		WX34	Short Range Ballistic Missile Defense	04	0	79,652	0	0	0	0	0	0
		MD34	Short Range Ballistic Missile Defense (SRBMD)	04	0	0	46,722	43,063	44,094	45,159	46,247	225,285
107	0604880C		LAND-BASED SM-3	04	0	0	281,378	345,937	187,062	93,456	139,595	1,047,428
		MD68	AEGIS Ashore	04	0	0	281,378	345,937	187,062	93,456	139,595	1,047,428
108	0604881C		Aegis SM-3 BLOCK IIA CO-DEVELOPMENT	04	0	255,987	318,800	405,500	416,300	337,300	227,500	1,705,400
		MD09	SM-3 Block IIA Co-Development	04	0	255,987	318,800	405,500	416,300	337,300	227,500	1,705,400
109	0604883C		PRECISION TRACKING SPACE SYSTEM	04	0	0	66,969	123,851	184,800	348,360	482,952	1,206,932
		MD10	Precision Tracking Space System (PTSS)	04	0	0	64,716	119,322	178,793	337,438	466,016	1,166,285
		MD40	Program-Wide Support	04	0	0	2,253	4,529	6,007	10,922	16,936	40,647
110	0604884C		AIRBORNE INFRARED (ABIR)	04	0	0	111,671	103,636	123,591	103,668	58,773	501,339
		MD67	Airborne Infrared (ABIR)	04	0	0	111,671	103,636	123,591	103,668	58,773	501,339
			Budget Activity 04 Total	04	7,897,654	6,799,590	7,173,490	6,570,679	6,974,816	6,892,269	6,744,146	34,355,400
151	0605502C		Small Business Innovative Research BMDO	06	124,788	0	0	0	0	0	0	0
		ZX45	Small Business Innovative Research (SBIR)	06	124,788	0	0	0	0	0	0	0
175	0901585C		Pentagon Reservation	06	20,146	19,709	20,482	0	0	0	0	20,482
		ZX42	Pentagon Reservation Maintenance Reserve Fund (PRMRF)	06	20,146	19,709	0	0	0	0	0	0
		MD42	Pentagon Reservation Maintenance Reserve Fund (PRMRF)	06	0	0	20,482	0	0	0	0	20,482
176	0901598C		Management Headquarters-MDA	06	87,151	52,403	29,754	29,421	29,974	30,567	31,171	150,887
		ZX38	Management Headquarters	06	87,151	52,403	0	0	0	0	0	0
		MD38	Management Headquarters	06	0	0	29,754	29,421	29,974	30,567	31,171	150,887
			Budget Activity 06 Total	06	232,085	72,112	50,236	29,421	29,974	30,567	31,171	171,369
			RDT&E Total	06	8,247,341	7,060,931	7,454,634	6,938,346	7,348,112	7,224,526	7,077,310	36,042,928

Line Number	Program Element	Budget Project	Program	Budget Activity	FY09 Actual	FY10	FY11	FY12	FY13	FY14	FY15	FY11-FY15
MILCON												
			Major MILCON		0	93,000	0	12,203	132,229	31,914	0	176,346
			Aegis BMD Facility Expansion		0	24,500	0	0	0	0	0	0
			Aegis BMD Ashore (ABA) Test Complex		0	68,500	0	0	0		0	0
			Aegis BMD Ashore (ABA) Consequence Mgr Fac		0	0	0	12,203	0	0	0	12,203
			Aegis Land Based SM-3 Launch Facility		0	0	0	0	89,429	0	0	89,429
			Fort Greely Security Upgrade		0	0	0	0	42,800	0	0	42,800
			Aegis Airborne Infrared Facility		0	0	0	0	0	31,914	0	31,914
			Minor MILCON		3,457	3,717	0	0	0	0	3,000	3,000
					3,457	3,717	0	0	0	0	3,000	3,000
			Planning and Design		14,889	2,000	0	7,600	0	0	3,188	10,788
					14,889	2,000	0	7,600	0	0	3,188	10,788
			MILCON Total	NA	18,346	98,717	0	19,803	132,229	31,914	6,188	190,134
BRAC												
	0207998C		BRAC	NA	159,938	86,622	8,679	0	0	0	0	8,679
		ZX36	Base Realignment and Closure (BRAC)	NA	159,938	86,622	0	0	0	0	0	0
		MD36	Base Realignment and Closure (BRAC)	NA	0	0	8,679	0	0	0	0	8,679
			Budget Activity NA Total	NA	159,938	86,622	8,679	0	0	0	0	8,679
			BRAC Total	NA	159,938	86,622	8,679	0	0	0	0	8,679
			PROGRAM TOTAL		8,632,247	7,890,899	8,416,263	8,902,645	9,426,159	9,418,927	9,550,301	45,714,295

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Missile Defense Agency

Fiscal Year (FY) 2011

Budget Estimates

Overview

For Public Release Only After Release Is Authorized by the Office of the Secretary of Defense

10-MDA-5141 (15 JAN 2010)

Missile Defense Agency
Fiscal Year (FY) 2011 Budget Overview

This overview is intended to serve informed readers as a stand-alone summary of our Ballistic Missile Defense System (BMDS) program priorities for FY 2011. It also describes key programmatic and management initiatives.

The Missile Defense Agency (MDA) is requesting an $8.416 billion funding level for FY 2011 -- a 6.6 percent increase from the appropriated FY 2010 level of $7.892 billion.

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I. INTRODUCTION

Key Accomplishments

While FY 2009 was in many ways a year of significant transition for the Ballistic Missile Defense program and MDA, the day-to-day work of the Agency to achieve its mission still proceeded at a high operational tempo. We participated in several warfighter activities in support of real world events, tested new capabilities, and delivered hardware and software to the warfighter in defense of the nation. We also systematically and rigorously restructured our test program and subsequently developed a revised Integrated Master Test Plan (IMTP); and supported development of the Phased Adaptive Approach that can be used for defense of deployed U.S. forces, friends, and Allies in Europe and globally. The FY 2011 President's Budget request reflects significant new policies and initiatives in homeland and regional defense, enhanced testing, and technology development to adapt and respond to future threats. Described below are some specific key accomplishments.

Delivering Capabilities to the Warfighter

Throughout the year, we continued to add increments of capability to the BMDS for use by the warfighter. In terms of homeland defense, we delivered four Ground Based Interceptors (GBIs) and Ground Based Midcourse Defense (GMD) Fire Control and Command Launch Equipment hardware upgrades and software improvements. Further, we completed the fourth operational silo at Vandenberg Air Force Base (VAFB). In addition, we transferred the upgraded Cobra Dane radar and the Beale and Fylingdales upgraded early warning radars (UEWRs) to the Air Force for operations in support of the BMD mission. In terms of regional defense, we delivered 19 Standard Missile (SM)-3 Block IAs; installed the first generation, Aegis BMD Weapon System (AWS) 3.6.1 on six Aegis BMD ships and achieved its certification for Fleet Tactical Operations; added our 19th Aegis BMD ship; and installed AWS 4.0.1 on the USS Lake Erie for test purposes. We also delivered the first Terminal High Altitude Area Defense (THAAD) battery ground equipment—an Army Navy/Transportable Radar Surveillance (AN/TPY-2), three launchers, and two THAAD Fire Command and Control Tactical Station Groups (TSGs)--and began taking delivery of the launchers and TSGs for the second THAAD battery. In the sensors area, we deployed, on a contingency basis, an AN/TPY-2 radar to Israel and delivered another AN/TPY-2 radar, which can now be assigned to the Army when a unit is available. The Command and Control, Battle Management and Communications (C2BMC) capabilities were improved by the activation of C2BMC servers at U.S. European Command (USEUCOM), providing track forwarding to in-theater Aegis BMD, situational awareness of the regional BMD mission, and control for the forward-based AN/TPY-2 radar in support of Defense of Israel. Additionally, we installed enhanced C2BMC hardware and software at command and control nodes in U.S. Pacific Command (USPACOM), U.S. Strategic Command (USSTRATCOM) and U.S. Northern Command (USNORTHCOM) in anticipation of FY 2010 operational testing of the next BMDS system upgrade.

Proving Capabilities

The restructuring of MDA's test program and plan was a significant accomplishment in FY 2009. Working with the Services' Operational Test Agencies and the Warfighter (represented by the Joint Forces Component Command for Integrated Missile Defense), and with the support of the Director of Operational Test and Evaluation, we transitioned to test objectives based on data to verify, validate, and accredit BMDS models and simulations and collected data to determine operational effectiveness, suitability, and survivability. The revised IMTP, which extends through FY 2015, focuses on proving system capabilities through the collection of identified flight test data to ensure adequate test investments and a solid foundation to anchor BMDS models and simulations. In the future, we will revise and update the IMTP semi-annually.

Accomplishments in our targets program proved very beneficial to testing in FY 2009 and will pay dividends in the future. We delivered 18 of 21 planned targets; prepared the target development and acquisition strategy and plan; crafted multiple Requests for Proposal (RFPs); and developed a new target cost model.

As for noteworthy flight and ground testing in FY 2009, we achieved five of eight successful hit-to-kill intercepts and a number of "firsts" in BMDS testing. For example,

- In the most operationally realistic Ground Based Midcourse Defense (GMD) flight intercept test to date, we successfully engaged a target launched from Kodiak Island in Alaska by a GBI launched from VAFB in California; correlated sensor data from four on-line sensors; and performed the functions to discriminate and intercept the dynamic lethal object from a target scene.
- In a THAAD flight test, we demonstrated the first salvo engagement of an endo-atmospheric threat-representative separating ballistic target. This test was conducted as a Developmental Test/Operational Test with oversight from the U.S. Army Test and Evaluation Command. Soldiers of the 6th Air Defense Artillery Brigade conducted launcher, fire control, and radar operations using tactics, techniques, and procedures developed by the U.S. Army Air Defense Center.
- Short Range Ballistic Missile (SRBM) intercepts were successfully demonstrated using Aegis BMD Standard Missile (SM)-2 Block IV interceptor in Stellar Daggers and the SM-3 Block IA in Stellar Avenger.
- Demonstrations of BMDS interoperability were major objectives of several key tests. For example, AWS 3.6.1 demonstrated a successful exchange of data via interoperable messaging with C2BMC, THAAD, GMD, and an AN/TPY-2 radar. Also, the Commander Operational Test and Evaluation Force assessed AWS 3.6.1 as operationally effective and suitable.
- We extended integrated and distributed ground testing in support of defense of Israel; successfully demonstrated the ability of forward-based AN/TPY-2 radars to cue Aegis BMD and the Arrow Weapon System; and provided improved regional BMD situational awareness and demonstrated the flow of BMD track data across regional commands.

Developing Future Missile Capabilities That Are Adaptable and Responsive

Our robust technology development program made significant progress this past year. We initiated concept exploration of intercepting Medium-Range Ballistic Missiles (MRBMs) and Intermediate-Range Ballistic Missiles (IRBMs) early in flight, leveraging existing Unmanned Aerial Vehicles and space assets for pervasive sensor netting to extend the engagement zone of BMDS interceptors. We achieved significant accomplishments in the Airborne Laser (ABL) and Space Tracking and Surveillance System (STSS) demonstration efforts. ABL achieved flight certification; ground tested the laser through the full weapon system; accomplished target tracking; compensated for atmospheric distortion and characterized beam control versus a boosting missile; and conducted "first light in flight" firing of the laser to include propagation of the high energy beam into the atmosphere. Planning to transition the ABL to a National laser research platform continued. STSS completed integration and assembly and successfully launched two vehicles into space orbit.

The Way Ahead

In his 17 September 2009 introduction of the Phased Adaptive Approach (PAA) for missile defense in Europe, President Obama stated his intent to deploy a missile defense system that best responds to the threats that our Nation faces and utilizes technology that is both proven and cost-effective. The President also stated the need to provide capabilities sooner, build on proven systems, and offer greater defenses against the threat of missile attack. MDA has designed its programs and budget request to achieve the President's objectives.

We are continuing the development and fielding of capabilities to defeat a limited ballistic missile attack against the United States. Today we have operational GBIs in missile fields at Fort Greely, Alaska, and VAFB in California. The GMD and C2BMC elements of the system, which are on alert 24 hours a day, are manned by Warfighter crews at operational situational awareness displays, sensor management controls, and fire control workstations. By the end of FY 2010, we plan to have 30 ready interceptors available to provide long-range defense. Our FY 2011 request includes funding for additional interceptors with upgraded avionics and completion of Missile Field 2 in FY 2012 at Fort Greely.

The PAA will counter immediate ballistic missile threats to NATO/European populations and U.S. bases, forces, and civilians and is extensible to other regions. The PAA is designed to build on already fielded BMDS assets, including upgraded early warning radars (UEWRs) and C2BMC components. It will feature forward-based BMDS radars in Southern Europe to provide early and precise tracks of threat missiles from the Middle East. These radars also will increase the accuracy of the fire control instructions to interceptors based in the United States, thereby improving the System's overall performance for the protection of the homeland. Phase 1 of the PAA, to be deployed by Calendar Year (CY) 2011, involves deployment of sea-based SM-3 Block IA interceptors and forward-based sensors to protect areas where we see the greatest threat to Europe from short- and medium-range ballistic missiles. By CY2015, Phase 2 deploys enhanced and proven missile defense systems, to include the SM-3 Block IB interceptor and a land-based "Aegis Ashore" site. We plan to deploy the more capable SM-3 Block IIA interceptor by about 2018 in land- and sea-based configurations in Phase 3 of the PAA to include protection against

IRBMs, and increase the defended area of Europe. Finally, in the 2020 timeframe, we intend to field in Phase 4 more advanced land-based capabilities in Europe using a more capable SM-3 Block IIB missile and space sensors to handle large raid sizes.

In response to Warfighter priorities, we have been focused on developing and delivering a more robust Aegis BMD capability to defeat short- to intermediate-range threats from the sea as well as initial fielding of the first THAAD batteries. Aegis BMD cruisers and destroyers integrated with SM-3 hit-to-kill interceptors, which intercept ballistic missiles in space, and SM-2 terminal interceptors, which intercept missiles as they reenter the atmosphere, provide a robust mobile capability that may be surged to a region to protect deployed forces and allies. Continuing the partnership begun in 2009, MDA and the Navy continue to jointly respond to the need for operational Aegis BMD capability. We are requesting more funds ($161M in FY11-13) to accelerate the number of second generation Aegis BMD systems in the fleet, and the Navy is requesting funds to bring online three additional ships with BMD capability and upgrade one existing Aegis BMD ship with the most modern capability. Together, MDA and the Navy will bring an additional 10 Aegis BMD ships online between FY 2010 and FY 2012.

We expect to have 61 SM-3 Block IAs in inventory by the end of fiscal year 2010. The SM-3 is a very capable interceptor, and we are evolving that capability as well as the Aegis Weapon System to intercept a target earlier in its flight and provide that capability from land locations, which we call Aegis Ashore. We are also developing C2BMC software that will allow us to better leverage sensors that are not part of the BMD system, which will greatly expand the area defended by a single Aegis Weapon System (sea or land based) and THAAD batteries. To further augment our regional defenses, we plan to have 26 THAAD interceptors in inventory by the end of fiscal year 2010. THAAD interceptors reach much farther than PATRIOT Advanced Capability (PAC)-3 interceptors and can defend a larger area by intercepting targets in the upper atmosphere and in space after apogee.

In our FY 2011 request, we are submitting new Program Elements (PEs) for the new Phased Adaptive Approach, including funding for developing and testing Aegis Ashore capability and Airborne Infrared (ABIR) sensor platforms. In response to Warfighter requests, we are also asking for significant funding increases ($3.4B in FY11-15) to procure additional THAAD batteries and interceptors, AN/TPY-2 radars, and Aegis BMD Block IB interceptors. We are also requesting funds for the continuing development and testing of the next generation of Aegis Weapon System and interceptors and the upgrading of additional Aegis BMD ships.

Another step we have taken to meet the President’s direction is to establish a robust testing program to demonstrate these capabilities and prove they can reliably and effectively help U.S. forces accomplish their mission. Working closely with the Services’ Operational Test Agencies, we are executing a rigorous test program documented in the IMTP that includes expanding our flight and ground test programs to test BMDS capabilities against medium-, intermediate-, and long-range threats. Because our flight tests are very expensive, as high as $200 million for a long-range flight test, and are impacted by safety constraints and long planning timelines, we focus our flight and ground test programs on fully validating models and simulations. Validated models and simulations are then used to run thousands of operationally realistic test scenarios across a full range of engagement conditions at a fraction of the cost of a flight test. Our test program also

helps demonstrate the integration of system assets, such as GMD, THAAD, AN/TPY-2, C2BMC, and the AN/SPY-1 radar on Aegis BMD ships. Integration expands BMD capability by pairing weapons and sensors according to mission needs.

We are also addressing the need to have more reliable, less costly targets. Our new target acquisition strategy, initiated in FY 2009, streamlines a set of target classes to increase quality control, account for intelligence uncertainties, control costs, and ensure the availability of backup targets. Since it takes about two years to build and deliver a high quality target, we expect to complete contract acquisition in 2010 and realize the benefits of the new strategy in the FY 2012 – 2013 time frame.

Before new capabilities are deployed, the simulations that model their performance must be anchored under conditions that represent realistic threats and environments. These tests will help build the confidence of U.S. and allied stakeholders in simulations of the ballistic missile defense system.

We continue to work with our allies and friends to develop and field operationally and cost-effective missile defenses because having coalition partners for this mission gives us a distinct advantage. Over the past several years, our involvement with foreign nations has grown significantly. We currently are working with or talking to more than 20 countries and NATO about missile defense.

MDA is also implementing the direction of the Weapon Systems Acquisition Reform Act of 2009 to make the system more affordable and operationally effective. This includes fostering competitive contracting to motivate innovation and keep costs down. In other words, we are taking significant steps to meet the Administration's objective of developing and producing sound capability improvements at a reasonable cost.

The Ground Based Midcourse Defense (GMD) program is an example of our competitive contracting approach. We intend to award a competitive Development and Sustainment Contract (DSC) for the future development; fielding; testing; systems engineering support; integration and configuration management; equipment manufacturing and refurbishment; and training, operations and sustainment support for GMD and associated support facilities. The GMD competitive acquisition approach will help minimize the risk of obsolescence, provide opportunities for periodic weapons system refresh, allow decision makers to make informed trades between cost, schedule, and performance, and based on historic data, will likely result in a cost savings of approximately 15%.

We also must design missile defenses that can adapt to future threats. As a hedge against future uncertainty, we have a number of on-going development programs to push the edge of the technology envelope. For example, we are requesting funds to begin development of a Precision Tracking Space System (PTSS). We are also requesting funds in FY 2011 to develop technologies that will kill missiles with directed energy and high velocity versions of the SM-3 family of missiles to intercept targets early in flight.

II. PROGRAM HIGHLIGHTS

In accordance with the Ballistic Missile Defense Review, the FY 2011 program is balanced to develop, rigorously test, produce, and integrate a BMDS architecture. The FY 2011 program has four focus areas based on the Agency's strategic goals:

- Provide capabilities to *defend the territory of the United States* against ballistic missile threats from rogue nations
- Enhance missile defense to *defend* our deployed forces, allies, and friends *against regional threats* including defeating large raid sizes and intercepting early in flight
- *Prove our BMDS works* before making production decisions ("fly before buy")
- *Develop future missile capabilities* that are adaptable and responsive to intelligence-based judgments of the threat.

The following discussion provides a summary of the highlights of the major Program Elements and does not necessarily include a discussion of all of the funding that resides in that Program Element.

Continuing a Viable Homeland Defense

Ground Based Midcourse Defense (GMD) (PE 0603882C): For the Future Years Defense Plan (FYDP), we are requesting $5.883B, including $1.346B in FY 2011. We will continue the development of long-range GMD capabilities with the deployment of 26 Ground-based Interceptors (GBIs) at Ft. Greely, Alaska and four GBIs at VAFB in California. We are requesting $359M to continue the improvement and expansion of the interceptor fleet, including an additional five GBIs with upgraded avionics (Fleet Avionics Upgrade/Obsolescence Program – FAU/OP) to support the new test program and Stockpile Reliability Program. We intend to complete Missile Field 2 in a 14-silo configuration by FY 2012. Once completed, we will transfer six GBIs currently deployed in Missile Field 1 to Missile Field 2. We plan to decommission Missile Field 1, since it was designed as a test asset only (i.e. not hardened or robust for long-term operational deployment), once Missile Field 2 is fully operational. Although we do not need to deploy more than 26 operational interceptors at Ft. Greely, completion of Missile Field 2 will allow for a contingency deployment of up to eight additional GBIs if needed over the next decade.

Sea Based X-Band Radar (SBX) (PE 0603907C): For the FYDP, we are requesting $820M, including $153M in FY 2011. The FY 2011 request includes $98M for the operations and sustainment of the SBX platform and its support vessel (the Dove) and $43M for operations and sustainment of the X-band radar in support of BMDS flight testing, as well as the completion of software upgrades that provide an improved capability to discriminate between countermeasures and re-entry vehicles.

BMD Sensors (PE0603884C): The BMD Sensors PE supports both the homeland and regional missions. For the former, we are requesting $23M in FY 2011 to sustain and upgrade Cobra Dane and the Upgraded Early Warning Radars (UEWRs) (Beale, Fylingdales and Thule). The Cobra Dane radar will undergo minor changes to existing hardware and will receive software upgrades. The UEWR upgrades will include replacing decades-old processing

hardware and the associated software. Finally, we will continue planning and design analysis to upgrade the Clear Early Warning Radar in Alaska to a UEWR for robust sensor capability for homeland defense.

Enhancing Regional Defense

Missile Defense Capability in Europe: The Phased Adaptive Approach:

- *Land Based SM-3 (PE 0604880C)*: This is a new PE. For the FY 2011 – 2015 Future Years Defense Plan (FYDP), we are requesting $1.047B of Research, Development, Test & Evaluation (RDT&E) funding, including $281M for FY 2011, to develop, test and deploy an Aegis Ashore capability for the Phased Adaptive Approach (PAA). The first Aegis Ashore battery is scheduled to be deployed by CY2015 with 24 SM-3 Block IB interceptors. The FY 2009 Appropriations bill included MILCON funding for the European missile defense sites in Europe which is no longer required. In FY 2010, the Congress rescinded the FY 2009 funds but appropriated $68.5M to construct an Aegis Ashore test facility at the Pacific Missile Range Facility (PMRF) in Hawaii. This project was not authorized since the President did not publicly announce his European Phased Adaptive Approach until September 17, 2009, well after the House and Senate had completed the conference agreement on the Defense Authorization Bill. In the FY 2011 President's Budget, the Department is requesting a modification to the FY 2010 Defense Authorization Act to seek authorization for the $68.5M Aegis Ashore Test Facility at PMRF.
- *Airborne Infrared (ABIR) (PE 0604884C)*: This is also a new PE. For the FYDP, we are requesting $501M of RDT&E funding, including $112M for FY 2011, for the development, testing and fielding of ABIR sensor platforms to support tracking large ballistic missile raid sizes for Phase 2 of the Phased Adaptive Approach. Three ABIR combat air patrols, each with four ABIR platforms, are scheduled to be available by CY2015. The forward-based ABIR platforms are a key to increasing our ability to defeat large ballistic missile raids and enable early intercepts.

Ballistic Missile Defense System Procurement (PE 0208866C): We are proposing significant increases in regional capability in response to warfighter requests. For the FYDP, we are requesting $8.669B of Procurement funding, including $953M for FY 2011, to procure additional THAAD batteries and interceptors, Aegis SM-3 Block IB interceptors, and AN/TPY-2 radars as outlined below:

- $4.013B in the FYDP, including $859M in FY 2011, to buy a total of nine THAAD batteries and 431 interceptors by 2015. This is an increase of three additional THAAD batteries and 142 additional interceptors compared to the program described in the President's Budget request for FY 2010. In addition, the FY 2011 program now provides a total of 42 THAAD launchers to increase the number of THAAD launchers per battery from three (FY 2010 program) to six.
- $3.129B in the FYDP, including $94M in FY 2011, to buy a total of 436 Aegis SM-3 Block IA and IB interceptors by 2015. This is an increase of 107 interceptors compared to the FY 2010 program.

- $1.527B in the FYDP starting in FY 2012, to add an additional three AN/TPY-2 radars to our previous procurement plan for a total of 14 AN/TPY-2 radars by 2015 compared to the FY 2010 program, which planned delivery of 11 AN/TPY-2 radars.

Terminal Defense (PE 0603881C): For the FYDP, we are requesting $2.046B, including $436M in FY 2011. The request includes $64M to complete the hardware deliveries, including ground components and 23 interceptors that were incrementally funded, and $62M for hardware and software improvements and enhanced modeling and simulation. The THAAD system can engage the enemy's incoming reentry vehicle (RV) above or in the earth's atmosphere in the terminal phase of flight. To launch THAAD interceptors using data from other BMDS sensor elements, we are integrating THAAD into our BMDS C2BMC by upgrading THAAD's communications and command and control system. We are also requesting $63M for continued flight and ground testing and the completion of Insensitive Munitions/Final Hazard Classification testing. Beginning in FY 2012, we intend to transition the operations and support costs for THAAD batteries to the Operation and Maintenance (O&M) appropriation.

BMD Aegis (PE 0603892C): For the FYDP, we are requesting $5.602B, including $1.467B in FY 2011. The request includes $165M to complete manufacturing of 30 SM-3 Block IB interceptors that are incrementally funded from the RDT&E appropriation. All additional SM-3 Block IB interceptors are fully funded from the Procurement appropriation after the Under Secretary of Defense for Acquisition, Technology and Logistics has approved initial production. The remainder of the request is primarily devoted to continuing the hardware and software developments as outlined below:

- $143M for the continuing development and testing of the Aegis BMD 4.0.1 Combat System. The System expands the Aegis BMD Weapons System (AWS) effectiveness by allowing the use of both the SM-3 Block IA and the SM-3 Block IB interceptor. It improves engagement performance against an expanded threat set and surveillance and track performance against some IRBMs as well as the capability of using remote BMDS sensor information to launch an interceptor (termed "Launch-on-Remote").
- $99M to continue the upgrade of three additional Aegis BMD engagement ships (two Aegis BMD 3.6.1 destroyers and one 4.0.1 destroyer).
- $255M for continuing development and testing of the SM-3 Block IB interceptor. The SM-3 IB is the next upgrade entering the fleet. The seeker, signal processor, and propulsion system of the Block IB missile kinetic warheads are improved versions of the proven Block IA missile and will result in increased missile effectiveness against growing technical sophistication of ballistic missiles. This missile upgrade, in combination with the BMD signal processor, provides Aegis BMD and the BMDS with an improved capability to identify closely spaced objects and probability of kill against advanced threats; it also expands the number of possible simultaneous engagements.
- $110M for system-level testing, including two important flight tests: (1) exercise the PAA's Phase 1 capability with an Aegis BMD AWS 3.6.1 and SM-3 IA interceptor engagement of an MRBM target; and (2) test an Aegis BMD AWS 4.0.1 and SM-3 Block 1B missile engagement and intercept of an MRBM target.
- $228M for continuing development and testing of the Aegis BMD 5.0 capability. Aegis BMD 5.0 will integrate Aegis BMD 4.0.1 with the Open Architecture system developed

by the Navy. This will allow the transition of Aegis BMD from older military standard computers to a commercial-off-the-shelf (COTS) computing system and will ensure the Aegis BMD system remains compatible with Navy assets as ship modernization plans are executed. A significant advantage of Aegis BMD 5.0 is that it will enable any Aegis ship to serve as a candidate for the BMD mission.

- $119M for development of Aegis BMD 5.1. Aegis BMD 5.1 integrates the SM-3 Block IIA missile with the 5.0 Open Architecture AWS and is capable of using remote BMDS sensor information to engage an incoming target (Engage-on-Remote).

Aegis SM-3 Block IIA Co-Development (PE 0604881C): This PE was established in the FY 2010 budget. We are requesting $1.705B for the FYDP, including $319M in FY 2011, for the development and testing of the SM-3 Block IIA interceptor which is being co-developed in cooperation with the Government of Japan. The SM-3 Block IIA missile will have a significant increase in velocity and range due to 21-inch diameter rocket motors, a two-color seeker, and an increased divert capability incorporated in an advanced kill vehicle. With these improvements, the SM-3 Block IIA missile will be able to defend a larger area against a wider range of threats than the Block I missiles.

BMD Sensors (PE0603884C): For the FYDP, we are requesting $2.873B, including $455M in FY 2011. The Sensors PE also supports the homeland defense mission, but most of the FY 2011 request is focused on the development of enhanced regional capabilities using the X-band AN/TPY-2 radar. The AN/TPY-2 radar is capable of operating in either a forward-based mode to provide information to the BMDS, or in terminal mode to provide information to a co-located THAAD battery. We are requesting $129M in FY 2011 for operations and sustainment of AN/TPY-2 radars worldwide and communications sustainment. We are also requesting $50M in FY 2011 for common software upgrades including the verification and validation of the first common software build (CX-1) that will allow the AN/TPY-2 radar to operate in a forward based mode or a THAAD radar mode. We are also requesting $36M for a Concurrent Test, Training and Operations (CTTO) capability that will provide operational BMDS sensors (to include the UEWRs, Cobra Dane and SBX) the capability to conduct simultaneous training and testing while continuing to operate the missile defense capability. For testing, we are requesting $68M for Sensors participation in BMDS flight and ground tests and for element test infrastructure; $26M for modeling and simulation (M&S) activities supporting all phases of sensor development; and $17M for development work related to Unifying Missile Defense Functions (communications, sensor registration, correlation, system track, system discrimination, battle management, and hit-to-kill assessment), which further increase BMDS integration.

Proving Missile Defense Works Through Enhanced Testing

BMD Test and Targets (PE 0603888C): For the FYDP, we are requesting $4.872B, including $1.113B in FY 2011. MDA conducted a systematic review of the BMDS testing program in 2009, using a new approach that transitioned from the use of "architecture based" test objectives to "technical parameter-based" test objectives to collect data to anchor models and

simulations (M&S). Flight testing can be too expensive and manpower intensive to be used as the sole means of statistically proving the effectiveness of the BMDS. We must therefore gather a set of pre-determined empirical data in our flight and ground testing programs and compare the results to those predicted by our models to support independent accreditation of our models and simulations. Under the new parameter-based approach, MDA and the Services' Operational Test Agencies have identified the specific data to be gathered and the circumstances in which to measure them – Critical Engagement Conditions (CECs) and Empirical Measurement Events (EMEs). We have identified, scheduled, and resourced over 120 test events over the FY 2011 to FY 2015 time period. In FY 2011 we are requesting $559M to support system level flight and ground tests, operate MDA range facilities and support Combined Test, Training, and Operations (CTTO) and the Distributed Multi-Echelon Training System (DMETS).

One of our most difficult test challenges is to acquire an inventory of reliable targets to represent a wide variety of threat ballistic missile parameters. In the past, our target acquisition strategy was comprised of uniquely combining and modifying older U.S. missile systems to perform as targets. These unique configurations were expensive and difficult to manage from a quality control standpoint. Over the past year, we have initiated steps to acquire a new set of targets. We are requesting $517M to provide threat representative targets of all ranges (short, medium, intermediate and intercontinental), to include Foreign Materiel Acquisitions with enhanced payloads to test, verify, and validate the performance of the BMDS. This Targets and Countermeasures (TC) funding includes $115M for non-recurring engineering and $250M for participation in BMDS flight tests utilizing short-, medium-, intermediate-, and intercontinental-range launch vehicles (LVs), reentry vehicles (RVs), and associated objects; $44M for Systems Engineering support; and $39M for inventory storage, aging surveillance and transportation of TC hardware in support of these tests. New competitive contracts will be awarded in FY 2011 to procure inventories of targets to allow the availability of backup targets for every flight test starting in FY 2012.

Test Planning and Modeling and Simulations: Evaluating the BMDS is likely one of the most challenging test endeavors ever attempted by the Department of Defense because of the global distribution of the system, high complexity of the engagements, and few live fire events. Ideally, comprehensive and rigorous testing is enabled by a stable configuration of the system being tested; a clearly defined threat; a consistent and mature operational doctrine; sufficient resources to repeat tests under the most stressing conditions; and a well-defined set of criteria of acceptable performance. Unfortunately, none of these situations applies to the BMDS. The hardware and software configurations of the BMDS frequently change since the system elements are still under development. There are significant uncertainties surrounding the nature and specifics of the ballistic missile defense threat. Moreover, the operational doctrine for simultaneous theater, regional, and homeland defense needs refinement. Further, costs can range between $40 million to $200 million per BMDS flight test, making the repetition of a very elaborate flight test cost-prohibitive.

In light of these challenges, the BMDS performance evaluation strategy is to develop models and simulations (M&S) of the BMDS capability and compare their predictions to empirical data collected through comprehensive flight and ground testing to verify and validate their accuracy. Then, rather than physically test all combinations of BMDS configurations,

engagement conditions, natural and man-made environments, and target phenomena, BMDS M&S can be used to assess full BMDS performance. These models are anchored by Critical Engagement Conditions (CECs) and Empirical Measurement Events (EMEs) data gathered via the MDA flight test program. The resultant models will be used in extensive BMDS technical assessments, which will augment the scenarios run in ground and flight tests with hundreds of additional cases to cover the threat, environmental and operational conditions needed to complete a high-confidence assessment of BMDS performance.

To that end, we are changing from an architecture-based approach to a verification, validation, and accreditation (VV&A) based parameter approach to testing. The validation of our models and simulations will enable our war fighting commanders to have confidence in the predicted performance of the BMDS, especially when those commanders consider employing the BMDS in ways other than originally planned or against threats unknown at this time. Despite this desire to rely on models, the complex phenomena associated with missile launches and associated environments mean that some performance measurements can only be investigated through flight and ground testing of the operational BMDS.

The MDA executes a combined developmental and operational test (DT/OT) program that actively involves the OTAs, the Director, Operational Test and Evaluation (DOT&E) and the warfighter community in all phases of test planning, execution, and post-test analysis. Early OTA involvement during a development program provides significant value to the developer, the OTA, and the warfighter.

A BMDS three-phase test review is conducted semi-annually to determine how to validate MDA M&S so that the war fighting commanders have confidence in the assessed performance of the BMDS. In Phase I, the data collection requirements to anchor models and simulations are identified and approved. In Phase II, an unconstrained test design is produced, using test data collection requirements from Phase I. In Phase III, an executable plan is developed by bringing the unconstrained test program in line with budget and resource realities. At the conclusion of the three-phase, semi-annual test plan review, the BMDS OTA Team and MDA produce, with full involvement by the DOT&E and the Joint Functional Component Command – Integrated Missile Defense (JFCC-IMD), approve and update the BMDS Integrated Master Test Plan (IMTP). The updated IMTP is event-oriented and extends until the collection of all identified data is completed to ensure adequate test investments.

In future revisions of the IMTP, the Director, Developmental Test and Evaluation (DDT&E) (a newly established position per the Weapons Systems Acquisition Reform Act of 2009) will participate in activities to update the IMTP and will also be a signatory of the document.

Developing Future Capabilities That Are Adaptable and Responsive

Space Tracking and Surveillance System (STSS) (PE 0603893C): For the FYDP, we are requesting $355M, including $113M in FY 2011. STSS launched two demonstration satellites on 25 September 2009 and has completed 50 percent of its system functionality testing. For FY 2011 we are requesting $84M to continue testing and operation of the two demonstration

satellites, including cooperative tests with other BMDS elements. We are also requesting $24M for the planning and participation of the demonstration satellites against targets of opportunity and scheduled IMTP tests. We will conduct feasibility demonstrations of down-linking STSS data to the Aegis BMD fire control system via C2BMC in preparation of an Aegis BMD remote launch engagement in FY 2012.

Precision Tracking Space System (PE 0604883C): The Precision Tracking Space System (PTSS) is a new Program Element. PTSS consists of prototype satellites, command and control, and ground stations. For the FYDP, we are requesting $1.207B, including $67M in FY 2011. We are developing the technologies to provide a persistent classification and global tracking capability that would greatly enhance the effectiveness of the BMDS because terrestrial-based sensor systems have inherent limitations, in particular their inability to acquire and track missiles around the curvature of the earth, require significant operational costs, and require permission on where, when, and how to operate by the host nation. Lessons learned from the two STSS demonstration satellites currently on orbit will inform our decisions on the development of the PTSS capability. Of the $67M, we are requesting $64M in FY 2011 to complete trade studies, alternatives analysis, and concept review; define and document the internal and external interfaces; conduct software-in-the-loop testing; and completion of the System Requirements Review, System Design Review, and Preliminary Design Review. The goal is to demonstrate the prototype PTSS system in FY 2014.

BMDS Space Program (PE 0603895C): For the FYDP, we are requesting $57M, including $11M in FY 2011. The requested funding is for the operation of the Missile Defense Space Experimentation Center (MDSEC). The MDSEC provides a single location for MDA elements to conduct on-orbit operations for satellites such as the two STSS demonstration satellites. The MDSEC also participates in BMDS tests, including data collection on targets of opportunity. Finally, the MDSEC conducts experiments, data integration, algorithm development and concept exploration to demonstrate the contribution of a space-based infrared sensor to overall BMDS performance.

BMD Technology (PE 0603175C): For the FYDP, we are requesting $1.004B, including $132M in FY 2011. Our advanced technology effort is focused on investing in potentially high payoff but low technology readiness level (TRL) technologies to provide such capabilities as the intercept of an enemy RV early in the battle space; optimized shoot-look-shoot opportunities; options for minimizing the potential impact of debris; and reductions to the number of interceptors required to defeat a raid of threat missiles. To achieve these goals, we are pursuing several efforts, including enhanced command, control, battle management and communications capabilities, high performance interceptor and kill vehicle components, and experiments to integrate ABIR, STSS, and new sensor technologies and to demonstrate early intercept concepts. For FY 2011, we are requesting $52M for C2BMC enhancements that will focus on the potential benefit of migrating the BMDS architecture to a net-centric, service-oriented architecture and combining National sensing capabilities with Airborne Infrared systems. We are requesting $41M in FY 2011 to develop components that increase the speed of our SM-3 family of interceptors with advanced divert capability, faster boosters, and lighter kill vehicles. We have also included $21M for science and technology research on innovative and breakthrough technologies such as a next-generation radar and electro-optical infrared passive sensors.

Other BMDS Program Highlights

Command and Control, Battle Management and Communications (C2BMC) (PE0603896C): For the FYDP, we are requesting $1.619B, including $343M in FY 2011. The C2BMC system is the backbone for the BMDS integration of sensor and fire control information and provides solutions to the various homeland and regional interceptors. More specifically, the C2BMC system provides: planners to help optimize the deployment of BMD assets; communications links between BMDS elements; a battle management function that allows a shoot-look-shoot approach; control of BMDS radars, correlating and combining sensor data from multiple sensors tracking the same threat into one BMD system track; real-time awareness of the battle as it develops; engagement coordination between BMDS elements; and advanced battle planning capability that enables warfighters to place BMDS assets in ideal locations in anticipation of a ballistic missile threat. To provide this capability, the C2BMC program is being developed, tested and provided to the warfighter in discrete spirals of capability.

- In FY 2011 we are requesting $217M to complete verification testing of Spiral 6.4 and continue development of Spiral 8.2. We are establishing a C2BMC prototyping and analysis activity at Ramstein AFB, Germany, with the Air Force to ensure Spiral 6.4 meets the Warfighter's needs. Spiral 8.2 will provide multi-element engagement coordination, incorporate boost tracking, and improve system-level coordination. The funding will also allow C2BMC to participate in and analyze the results from ground and flight tests, war games and exercises.
- We are requesting $48M in FY 2011 to maintain the C2BMC training and sustainment of deployed systems, and $32M for fielding of Spiral 8.2 hardware at Northern Command (NORTHCOM), Strategic Command (USSTRATCOM), Pacific Command (USPACOM), European Command (USEUCOM) and Central Command (USCENTCOM). Finally we are requesting $35M to develop, test and install communications node equipment and long-haul communications necessary to support the Phased Adaptive Approach.

BMD Enabling Programs (PE 0603890C): One of MDA's strategic goals is to "deliver reliable, high quality, and fiscally sustainable missile defense products." In pursuit of this goal, we are requesting $2.292B for the FYDP, including $403M in FY 2011 for BMD Enabling Programs to continue integration of stand-alone missile defense systems into a layered BMDS. To achieve this integration, Enabling Programs provide the required expertise in systems engineering, threat assessment, manufacturing maturity, modeling and simulation, quality, safety, and mission assurance. In FY 2011 we are requesting Enabling Programs support as follows:

- $124M for Systems Engineering and Integration support to continue the development and improvement of the integrated BMDS and to prove the effectiveness of the system. This support includes the analysis and engineering trades required for developing the Phased Adaptive Approach.
- $16M for Intelligence and Security support for intelligence, counterintelligence and BMDS Information Assurance development and management. Collectively, these efforts

provide critical protection against cyber attacks and information regarding threat ballistic missile capabilities (via intelligence), protection of personnel, activities and technology from espionage and terrorism through active and passive activities (via counterintelligence), and BMDS system vulnerabilities (via BMDS information assurance).

- $37M for Production and Manufacturing support. This support applies production tools such as Design and Manufacturing Assembly, supply chain gap analysis, and Continuous Process Improvement approaches such as Lean Six-Sigma to eliminate manufacturing waste, reduce process variability and ensure first time manufacturing quality for the BMDS.
- $112M for Information Technology (IT) support services required to operate and maintain the classified and unclassified local, metropolitan, and wide area networks and IT general services for missile defense in the National Capital Region (NCR), including the Aegis Program Office in Dahlgren, Virginia; the Huntsville, Alabama region; the Colorado Springs region; Kirtland Air Force Base (AFB) in New Mexico; Edwards Air Force Base in California, Elmendorf AFB, Eareckson Air Force Station, and Fort Greely in Alaska, and the Pacific Missile Range Facility in Hawaii. This support includes operation and maintenance of hardware, software and help desk services.
- $65M for Modeling and Simulation (M&S) support. The ability to develop models and simulations that provide a repeatable, consistent and accurate representation of real-world missile defense operations is essential for the future success of the BMDS. The primary mission of the M&S program is to develop system-level models and simulations that compare predictions to empirical data gathered through the comprehensive flight and ground test programs to validate their accuracy.
- $33M for Quality, Safety, and Mission Assurance. This support provides on-site quality surveillance for the MDA Director at contractor facilities across the United States. These Safety, Quality, and Mission Assurance experts provide oversight functions ranging from production work to executive management to reduce cost and risk.

Joint Warfighter Support (PE 0603898C): For the FYDP, we are requesting $327M, including $69M in FY 2011. Joint Warfighter Support is MDA's principal interface to the Warfighter (i.e., the Combatant Commands and their Functional/Service Components; the Joint Staff; and the Military Services). The primary mission of the Joint Warfighter Support is to ensure the effective transition and transfer of BMDS capabilities to the Warfighter through the Warfighter Involvement Process (WIP). The FY 2011 request includes $7M for the continued operations support to the BMDS through the Operational Support Center, which is manned 24 hours per day, 365 days per year to develop, maintain and communicate BMDS situational awareness data concerning the current "health and status" of the BMDS; $36M for support to Combatant Commander exercises and wargames, $7M for BMD education and training, including the operation of the BMDS Training and Education Center and $12M for warfighter interface management and Combatant Commander support.

Israeli Cooperative (PE 0603913C): For the FYDP, we are requesting $581M, including $122M in FY 2011. This amount includes

- $51M for the continued development of Upper Tier component of the Arrow Weapon System. The Upper Tier component of the Arrow Weapon System will provide Israel with an indigenous capability to defend against medium- and long-range ballistic missiles and will provide a cornerstone for the Architecture Enhancement Plan, which is a joint effort to create a combined U.S.-Israel multi-tier Missile Defense Architecture. Another $24M is needed to continue co-production of the Arrow interceptors and the Arrow System Improvement Program (ASIP). The ASIP will enhance the performance of the Arrow Weapon System to defeat longer-range and more robust ballistic missile threats expected to be introduced to the Middle East in the near future.
- $47M for the continued development of the David's Sling Weapon System for protection against Short-Range Ballistic Missiles (SRBMs). The 2006 summer conflict between Hezbollah and Israel underscored the strategic effect of inexpensive short-range ballistic missile attacks on civilian populations. The current Israeli architecture (comprised of PATRIOT and Arrow) has capability against some, but not all of these short-range ballistic missile threats. Consequently, in March 2005 the U.S. and Israel initiated an 18-month feasibility study of a low cost SRBM defense capability, and in September 2008, the United States and Israel signed a project agreement to jointly manage the development of the David's Sling Weapon System.

Directed Energy Research (PE 0603901C): For the FYDP, we are requesting $512M, including $99M for FY 2011. In this request, we have zeroed out funding in the BMD Boost Defense PE - Airborne Laser (ABL) (PE 0603883C) and created a new PE to fund continued research on lasers. The Missile Defense Agency (MDA) will continue focused directed energy research and development to hedge against future threats. Near-term efforts will focus on scaling lasers for use (and test) on operationally viable and logistically supportable platforms to include development of a Diode Pumped Alkaline-gas Laser System (DPALS). Success in this effort could transition to prototyping activities for future BMD systems. MDA will transition the ABL aircraft to a National Laser Test Platform for advanced directed energy research for missile defense. Working with the Director of Defense Research and Engineering (DDR&E) and the High Energy Laser Joint Technology Office, MDA will leverage the airborne test platform to characterize high-energy, long-range laser beam propagation and validate the chemical oxygen iodine laser and other laser models in flight tests. The test platform will also provide a venue for other integrated laser weapon system demonstrations.

III. SPECIAL TOPICS

International Participation

Ballistic missile defense is a global effort that requires the United States to work closely with friends and allies to dissuade potential adversaries from acquiring ballistic missiles and, if necessary, defeat ballistic missile attacks. International participation in missile defense remains a pillar of our nation's counter-proliferation strategy, and one of MDA's strategic goals is "expand international cooperation and development of missile defenses in accordance with national defense policy."

MDA's International Strategy aims to build relationships and communicate the importance of missile defense with the practical effect of expanding global missile defense capability and interoperability. Through the international fielding of missile defense assets, the identification and integration of U.S. and partner assets and systems, technology development efforts, and other forms of cooperation and collaboration, MDA robustly supports national defense policy.

International participation in missile defense continues to grow and is especially responsive to the threat posed by Iranian and North Korean weapon development activities. MDA works closely with Combatant Commanders, the State Department, and other government agencies to support their missions and international missile defense goals.

Most recently, the President approved the Phased Adaptive Approach for missile defense in Europe. This new approach was based on an updated assessment of the Iranian missile threat and a commitment to deploy technology that is proven, cost effective, and adaptable to an evolving security environment. The PAA will build on already fielded BMDS assets to deploy capability in four phases, delivering missile defenses earlier than prior plans for defense of Europe, and will complement NATO missile defense activities. This approach is applicable to other regions of the world if threats emerge.

More broadly, MDA international research partnerships and technology programs provide significant contributions to the BMDS. These partnerships include six "framework" agreements to facilitate BMD cooperation with Japan, the United Kingdom, Australia, Denmark, Italy and the Czech Republic. In the case of the Czech Republic, MDA is continuing its productive partnership with Czech government, industry, and academic sources to further several missile defense technology efforts. Additionally, cooperative activities are under consideration with several other nations.

MDA continues to support efforts to collaborate with the Russian government on missile defense. We have supported several meetings of experts, and MDA stands ready to support more substantive technical and information-sharing initiatives with Russia.

NATO continues to examine its missile defense requirements. As a result of its Missile Defense Feasibility Study, the 2008 NATO Bucharest Summit recognized the importance of protecting member Nations from ballistic missile threats. The subsequent 2009 Strasbourg-Kehl Summit noted that future U.S. contributions of architectural elements could enhance NATO efforts and that missile threats should be addressed in a prioritized manner. As noted above, MDA activities in support of the PAA are expected to complement NATO's missile defense strategy. MDA continues to collaborate closely with NATO's Active Layered Theater BMD Program Office to demonstrate U.S.-NATO BMD interoperability and to ensure an integrated planning capability exists. These efforts give the Department of Defense confidence that interoperability with NATO will be supported throughout PAA's four phases.

Longstanding relationships continue to evolve, making substantial contributions to security and laying a firm foundation for future cooperation and contributions. Japan has proceeded to field operational Aegis Destroyers with a BMD capability and is also upgrading

their PATRIOT Advanced Capability (PAC)-3 units. Japan is currently fielding a multilayered BMD system that is capable of being interoperable with the U.S. system, including the forward-based U.S. AN/TPY-2 radar at Shariki and our Aegis BMD ships in the region. The X-band radar at Shariki provides precise early detection and tracking to increase the probability we will destroy any lethal target launched by North Korea.

Also, we are continuing our work with Japan through the joint SM-3 Block IIA Cooperative Development Project that promises to deliver a substantial capability to defeat more robust threats. The development of the 21-inch diameter SM–3 Block IIA interceptor will increase our capability to engage more robust threats from Aegis BMD platforms. This effort is one of the largest and most complex cooperative projects ever undertaken between Japan and the United States.

Our long-standing partnership with the United Kingdom has continued to expand as we have increased the capabilities of the Fylingdales Early Warning Radar and improved our combined C2BMC situational awareness, and we are exploring new areas of future cooperation both on a bilateral basis and potentially in concert with other allies. The United States and Denmark completed the Thule Early Warning Radar upgrade to the configuration of other early warning radars and, like the radar at Fylingdales, Thule will significantly enhance our capability to detect and track ballistic missile threats emerging from the Middle East.

The United States and Israel have cooperated on missile defense for over twenty years. Collaborative efforts have grown from early feasibility studies to the development and employment of the Arrow Weapon System, a fully operational missile defense system that is interoperable with U.S. BMDS elements. On-going cooperative programs and forthcoming initiatives will continue to advance this cooperation. These include U.S. and Israeli industrial co-production of Arrow interceptors; the joint short range David's Sling Weapon System; and development of an Israeli upper-tier defense system. The Juniper Cobra exercise in 2009 demonstrated the great potential for integrating U.S. and Israeli missile defense systems.

The upcoming year will include several significant events to demonstrate combined U.S. and Israeli missile defense capabilities and interoperability. U.S. BMDS elements, such as the AN/TPY-2 radar, THAAD, and the Aegis BMD Weapon System, will participate in these flight tests to demonstrate interoperability and enhance combined operations and develop and refine tactics, techniques and procedures associated with this coalition architecture.

The MDA and Israel are jointly developing the David's Sling Weapon System to defend Israel against shorter range ballistic missile and large caliber rocket threats. The first booster fly-out was successfully conducted in February 2009, and the first intercept test is scheduled to occur in 2010, to be followed by the first system flight test in 2011. Upon implementation of the U.S./Israel Upper Tier Interceptor Project Agreement, cooperative efforts will begin to develop and demonstrate the Arrow-3 interceptor with a potential system fly-out test in 2011.

MDA continues to expand its international initiatives in the Middle East, where interest is significant and growing. We continue to work on the development of a Foreign Military Sales (FMS) Letter of Offer and Acceptance for THAAD with the United Arab Emirates. If all options

are exercised, the sale of THAAD to the UAE would be valued at $6.9B and introduce an important new BMD capability in the Gulf Region.

MDA continues to work closely with USCENTCOM on international engagement and outreach on missile defense topics. MDA actively participates in USCENTCOM Bilateral Air and Missile Defense Working Groups that have been established with Bahrain, Kuwait, Saudi Arabia, and Qatar. In FY 2010, we expect Working Group participation to expand to include all six Gulf Cooperation Council (GCC) countries.

Other outreach efforts include the conduct of BMD architecture analyses and participation in the ARCENT International Air and Missile Defense (IAMD) Symposium. The IAMD Symposium includes a mix of hands-on training of the U.S. Military decision making process and senior-level briefings on development of air and missile defense designs. In FY 2010, the IAMD symposium will focus on missile defense, and MDA participation will increase to include simulation support to conceptualize and validate partner nation plans developed as part of the Symposium's training. At USCENTCOM's request, MDA conducted BMD analyses for Bahrain and Saudi Arabia in FY 2009 and will conduct analysis for Kuwait and Oman in FY 2010. BMD analysis for Qatar is expected to take place as part of a larger FMS case for defense analysis.

Elimination of the BMDS Block Structure

With the President's Budget for FY 2009, we presented the Agency's programs and budget below the program element level according to a new capability-based "block structure" that was based on significant increments of capabilities against particular threats. The new structure included five blocks, each being a subset of and contributing to the overall, integrated operational BMD capability pool. However, the House Appropriations Committee stated in its report on our FY 2009 budget that "justification materials should no longer be presented in the Block format, but rather by fiscal year for each activity within the program element." As a result of this congressional direction, we have eliminated use of the capability-based block structure for all planned funding from FY 2011-2015. MDA's budget request for FY 2011 reflects our incremental, evolutionary approach to enhancing the BMDS. Whether the delivered capability is a new component or an enhancement to an existing one, each delivered capability ultimately, following successful testing, constitutes an incremental upgrade to the entire BMDS. With elimination of the BMDS block structure, we began establishing our cost and schedule baselines for components within project elements and performance baselines for homeland and regional BMDS capabilities in the BMDS Accountability Report (BAR) to Congress dated 13 August 2009.

IV. MDA Management

New Acquisition Oversight Process

In recent months, MDA has been establishing a process to better translate capability needs and technology opportunities into stable, affordable, and well-managed BMDS development programs. The Deputy Secretary of Defense approved the BMDS Life Cycle

Management Process in 2008. Our structured and transparent BMDS development management process will be based on certain key principles:

- Baseline reviews to describe and manage development programs through six baselines (resource, schedule, technical, test, contract, and operational)
- Evolutionary delivery of incremental capability to the warfighter
- Distinct and disciplined phases for Materiel Solution Analysis (Concept Exploration), Technology (Concept) Development, and Product Development (Design and Demonstration)
- Use of Knowledge Points for measuring progress and informing key decisions
- Balancing of capability needs and available resources (mature technologies and adequate schedule and funding) at the start of product development–the key decision point for making a substantial investment in a new BMDS capability

These principles are consistent with Federal statutes and the tenets of the Defense Acquisition System (Department of Defense Instruction 5000.02) and acquisition best practices recommended by the Government Accountability Office (GAO). They also reinforce the direction provided by Congress in the Weapon Systems Acquisition Reform Act of 2009.

The reviews mentioned above will emphasize the establishment of sound baselines and confirmation of an affordable, achievable plan for proceeding from one phase to the next. Reviews will consider earned value data and Knowledge Points. All BMDS elements have prime contracts with integrated cost, schedule, and technical baselines along with a performance measurement process. As a result, the Agency has significant cost, schedule, and technical performance transparency on the elements' budgeted dollars. This transparency allows for measurement of deviations to the program baseline to better promote accountability. Product Development baseline reviews will be co-chaired with the lead service Acquisition Executive and Director, MDA. In January 2010, we held our first review with the U.S. Navy Assistant Secretary of Research, Development and Acquisition, and we will complete all reviews by the third quarter of FY 2010.

Missile Defense Agency Engineering and Support Services (MiDAESS)

The MDA acquires contractor support services mostly through headquarters contracts, program level contracts with Other Government Agencies (OGA), direct contracts with OGAs, and General Services Administration orders. To gain efficiencies, MDA has determined the best path forward is to transfer the Advisory and Assistance Services work to an MDA program for enterprise-wide functional management and oversight. In 2007 the MiDAESS program was established to more efficiently and effectively provide engineering and technical support; studies, analyses, and evaluation support; and management and professional services enterprise-wide.

Over the course of 2009, the Agency finalized the MiDAESS acquisition strategy. In April 2009 the Small Business Administration concurred with the MiDAESS acquisition cost-benefit analysis, and in May 2009, the Office of the Secretary of Defense approved the MiDAESS acquisition plan. With this approval, MDA released two solicitations in June 2009: Full and Open unrestricted competition and Small Business Set-Aside competition to support

requirements from 16 functional organizations. The Agency received proposals from interested companies in July 2009 and began source selection evaluations in August 2009. The completion of source selection will result in multiple Indefinite Delivery/Indefinite Quantity (IDIQ) contract awards. We anticipate all contracts will be awarded during FY 2010, and some task orders executed under the IDIQ contracts will begin as well.

Base Realignment and Closure (BRAC)

The 2005 Defense Base Realignment and Closure (BRAC) Commission approved recommendations directing the realignment of several MDA functions from the National Capital Region (NCR) to government facilities at Fort Belvoir, Virginia, and the Redstone Arsenal in Huntsville, Alabama. Specifically, a Headquarters Command Center (HQCC) for MDA will be located at Fort Belvoir, while most other MDA mission and mission support activities originally in the NCR will be realigned to Redstone Arsenal.

In support of these realignments, MDA awarded contracts to construct two new facilities: a $38.5 million HQCC at Fort Belvoir, and a $221 million addition to the Von Braun Complex at Redstone Arsenal. HQCC construction began in 2009 and is expected to be completed for occupancy in FY 2011. The HQCC will accommodate 292 positions. The Von Braun project construction began in the fall of 2008. The first phase is being readied for occupancy by late 2010, and the second phase scheduled for completion and occupancy by the BRAC deadline of September 15, 2011. Meanwhile, the transfer of government and contractor positions from the NCR is well underway. Thus far, MDA has transitioned approximately 1,500 of the planned 2,248 positions to Huntsville/Redstone Arsenal.

Human Capital Development

The constantly changing nature of the BMDS mission will drive a variety of requirements and new priorities that will influence how we support that mission. Translating the impact of these changes into how they will affect our total workforce is a mission imperative that we must accomplish in order to sustain a relevant workforce capable of responding to these emergent requirements. To accomplish the Agency's strategic goals, we must foster a motivated high-performing workforce by enhancing retention, recruitment, education, and opportunities for increasing responsibility and authority.

Workforce Planning: We will continue to analyze the structure and alignment of our human capital resources, recognizing that our manpower projections and growth must be framed by a comprehensive human capital strategic plan. This degree of forward planning represents our best effort to analyze critical workforce data and use it for projecting mission and staffing needs in the foreseeable future. We intend to continue monitoring our position vacancy fill rates and deliver quality people in more efficient timeframes. Our in-sourcing strategy will comply with the FY 2008 National Defense Authorization Act, which requires the Department to ensure consideration is given to utilizing government employees to perform new functions and to analyze existing contracted work for opportunities to in-source work to the government workforce. We will also continue to grow the Missile Defense Career Development Program in the future by semi-annually hiring entry-level employees in engineering, science and acquisition career fields. Our first class of 60 career development personnel started in July 2009. Our

second class of 100 began in January 2010. The success of this initiative is closely linked to our national marketing and recruitment outreach efforts to acquire qualified staff, and efforts to leverage technical expertise from other government organizations. Fundamental in this entire talent acquisition process is strengthening our workforce diversity.

Employee Retention: Supplementing our strategic human capital direction are other integral objectives aimed at improving employee job satisfaction and engagement, our performance culture, and the leadership capabilities necessary to retain a workforce that reflects the Agency's vision, mission, and core values. For example, we propose to develop a funding stream to support an Interagency Agreement with Federal Occupational Health for assistance in providing a comprehensive employee wellness program across our Agency, and we will closely analyze results of annual employee surveys to develop plans for tackling issues that our employees perceive as obstacles in how they can best perform their work. We envision retaining our human capital by promoting a healthy workplace and reinforcing this belief with contemporary human capital management policies and initiatives that comply with Office of Personnel Management and Departmental priorities.

Employee Development: Building the capacity to address educational and other developmental requirements for sustaining our technical, supervisory, and executive management skills is an important factor in acquiring and retaining an effective workforce for meeting today and tomorrow's challenges. We will continue to build a sequential leadership development process within the Agency, and identify future skills and competencies that we must obtain through programmed educational and training opportunities for employees who demonstrate the potential for accepting greater responsibilities and career development. We encourage our next generation leaders to fully participate in civilian leadership development programs. We will mature our succession planning approach to identify these performers and open doors for their continued professional development through competitive academic degree programs and other financial assistance initiatives.

Competency Management: We will align our human capital with current and emerging mission and programmatic goals, then develop long-term strategies for acquiring, developing, and retaining a staff to achieve those programmatic goals. We are committed to developing steps that are tailored to address gaps in the competencies, allocation, and deployment of our human capital resources, and aligning these resources so that the sum of their critical skills and competencies enables us to promote an effective matrix management environment for accomplishing the scope of our program goals. We are also committed to ensuring our acquisition certification rates increase as a result of better forecasting and management of Defense Acquisition Workforce Improvement Act continuous training requirements. Integrating new automated tools, such as a Learning Management System, will facilitate our ability to monitor employee training progress, and more accurately evaluate annual budget needs and how well our employees and supervisors collaborate in career development planning.

Summary

By program element, the following table summarizes our spending plans for FY 2011, compared to FY 2009 and FY 2010 appropriated levels.

($millions, then year)

Program Element (PE) Title	PE Number	FY 2009	FY 2010	FY 2011
Procurement				
Aegis	0208866C	102	226	94
THAAD	0208866C	105	419	859
RDT&E				
Technology	0603175C	118	189	132
Terminal	0603881C	951	716	436
Midcourse	0603882C	1473	1027	1346
Boost	0603883C	384	182	
Sensors	0603884C	683	621	455
System Interceptor	0603886C	309		
Test and Targets	0603888C	907	823	1113
BMD Enabling Programs	0603890C	403	359	403
Special Programs – MDA	0603891C	183	250	270
Aegis BMD	0603892C	1054	1436	1467
STSS	0603893C	210	162	113
MKV	0603894C	226		
System Space Program	0603895C	23	12	11
C2BMC	0603896C	275	335	343
Hercules	0603897C	52	48	
Joint Warfighter Support	0603898C	66	61	69
MDIOC	0603904C	103	86	86
Directed Energy Research (new)	0603901C			99
Regarding Trench	0603906C	3	6	8
SBX	0603907C	144	167	153
European Interceptor Site	0603908C	349		
European Midcourse Radar	0603909C	74		
European Capability	0603911C		50	
European Communications Support	0603912C	26		
Israeli Cooperative	0603913C		201	122
Land Based SM-3 (new)	0604880C			281
Aegis SM-3 Block IIA Co-Development (new)	0604881C		256	319
Precision Tracking Space System (new)	0604883C			67
Airborne Infrared (ABIR) (new)	0604884C			112
Small Business Innovative Research	0605502C	125		
Pentagon Reservation	0901585C	20	20	20
Management Headquarters	0901598C	87	52	30
MILCON				
Test and Targets	0603888C	18	6	
Land Based SM-3	0604880C		69	
BMD Aegis	0603892C		25	
European Interceptor Site	0603908C			
European Midcourse Radar	0603909C			
BRAC	0207998C	160	87	9
MDA Total		8632	7891	8416

Table 1: Funding by Appropriation and Program Element, FY 2009 – FY 2011


MISSILE DEFENSE AGENCY
DEPARTMENT OF DEFENSE

Defense-Wide
FY 2011 President's Budget
Exhibit P-1
(Dollars in Millions)

Appropriation: 0300D Procurement, Defense-Wide

Date: 20 Jan 2010

Line No	Item Nomenclature	Ident Code	FY 2009 Quantity	FY 2009 Cost	FY 2010 Quantity	FY 2010 Cost	FY 2011 Quantity	FY 2011 Cost	Sec
	Budget Activity 01: Major equipment								
	Major Equipment, Missile Defense Agency								
32	TERMINAL HIGH ALTITUDE AREA DEFENSE FIELDING	B		104.7	26	419.0	67	858.9	U
33	AEGIS FIELDING	A		101.9	6	225.6	8	94.1	U
	Total Major equipment			206.6		644.6		953.0	
	Total Procurement, Defense-Wide			206.6		644.6		953.0	

Exhibit P-1: Total (Direct and Supplementals), as of January 20, 2010 at 11:17:13

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Missile Defense Agency

Terminal High Altitude Area Defense (THAAD) Procurement

($ in Millions)

FY 2011 Estimate	858.870
FY 2010 Estimate	419.004
FY 2009 Estimate	104.690

Program Overview

The Terminal High Altitude Area Defense (THAAD) is an element of the Terminal Defense Segment (TDS) of the Ballistic Missile Defense System (BMDS). The THAAD element provides the THAAD Interceptor Engage on Army Navy/Transportable Radar Surveillance - Model 2 (AN/TPY-2) (THAAD Mode) engagement sequence of the BMDS. THAAD enhances the TDS by deepening, complementing, and extending the BMDS battlespace and capability to engage ballistic targets in the late mid-course and terminal phases of their trajectory. THAAD will also be a surveillance sensor, providing sensor data to cue other elements of the BMDS. THAAD, in conjunction with the fielded PATRIOT System, provides the TDS and supports the MDA objective of enhancing the BMDS capability. Five major components (Interceptors, Launchers, AN/TPY-2 Radar, THAAD Fire Control and Communication (TFCC), and Peculiar Support Equipment) will be integrated into the THAAD element and the BMDS.

Purpose and Scope of Work

The Terminal High Altitude Area Defense (THAAD) provides additional 7 THAAD Batteries (#3 - #9). Each Battery consists of a basic load of 48 interceptors, 6 launchers, and 1 TFCC consisting of 2 Tactical Station Groups (TSGs) each. Radars will be provided by the Sensors Directorate. Total procurement of THAAD hardware includes 431 interceptors, 18 TSGs, 60 launchers (9 Batteries, with 6 launchers each, plus an additional 6 launchers), peculiar support equipment, and common support equipment.

Justification of Funds

FY 2009: Interceptor Long Lead Parts Procurement and Obsolescence Mitigation

FY 2010: Procurement of Lot Buys for Interceptors and Ground Componenents for the Delivery of a THAAD Battery & Long Lead Parts

FY 2011: Procurement of Lot Buys for Interceptors and Ground Componenents.

Exhibit P-40, Budget Item Justification								Date	February 2010
Appropriation (Treasury) Code/CC/BA/BSA/Item Control Number Procurement, Defense-Wide/BA-01/32					P-1 Line Item Nomenclature Terminal High Altitude Area Defense Fielding				
Program Element for Code B Items:					Other Related Program Elements			0603881C	

	ID Code	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	To Complete	Total
Proc Qty			26	32	67	72	72	72		
Gross Cost ($M)		104.690	419.004	858.870	772.248	637.271	850.180	894.654		4,536.917
Less PY Adv Proc ($M)										
Plus CY Adv Proc ($M)										
Net Proc (=P-1) ($M)		104.832	420.300	858.870	772.248	637.271	850.180	894.654		4,538.355
Initial Spares ($M)										
Total Proc Cost ($M)		104.832	420.300	858.870	772.248	637.271	850.180	894.654		4,538.355
Flyaway Unit Cost ($M)										
Wpn Sys Proc U/C ($M)										

Description

Justification

FY 2009: Interceptor Long Lead Parts Procurement and Obsolescence Mitigation
FY 2010: Procurement of Lot Buys for Interceptors and Ground Componenents for the Delivery of a THAAD Battery & Long Lead Parts
FY 2011: Procurement of Lot Buys for Interceptors and Ground Componenents.

Exhibit P-5 Cost Analysis		Weapon System THAAD PE 0208866C						Date: February 2010		
Appropriation (Treasury) Code/CC/BA/BSA/Item Control Number Procurement, Defense-Wide/BA-01/32							D Code I.E. A	P-1 Line Item Nomenclature Terminal High Altitude Area Defefense Fielding		
WBS Cost Elements	**Prior Years Unit Cost**	**Prior Years Total Cost**	**FY 2009 Unit Cost**	**FY 2009 Total Cost**	**FY 2010 Unit Cost**	**FY 2010 Total Cost**	**FY 2011 Unit Cost**	**FY 2011 Total Cost**	**FY 2012 Unit Cost**	**FY 2012 Total Cost**
TH Hardware & Integration										
Interceptor				104.690	10.507	287.937	9.430	594.317	8.867	638.446
Tactical Station Group					9.685	19.370	10.020	40.081		
Launcher					6.508	19.524	6.626	99.387	6.558	39.345
Peculiar Support Equipment						34.767		73.118		20.077
System Integration						57.406		51.967		74.380
Total		**-**		**104.690**		**419.004**		**858.870**		**772.248**

P-1 Line Item No 32

Exhibit P-5, Cost Analysis

(Exhibit P-5, page 1 of 1)

Exhibit P-5a, Procurement History and Planning					THAAD PE 0208866C			Date: February 2010		
Appropriation (Treasury) Code/CC/BA/BSA/ItemControl Number Procurement, Defense-Wide/BA-01/32					P-1 Line Item Nomenclature Terminal High Altitude Area Defense Fielding					
WBS COST ELEMENTS	**Qty**	**Unit Cost**	**Location of PCO**	**RFP Issue Date**	**Contract Method & Type**	**Contractor and Location**	**Award Date**	**Date of First Delivery**	**Tech Data Available Now?**	**Date Revisions Available**
FY 2009 - Batteries 3&4										
Interceptor LL/Obsolescence	n/a	n/a	MDA, Hsv, AL	4QFY08	SS/FFP/CPIF	LM, Sunnyvale, CA	3QFY09	n/a	Yes	
FY 2010										
Interceptor	26	10.507	MDA, Hsv, AL	1QFY10	SS/CPIF	LM, Sunnyvale, CA	3QFY10	3QFY11	Yes	
Tactical Station Group	2	9.685	MDA, Hsv, AL	1QFY10	SS/FFP	LM, Sunnyvale, CA	3QFY10	1QFY12	Yes	
Launcher	3	6.508	MDA, Hsv, AL	1QFY10	SS/FFP	LM, Sunnyvale, CA	3QFY10	1QFY12	Yes	
Peculiar Support Equipment	n/a	n/a	MDA, Hsv, AL	1QFY10	SS/FFP	LM, Sunnyvale, CA	3QFY10	1QFY12	Yes	
System Integration	n/a	n/a	MDA, Hsv, AL	1QFY10	SS/FFP	LM, Sunnyvale, CA	3QFY10	4QFY12	Yes	
Battery 5 LL/Obsolescence	n/a	n/a	MDA, Hsv, AL	1QFY10	SS/FFP	LM, Sunnyvale, CA	3QFY10	n/a	Yes	
FY 2011										
Interceptor	67	9.430	MDA, Hsv, AL	4QFY10	SS/CPIF	LM, Sunnyvale, CA	1QFY11	3QFY12	Yes	
Tactical Station Group	4	10.020	MDA, Hsv, AL	4QFY10	SS/FFP	LM, Sunnyvale, CA	1QFY11	4QFY13	Yes	
Launcher	15	6.626	MDA, Hsv, AL	4QFY10	SS/FFP	LM, Sunnyvale, CA	1QFY11	4QFY13	Yes	
Peculiar Support Equipment	n/a	n/a	MDA, Hsv, AL	4QFY10	SS/FFP	LM, Sunnyvale, CA	1QFY11	4QFY13	Yes	
System Integration	n/a	n/a	MDA, Hsv, AL	4QFY10	SS/FFP	LM, Sunnyvale, CA	1QFY11	3QFY14	Yes	
FY 2012										
Interceptor	72	8.867	MDA, Hsv, AL	4QFY11	SS/CPIF	LM, Sunnyvale, CA	1QFY12	1QFY14	Yes	
Launcher	6	6.558	MDA, Hsv, AL	4QFY11	SS/FFP	LM, Sunnyvale, CA	1QFY12	1QFY14	Yes	
System Integration	n/a	n/a	MDA, Hsv, AL	4QFY11	SS/FFP	LM, Sunnyvale, CA	1QFY12	3QFY15	Yes	

REMARKS

Exhibit P-21, Production Schedule			Date: February 2010
Appropriation (Treasury) Code/CC/BA/BSA/Item Control No		Weapons System	P-1 Line Item Nomenclature
Procurement, Defense-Wide/BA-01/32		THAAD	Terminal High Altitude Area Defense Fielding

		PRODUCTION RATE			PROCUREMENT LEADTIMES					
Item	Manufacturer's Name and Location	MSR	ECON	MAX	ALT Prior to Oct 1	ALT After 1-Oct	Initial Mfg PLT	Reorder Mfg PLT	Total	Unit of Measure
Battery Interceptors	**LMSSC, Troy, AL**	1 /month		6 /month	0	10	24	0	34	Months
Battery Fire Control/Communication - (TSG)	**LM, Sunnyvale, CA**	2/3month		2/3month	0	10	24	0	34	Months

						FISCAL YEAR 2010														**FISCAL YEAR 2011**										
						CALENDAR YEAR 2010														**CALENDAR YEAR 2011**										
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
Battery Interceptors (Lots 1,2)	10		26		26																									26
	11		22	0	48																			0	0	3	1	2	2	40
Battery Fire Control/Communication - (TSG)	10		2		2																									2
	11		4		6																									6
Battery Launchers	10		3		3																									3
	11		15		18																									18
Battery Interceptors (Lots 3-7)	11		45		45																									45

						FISCAL YEAR 2012														**FISCAL YEAR 2013**										
						CALENDAR YEAR 2012														**CALENDAR YEAR 2013**										
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
Battery Interceptors (Lots 1,2)	12			8	40	3	3	3	3	3	3	3	3	3	3	3	3													4
	13			44	4													3	1											0
Battery Fire Control/Communication - (TSG)	12			0	6		1	1								1	1													2
	13			4	2																				1	1				0
Battery Launchers	12		6	0	24	1	1	1							1	1	1													18
	13		0	6	18													1	1	1	1	1	1	1	1	1	1	1	1	6
Battery Interceptors (Lots 3-7)	12		72	0	117																									117
	13		72	0	189														3	3	3	3	4	3	3	4	4	4	5	150

REMARKS: Use continuation pages as necessary to complete all procurements. If only one component or item is being delivered, show deliveries on one page.

Exhibit P-21, Production Schedule			Date: February 2010
Appropriation (Treasury) Code/CC/BA/BSA/Item Control No Procurement, Defense-Wide/BA-01/32		Weapons System THAAD	P-1 Line Item Nomenclature Terminal High Altitude Area Defense Fielding

		PRODUCTION RATE			PROCUREMENT LEADTIMES					
Item	Manufacturer's Name and Location	MSR	ECON	MAX	ALT Prior to Oct 1	ALT After 1-Oct	Initial Mfg PLT	Reorder Mfg PLT	Total	Unit of Measure
Battery Interceptors	**LMSSC, Troy, AL**	1 /month		6 /month	0	10	24	0	34	Months
Battery Fire Control/Communication - (TSG)	**LM, Sunnyvale, CA**	2/3 month		2/3 month	0	10	24	0	34	Months

						FISCAL YEAR 2014												**FISCAL YEAR 2015**												
						CALENDAR YEAR 2014												**CALENDAR YEAR 2015**												
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
Battery Interceptors (Lots 3-7)	14		72	39	222	6	6	6	6	6	6	6	6	6	6	6	6													150
	15		72	111	222													6	6	6	6	6	6	6	6	6	6	6	6	150
Battery Fire Control/Communication - (TSG)	14		4	6	4																							1	1	2
	15		4	8	6																									6
Battery Launchers	14		12	18	18	1	1	1	1	1	1																			12
	15		18	24	30																						2	2	2	24
						FISCAL YEAR 2016												**FISCAL YEAR 2017**												
						CALENDAR YEAR 2016												**CALENDAR YEAR 2017**												
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
Battery Interceptors (Lots 3-7)	16			183	150	6	6	6	6	6	6	6	6	6	6	6	6													78
	17			255	78													6	6	6	6	6	6	6	6	6	6	6	6	6
Battery Fire Control/Communication - (TSG)	16			8	6		1	1								1	1													2
	17			12	2																	1	1							0
Battery Launchers	16			30	24	1	1	1	1	1	1				1	1	1													15
	17			39	15													1	1	1	2	2	2	2	2	2	0	0	0	0

REMARKS: Use continuation pages as necessary to complete all procurements. If only one component or item is being delivered, show deliveries on one page.

PROCUREMENT, DEFENSE-WIDE

Missile Defense Agency

($ in Millions)

FY 2011 Estimate	94.080
FY 2010 Estimate	225.625
FY 2009 Estimate	101.932

AEGIS Ballistic Missile Defense (BMD)

Program Overview

The Aegis Ballistic Missile Defense (Aegis BMD) mission is to deliver an enduring, operationally effective and supportable Ballistic Missile Defense Capability on Aegis cruisers and destroyers to defend the nation, deployed forces, friends and allies, and to incrementally increase this capability by delivering evolutionary spiral improvements as part of Ballistic Missile Defense System (BMDS) block upgrades. The Aegis BMD element of the BMDS builds upon the existing U.S. Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges, and the ability to destroy Short-Range Ballistic Missile (SRBM), Medium-Range Ballistic Missile (MRBM), Intermediate-Range Ballistic Missile (IRBM), and selected long-range class threats in the midcourse phase of flight. Spiral upgrades to both the Aegis BMD Weapon System and the SM-3 configurations will enable Aegis BMD to provide effective, supportable defensive capability against more difficult threats, including Long Range Ballistic Missiles (LRBMs), and expand capability to counter limited engagements in the terminal phase of flight.

Purpose and Scope of Work

Standard Missile-3 is being developed for Aegis Ballistic Missile Defense (BMD) as part of the Missile Defense Agency's Ballistic Missile Defense System (BMDS). The Aegis BMD system integrates SM-3 with the Aegis Weapon System (AWS) aboard U.S. Navy cruisers to provide an umbrella of protection against short to intermediate-range ballistic missile threats. SM-3 is compatible with the MK 41 Vertical Launching System (VLS) deployed on many U.S. Navy and international surface combatants. The SM-3 is primarily used and tested by the United States Navy and also operated by the Japan Maritime Self-Defense Force. SM-3 has a spiral upgrade path designed to counter the evolving ballistic missile threats. The SM-3 Block IA provides increased capability over the SM-3 Block I to engage short- to intermediate-range ballistic missiles. The SM-3 Block IA incorporates rocket motor upgrades and computer program modifications to improve sensor performance, missile guidance and control, and lower cost. It also includes producibility and maintainability features required to qualify the missile as a tactical fleet asset. The SM-3 Block IB will incorporate a two-color, all reflective infrared seeker, enabling longer range acquisition and increased threat discrimination. A Throttleable DACS (TDACS) is also in development to provide a more flexible and lower cost alternative to the SDACS. The U.S. and Japan are co-developing the SM-3 Block IIA, which will incorporate 21" 2nd and 3rd stage rocket motors, providing a significant increase in engagement capability and larger defended areas. The Block IIA will also provide a larger, more capable KW to counter future ballistic missile threats.

Justification of Funds

Procures SM-3 interceptors to meet War Fighter requirements for providing an enduring, operationally effective and supportable Ballistic Missile Defense Capability on Aegis BMD capable cruisers and destroyers

Exhibit P-40, Budget Item Justification									Date February 2010		
Appropriation (Treasury) Code/CC/BA/BSA/Item Control Number Procurement, Defense-Wide/BA-01/33						P-1 Line Item Nomenclature Aegis Fielding					
Program Element for Code B Items:						Other Related Program Elements 0603892C					
	ID Code	Prior Years	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	To Complete	Total Program
Proc Qty			**12**	**6**	**8**	**66**	**72**	**72**	**72**	**0**	**308**
Gross Cost ($M)		0.000	101.932	225.625	94.080	701.877	712.659	681.695	669.685		3,187.553
Less PY Adv Proc ($M)			0.000	0.000		0.000	0.000	0.000	0.000		
Plus CY Adv Proc ($M)			0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Net Proc (=P-1) ($M)		**0.000**	**101.932**	**225.625**	**94.080**	**701.877**	**712.659**	**681.695**	**669.685**		**3,187.553**
Initial Spares ($M)											
Total Proc Cost ($M)		**0.000**	**101.932**	**225.625**	**94.080**	**701.877**	**712.659**	**681.695**	**669.685**		**3,187.553**
Flyaway Unit Cost ($M)											
Wpn Sys Proc U/C ($M)											

Description:
Standard Missile-3 is being developed for Aegis Ballistic Missile Defense (BMD) as part of the Missile Defense Agency's Ballistic Missile Defense System (BMDS). The Aegis BMD system integrates SM-3 with the Aegis Weapon System (AWS) aboard U.S. Navy cruisers to provide an umbrella of protection against short to intermediate-range ballistic missile threats. SM-3 is compatible with the MK 41 Vertical Launching System (VLS) deployed on many U.S. Navy and international surface combatants. The SM-3 is primarily used and tested by the United States Navy and also operated by the Japan Maritime Self-Defense Force. SM-3 has a spiral upgrade path designed to counter the evolving ballistic missile threats. The SM-3 Block IA provides increased capability over the SM-3 Block I to engage short- to intermediate-range ballistic missiles. The SM-3 Block IA incorporates rocket motor upgrades and computer program modifications to improve sensor performance, missile guidance and control, and lower cost. It also includes producibility and maintainability features required to qualify the missile as a tactical fleet asset. The SM-3 Block IB will incorporate a two-color, all reflective infrared seeker, enabling longer range acquisition and increased threat discrimination. A Throttleable DACS (TDACS) is also in development to provide a more flexible and lower cost alternative to the SDACS. The U.S. and Japan are co-developing the SM-3 Block IIA, which will incorporate 21" 2nd and 3rd stage rocket motors, providing a significant increase in engagement capability and larger defended areas. The Block IIA will also provide a larger, more capable KW to counter future ballistic missile threats.

Justification: Procures SM-3 interceptors to meet War Fighter requirements for providing an enduring, operationally effective and supportable Ballistic Missile Defense Capability on Aegis BMD capable cruisers and destroyers

	P-1 Line Item N0. 33	**Exhibit P-40** Page 1 of 1

Exhibit P-5 Cost Analysis		Weapon System AEGIS BMD				Date: February 2010			
Appropriation (Treasury) Code/CC/BA/BSA/Item Control Number Procurement, Defense-Wide/BA-01/33					D Code A	P-1 Line Item Nomenclature AEGIS Fielding			
WBS Cost Elements		Prior Years Unit Cost	Prior Years Total Cost	FY 2009 Unit Cost	FY 2009 Total Cost	FY 2010 Unit Cost	FY 2010 Total Cost	FY 2011 Unit Cost	FY 2011 Total Cost
AB Standard Missiles									
23	CLIN 3 (BlK IA Missiles 72-94) *				60.700		87.271		
18	CLIN 4 (BlK IA Missiles 95-112) **				41.232		138.354		
8	CLIN 18 (BlK IB Missiles 147-154)							11.76	94.080
66	CLIN 19 (BlK IB Missiles 155-220)								
72	CLIN 20 (BlK IB Missiles 221-292)								
72	CLIN 21 (BlK IB Missiles 293-364)								
72	CLIN 22 (BlK IB Missiles 365-436)								
Total			-		101.932		225.625		94.080

P-1 Line Item No 33

* CLIN 3 incrementally procured 23 missiles in FY 08 as follows:

FY 08	63.537	RDT&E
FY 09	60.700	PROC
FY10	87.271	PROC
Total	211.508	
Unit Cost	9.2	

** CLIN 4 incrementally procures 12 missiles in FY 09 and 6 additional missiles added by congress ($57.6M) in FY 10 as follows:

FY 09	41.232	PROC
FY10	138.354	PROC
Total	179.586	
Unit Cost	10.0	

Exhibit P-5, Cost Analysis

P-1 Line Item No. 33

(Exhibit P-5, page 1 of 1)

Exhibit P-5a, Procurement History and Planning					Weapon System AEGIS BMD			Date: February 2010		
Appropriation (Treasury) Code/CC/BA/BSA/ItemControl Number Procurement, Defense-Wide/BA-01/33					P-1 Line Item Nomenclature Aegis Fielding 0208866C					
WBS COST ELEMENTS	Qty	Unit Cost	Location of PCO	RFP Issue Date	Contract Method & Type	Contractor and Location	Award Date	Date of First Delivery	Tech Data Available Now?	Date Revisions Available
SM-3 Missiles			Dahlgren, VA		CPIF	Raytheon Missile System, Tucson AZ				
REMARKS										

Exhibit P-21, Production Schedule			Date: February 2010
Appropiation (Treasury) Code/CC/BA/BSA/Item Control No Procurement, Defense-Wide/BA-01/33		Weapons System	P-1 Line Item Nomenclature Aegis Fielding

Item	Manufacturer's Name and Location	PRODUCTION RATE MSR	ECON	MAX	PROCUREMENT LEADTIMES ALT Prior to Oct 1	ALT After 1-Oct	Initial Mfg PLT	Reorder Mfg PLT	Total	Unit of Measure
SM-3 Block IA Missiles	Raytheon Missile System	1 per month		4 per month			36 Months	36 Months		AUR
SM-3 Block IB Missiles	Tucson Arizona	1 per month		2 per month			36 Months	36 Months		AUR

	FISCAL YEAR 2010																FISCAL YEAR 2011										
	CALENDAR YEAR 2010																CALENDAR YEAR 2011										
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
CLIN 3 (BlK IA Missiles 72-94)			23		23										3	3	3	2	2	2	3	3	2							0
CLIN 4 (BlK IA Missiles 96-112)	10		18		18																			2	2	2	2	2	2	6
CLIN 18 (BlK IB Missiles 147-154)	11		8		8																									8
CLIN 19 (BlK IB Missiles 155-220)	12		66		66																									66
CLIN 20 (BlK IB Missiles 221-292)	13		72		72																									72
CLIN 21 (BlK IB Missiles 293-364)	14		72		72																									72
CLIN 22 (BlK IB Missiles 365-436)	15		72		72																									72

	FISCAL YEAR 2012																FISCAL YEAR 2013										
	CALENDAR YEAR 2012																CALENDAR YEAR 2013										
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
CLIN 3 (BlK IA Missiles 72-94)			23	23	0																									
CLIN 4 (BlK IA Missiles 96-112)	10		18	12	6	2	2	2																						0
CLIN 18 (BlK IB Missiles 147-154)	11		8	0	8																						2	3	3	0
CLIN 19 (BlK IB Missiles 155-220)	12		66	0	66																									66
CLIN 20 (BlK IB Missiles 221-292)	13		72	0	72																									72
CLIN 21 (BlK IB Missiles 293-364)	14		72	0	72																									72
CLIN 22 (BlK IB Missiles 365-436)	15		72	0	72																									72

REMARKS: Use continuation pages as necessary to complete all procurements. If only on component or item is being delivered, show deliveries on one page.

P-1 Line Item No. 33

Exhibit P-21, Production Schedule
(Exhibit P-21, page 1 of 2)

Exhibit P-21, Production Schedule			Date: February 2010
Appropiation (Treasury) Code/CC/BA/BSA/Item Control No Procurement, Defense-Wide/BA-01/33		Weapons System	P-1 Line Item Nomenclature Aegis Fielding

			PRODUCTION RATE			PROCUREMENT LEADTIMES					
Item	Manufacturer's Name and Location		MSR	ECON	MAX	ALT Prior to Oct 1	ALT After 1-Oct	Initial Mfg PLT	Reorder Mfg PLT	Total	Unit of Measure
SM-3 Block IA Missiles	**Raytheon Missile System**		1 per month		4 per month			36 Months	36 Months		AUR
SM-3 Block IB Missiles	**Tucson Arizona**		1 per month		2 per month			36 Months	36 Months		AUR

						FISCAL YEAR 2014											**FISCAL YEAR 2015**												
						CALENDAR YEAR 2014														**CALENDAR YEAR 2015**										
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
CLIN 3 (BlK IA Missiles 72-94)			23	23	0																								0
CLIN 4 (BlK IA Missiles 96-112)	10		18	18	0																								0
CLIN 18 (BlK IB Missiles 147-154)	11		8	8	0																								0
CLIN 19 (BlK IB Missiles 155-220)	12		66	0	66	4	5	5	5	5	6	6	6	6	6	6	6												0
CLIN 20 (BlK IB Missiles 221-292)	13		72	0	72													6	6	6	6	6	6	6	6	6	6	6	6	0
CLIN 21 (BlK IB Missiles 293-364)	14		72	0	72																								72
CLIN 22 (BlK IB Missiles 365-436)	15		72	0	72																								72

						FISCAL YEAR 2016																								
						CALENDAR YEAR 2016														**CALENDAR YEAR 2017**										
ITEM	FY	SVC	QTY	DEL	BAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	BAL
CLIN 3 (BlK IA Missiles 72-94)			23	23	0																								0
CLIN 4 (BlK IA Missiles 96-112)	10		18	18	0																								0
CLIN 18 (BlK IB Missiles 147-154)	11		8	8	0																								0
CLIN 19 (BlK IB Missiles 155-220)	12		66	66	0																								0
CLIN 20 (BlK IB Missiles 221-292)	13		72	72	0																								0
CLIN 21 (BlK IB Missiles 293-364)	14		72	0	72	6	6	6	6	6	6	6	6	6	6	6	6												0
CLIN 22 (BlK IB Missiles 365-436)	15		72	0	72													6	6	6	6	6	6	6	6	6	6	6	6	0

REMARKS: Use continuation pages as necessary to complete all procurements. If only on component or item is being delivered, show deliveries on one page.

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Exhibit P-21, Production Schedule
(Exhibit P-21, page 2 of 2)

Missile Defense Agency Congressional Reporting Requirements		
Reporting Requirement Reference	**Reporting Requirement Language**	**Budget Documentation**
Report of the House Committee on Armed Services on the FY10 Defense Appropriations Act (H.R. 3326), p. 296.	MISSILE DEFENSE AGENCY REPORTING REQUIREMENTS AND JUSTIFICATION MATERIALS The budget justification provided by the Missile Defense Agency (MDA) continues to be insufficient to conduct proper oversight of MDA's programs. However, the Committee commends the Agency for establishing the two new procurement lines that were created in Public Law 110—369 and anticipates additional adjustments to budget documentation to include an operation and maintenance account in fiscal year 2011 and beyond. MDA programs have historically changed significantly from the time the budget is submitted to the time funding is appropriated, making it extremely difficult to understand what is actually in the budget on an annual basis. The justification materials must provide more detailed schedules, quantities, and break-outs of funding for each activity. MDA is directed to report according to the existing acquisition laws to improve accountability and transparency of the programs.	**Fiscal Year 2011 Budget Estimate Overview,** New Acquisition Oversight Process, p. 21. **Ballistic Missile Defense System Procurement (PE 0208866C),** p. 1
Consolidated Security, Disaster Assistance, and Continuing Appropriations Act, 2009 Explanatory Statement Part 2, Department of Defense Appropriation Act FY 2009 (House of Representatives – September 24, 2008) p. H9713-H9714	The budget information provided by the MDA does not allow sufficient oversight of the Ballistic Missile Defense programs. The programs change significantly from the time the budget is submitted to the time funding is appropriated, making it extremely difficult to understand what is actually in the budget on an annual basis. The justification materials should no longer be presented in the block structure format, but rather by fiscal year for each activity within the program element. The documents must provide more detailed schedules, quantities, and break-outs of funding for each activity. Past Congresses have established a framework of laws that require program and cost reporting to Congress to help exercise this oversight. The MDA is directed to report according to the existing acquisition laws to improve accountability and transparency of the programs.	**Fiscal Year 2011 Budget Estimate Overview,** Elimination of the BMDS Block Structure, p. 21.

Missile Defense Agency Congressional Reporting Requirements		
Sec 223(a). Ballistic Missile Defense Programs: Procurement; National Defense Authorization Act for Fiscal Year 2004 (H.R. 1588, H. Rpt. 108-354, pp. 30-31)	*BUDGET JUSTIFICATION MATERIALS-In the budget justification materials submitted to Congress in support of the Department of Defense budget for any fiscal year (as submitted with the budget of the President under section 1105(a) of title 31), the Secretary of Defense shall specify, for each ballistic missile defense system element for which the Missile Defense Agency is engaged in planning for production and initial fielding, the following information: (1) The production rate capabilities of the production facilities planned to be used for production of that element. (2) The potential date of availability of that element for initial fielding. (3) The estimated date on which the administration of the acquisition of that element is to be transferred from the Director of the Missile Defense Agency to the Secretary of a military department.*	**Fiscal Year 2011 Budget Estimate Overview,** Delivering Capabilities to the Warfighter, p. 4 **Fiscal Year 2011 Budget Estimate Overview,** Program Highlights, pp. 9-18 **Fiscal Year 2011 Budget Estimate Overview,** MDA Management, p. 21
Sec 223(a). Ballistic Missile Defense Programs: Procurement; National Defense Authorization Act for Fiscal Year 2004 (H.R. 1588, H. Rpt. 108-354, pp. 30-31)	*FUTURE-YEARS DEFENSE PROGRAM-The Secretary of Defense shall include in the future-years defense program submitted to Congress each year under section 221 of this title an estimate of the amount necessary for procurement for each ballistic missile defense system element, together with a discussion of the underlying factors and reasoning justifying the estimate.*	**Procurement -MDA** **0208866C**, Terminal Defense, p. 1 **0208866C,** Aegis BMD, p. 1

Missile Defense Agency Congressional Reporting Requirements		
BMDO BUDGET JUSTIFICATION MATERIAL; H.Rpt.107 298, the House Appropriations Committee Report to accompany H.R.3338, the Department of Defense Appropriations Bill, 2002 Pg 252	The Committee is concerned about the level of information provided in this year's budget justification material. In addition to the material currently provided, the Committee directs the Department to submit the following information as part of its future budget requests. For each program element and project: the funding appropriated in the previous year and the expected requirement for the next six years, by year. For special interest projects and new starts: a detailed schedule (including contract awards, decision points, test events and hardware/software deliveries) at least through the stage of testing the prototype whose performance will form the basis for deciding whether or not to begin developing the system as a major defense acquisition program. For those programs that are already major defense acquisition programs: a detailed schedule (including contract awards, decision points, test events and hardware/software deliveries), the number of systems to be acquired, the expected performance, the unit cost, and the cost to completion for the program. In addition, the Department should present an overall timeline for its future architecture highlighting when each system in that architecture will go into production as well as a comparable threat timeline indicating which threat systems are expected to be deployed and in what quantities.	**Fiscal Year 2011 Budget Estimate Overview** **MDA Exhibit R-2 for each Program Element** MDA to provide BMDS Accountability Report to the Congressional Defense Committees.

Missile Defense Agency Congressional Reporting Requirements		
Report of the House Committee on Armed Services on The National Defense Authorization Act (HR 5658) for FY 2009, May 26, 2008 p. 260-261	Missile Defense Program Element Structure (p. 260) The committee continues to believe that the Missile Defense Agency program element (PE) structure is too broad, and that this structure needs to be further refined to provide Congress greater transparency into missile defense programs. Therefore, starting with the fiscal year 2010 budget submission, the committee directs the Director of the Missile Defense Agency to provide separate PE numbers for each specific element in the Terminal Defense Segment and within Ballistic Missile Defense Sensors. These new PE numbers should include: Terminal High Altitude Area Defense; Israeli Cooperative Programs; Upgraded Early Warning Radars; Sea-based, X-Band radar; Army Navy/Transportable Radars; and European Midcourse Radar.	**Fiscal Year 2011 Budget Estimate Overview,** Table 1: Funding by Appropriation and Program Element, p. 25 **Terminal Defense (0603881C),** p. 1 **Israeli Cooperative (0603913C),** p. 1 **SBX Sustainment (0603907C),** p. 1 **European Midcourse Radar (0603909C),** p. 1
H. Rpt. 110-279, the House Appropriations Committee Report to accompany the FY 2008 Department of Defense Appropriations Act (H.R. 3222), p. 382	The Committee directs MDA to develop a system-wide plan to report according to the spirit of existing acquisition laws to improve accountability and transparency of its program. MDA is directed to report all elements that are effectively in System Development and Demonstration or production corresponding baselines, the results of independent cost estimates performed by the Cost Analysis Improvement Group, unit costs, and unit cost growth. This direction should not be construed as requiring full compliance with DoD Regulation 5000.2. In addition, while developing and fielding the BMDS outside DoD's normal acquisition cycle, MDA should address operational testing by including operational test objectives in developmental tests. The Committee directs that this plan be delivered to the congressional defense committees with the submission of the fiscal year 2009 budget and updated semiannually.	**Fiscal Year 2011 Budget Estimate Overview,** New Acquisition Oversight Process, p. 21. Additionally, MDA to provide BMDS Accountability Report to Congressional Defense Committees. This report fully satisfies the requirement.

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PART SUMMARY

Missile Defense

The Missile Defense Agency (MDA) mission is to defend the U.S., deployed forces and allies from ballistic attack. MDA is researching, developing and fielding a global, integrated and multi-layered Ballistic Missile Defense System (BMDS), comprising multiple sensors, interceptors and battle management capabilities.

In accordance with the President’s Management Agenda, Budget and Performance Integration Initiative, program has been assessed using the Program Assessment Rating Tool (PART). Remarks regarding program performance and plans for performance improvement can be located at the Expectmore.gov website.

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