RCS: DD-A&T(Q&A)823-362

Ballistic Missile Defense System (BMDS)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name
Ballistic Missile Defense System (BMDS)

DoD Component
DoD

Responsible Office

VADM Jon Hill
Missile Defense Agency (MDA)
5700 18th Street
Fort Belvoir, VA 22060-5573

Phone: 571-231-8006
Fax: 571-231-8090
DSN Phone: 289-8006
DSN Fax: 289-8090
Date Assigned: May 31, 2019

References

SAR Baseline (Planning Estimate)

National Security Presidential Directive (NSPD) - 23 dated December 16, 2002 (rescinded by Presidential Policy Directive (PPD) - 10) and PPD-10 dated July 26, 2011

Mission and Description

Mission and Description

To develop and deploy a layered Missile Defense System (MDS) to defend the United States, its deployed forces, allies, and friends from hypersonic and missile attacks of all ranges and in all phases of flight.

Following guidance from the President, the Secretary of Defense approved the 2019 Missile Defense Review (MDR) Report (dated January 2019), which established the following principles and elements governing U.S. Missile Defense:

1. The U.S. homeland missile defense will stay ahead of rogue states' missile threats
2. The missile defense will defend U.S. forces deployed abroad and support the security of allies and partners
3. The United States will pursue new concepts and technologies
4. Comprehensive missile defense capabilities will support a broad, multi-layered approach to preventing and defeating missile attacks
5. Flexibility and adaptability will enable the United States to tailor its missile defense strategy to potential adversaries
6. Tighter offense-defense integration and interoperability will leverage the full range of assets available
7. A focus on the importance of space will provide a more effective, resilient, and adaptable missile defense posture

Executive Summary

Program Highlights Since Last Report

Introduction

As the threat evolves and includes new offensive systems such as hypersonic glide vehicles, our Nation will need to increase investments in cutting-edge missile defense technologies, to include a persistent overhead sensor capability. If we are to support the Warfighter in a highly uncertain strategic environment, we must meet technology maturation, systems development, and manufacturing challenges head-on and continue to demonstrate missile defense capabilities through robust, operationally realistic live-fire testing. The Missile Defense Agency's (MDA's) overriding program lines of effort are to:

1. Build Warfighter confidence through focus on readiness and sustainment,
2. Increase missile defense engagement capability and capacity to outpace emerging threats, and
3. Increase speed of delivery of new capability to address evolving threats

MDA's mission today is "to develop and deploy a layered Missile Defense System to defend the United States, its deployed forces, allies, and friends from missile attacks in all phases of flight." In June 2019, MDA expanded the mission beyond "ballistic" missiles to include other missile threats, including hypersonic glide vehicles (HGVs). Additionally, In August 2019, the Missile Defense Executive Board (MDEB) recommended to the Secretary of Defense (SECDEF) that MDA be the lead acquisition organization within the Department of Defense (DoD) for Cruise Missile Defense-Homeland. Once approved by the SECDEF, MDA will broaden the mission to include cruise missile attacks.

The growing threats from ballistic and non-ballistic missiles, many of which can be armed with weapons of mass destruction, drive MDA programs. Some weapon systems have characteristics of both ballistic and cruise missiles. For example, ballistic missile-launched HGVs are unpowered and maneuverable, capable of delivering various payloads that travel at hypersonic speed (greater than Mach 5) and spend most of their flight at much lower altitudes than a typical ballistic missile. Russia and China are developing advanced cruise missiles and hypersonic missile capabilities that can take unpredictable flight paths that challenge existing defenses.

Missile defense remains a high priority investment within the 2018 National Defense Strategy, which states, "it is now undeniable that the homeland is no longer a sanctuary." The missile defense architecture must evolve to give the Warfighter the ability to counter these threats, which now include non-ballistic threats. MDA intends to continue making progress in the design, development and delivery of an integrated and layered system and to support the investigation of new concepts and development of new technologies to address the challenging missile threat of tomorrow.

The 2019 Missile Defense Review (MDR) underscores the evolving missile threat we face and that missile defense must remain a high priority investment in our National Defense Strategy. The MDR also emphasizes our continued pursuit of cooperative relations with allies and partners to field interoperable and effective regional missile defenses.

Highlights Since the Previous SAR

Completed deployment and successful demonstration of Space Based Kill Assessment (SKA) sensor network Hit Assessment capability in Flight Test Ground-based Midcourse Defense (FTG)-11 (March 2019). Upon successful demonstration, the MDA Director accelerated the operationalization of the SKA Hit Assessment into Missile Defense System (MDS) Increment 6B as part of initial Post Intercept Assessment (PIA) capability. In November 2019, MDA also began providing in a limited SKA Hit Assessment situational awareness capability to Northern Command (NORTHCOM) during their declared Periods of Heightened Activity (POHA).

On May 31, 2019, the MDA conducted a change of responsibility with U.S. Navy Vice Admiral (VADM) Jon A. Hill succeeding U.S. Air Force Lieutenant General Samuel A. Greaves as MDA's 11th director.

Sea-Based X-band Radar (SBX) – arrived at Joint Based Pearl Harbor, Hickam, on May 31, 2019. SBX recorded 582 continuous days at sea. During its deployment, in support of homeland defense, SBX successfully participated in several key MDA test events.

MDA transferred a Medium Range Ballistic Missile Type 3 Configuration 2 (MRBM T3c2) Target Front End (3rd quarter FY 2019) and provided engineering Subject Matter Experts to support another Government Agency in the successful execution (1st quarter FY 2020) of its high priority DoD mission.

In August 2019, MDA transitioned Command and Control, Battle Management, and Communications (C2BMC) Spiral 8.2-3 to NORTHCOM and Indo-Pacific Command (INDOPACOM). The new configuration coupled with the improved BMDS OPIR Architecture (BOA) 6.1 update, delivered last year to mission nodes at European Command (EUCOM) and Central Command (CENTCOM), provide Aegis Weapon System (AWS) Engage-on-Remote (EoR) capability to broaden and improve defensive coverage.

In August 2019, the MDA accepted the 200th Standard Missile-3 (SM-3) Block IB. This delivery represented the 400th overall SM-3 delivered to date.

MDA terminated the Redesigned Kill Vehicle work in August 2019 and has developed the acquisition strategy for the Next Generation Interceptor (NGI). MDA has released three Requests-for-Information (RFI), including two rounds of Industry feedback on the Draft Request-for-Proposal (RFP). MDA plans to release the RFP 2nd quarter FY 2020.

Arrow-3 Interceptor full production was initiated in September 2019, following approval of Arrow-3 Co-Production Agreement.

The Medium Range Ballistic Missile Type 1/Type 2 (MRBM T1/T2) Targets Program executed a successful Flight Test THAAD (FTT)-23 in 4th quarter FY 2019. This was the first MRBM T1 target produced under this program.

MDA completed the concept development phase and initiated the next phase of the Hypersonic and Ballistic Tracking Space Sensor (HBTSS). In September 2019, MDA awarded four agreements under MDA Other Transaction (OT) authority for the Phase IIa Prototype Payload Design and Signal-chain Processing Risk Reduction Demonstration. HBTSS funding in FY 2021 and beyond will be transferred to the Space Development Agency.

MDA completed Navy certification and approval to join the MDS Operational Capacity Baseline (OCB) for Aegis BMD Weapon System Baseline 5.1/ Aegis Baseline 9, which includes the introduction of EoR capability with the SM-3 Block IIA missile.

MDA awarded five Hypersonic Defense Weapon System (HDWS) Concept Definition (CD) Phase II contracts. The HDWS CD Phase II efforts focus on the refinement of performance parameters and provide detailed cost data and schedules for future development and demonstration efforts. MDA is exploring kinetic and non-kinetic solutions for hypersonic defense.

After receiving authority from the Under Secretary of Defense (Acquisition and Sustainment [USD(A&S)] to precede with Initial Production In December 2019, the MDA awarded the first SM-3 Block IIA production contract for a total of 62 missiles (37 US and 25 through Foreign Military Sales (FMS)), which will begin deliveries in 2nd quarter FY 2022.

The two Space Tracking and Surveillance System (STSS) space vehicles reached their 10th anniversary on orbit. The satellites participated in 16 MDA Integrated Master Test Plan events in FY 2019 and continue to collect missile tracking and environmental data to inform the design of the next space-based missile defense sensor system.

The Long Range Discrimination Radar (LRDR) completed demolition of the Ballistic Missile Early Warning (BMEWS) structures, testing foundation slabs and final clearing of the BMEWS complex. The first production panel of Array 2 delivered and accepted at Clear Air Force Station (CAFS). Six panels of Array 2 secondary array have completed assembly and acceptance testing. LRDR completed the Developmental Baseline Review (DBR) for Configuration 1.

Testing

MDA continues to execute a robust and rigorous test program that demonstrates BMDS capabilities and provides

confidence to Combatant Commanders. MDA develops the test program in full collaboration with the Director, Operational Test and Evaluation (DOT&E); Deputy Director, Developmental Test, Evaluation, and Prototyping (DDTE&P); Combatant Commands; the Services Operational Test Agencies (OTA), and the Joint Interoperability Test Command (JITC). In 2019, MDA improved the confidence in missile defense and conducted four U.S.-only flight test events and eight flight tests with international partners. MDA also completed twelve system-level ground tests, and six Cybersecurity tests.

MDA also supported planning and execution of 32 multi-event exercises and wargames, which are used by Combatant Commands to develop concepts of operation; Tactics, Techniques, and Procedures, and Command and Control relationships. These events support development of current and future Warfighter capabilities. Test highlights include:

Flight Tests

Flight Test Ground-based Midcourse Defense (FTG)-11 (March 25, 2019): FTG-11 was the first salvo engagement of a threat-representative Intercontinental Ballistic Missile (ICBM)-class target by two Ground Based Interceptors (GBI). The GBI -Lead intercepted the reentry vehicle, as it was designed to do. The GBI-Trail intercepted the next 'most lethal object', also according to design,

Flight Test Aegis BMD (FTM)-31 Event 2 (August 29, 2019): MDA and the Navy successfully intercepted an air-breathing target with a Standard Missile-6 (SM-6) Dual II in anti-air warfare mode. This engagement supports the SM-6 Dual II Engineering Change Proposal production decision and subsequent delivery of interceptors to the fleet.

Flight Test Terminal High Altitude Area Defense (FTT)-23 (August 30, 2019): MDA and the Army conducted the first intercept in THAAD extended battlespace of a MRBM target using THAAD remote launcher capability. This was the first time the THAAD system used a government-developed remote launcher kit that extended the range of the defended area. This supported the technical declaration of the U.S. Forces Korea (USFK) JEON Phase 1 capabilities.

Ground Tests

Ground Test Integrated (GTI)-18 Sprint 3 (January 7-18, 2019): This Theater/Regional Hardware-in-the-Loop (HWIL) test event included Defense of Homeland (DOH) and Defense of INDOPACOM. Sprint 3 supported the NORTHCOM and INDOPACOM Operational Capacity Baseline (OCB) and fielding decisions related to Increment 5 capabilities and subsequent operational acceptance (OA).

Ground Test Distributed (GTD)-07b NORTHCOM/INDOPACOM (N/I) (May 7-16, 2019): This test supported operational acceptance of BMDS performance defending against Intermediate Range Ballistic Missile (IRBM) and ICBM attacks on NORTHCOM and Short Range Ballistic Missile (SBRM), MRBM, and IRBM attacks on INDOPACOM. GTD-07b (N/I) supported fielding decisions for C2BMC S8.2-3 (N/I), AN/TPY-2 Forward Based Mode (FBM) CX-3.0 (P), THAAD 3.0 (P), and Cape Cod Upgraded Early Warning Radar (UEWR).

GTI-19 Sprint 2 JEON (August 5-14, 2019): HWIL test event supported the rapid deployment of command and control and improved performance against new threats in support of USFK JEON Phase 3. GT-19 Sprint 2 employs initial THAAD Remote Launcher Capability, and improved THAAD radar protections and mitigations.

GTI-19 Sprint 4 (September 19-25, 2019): Theater/Regional HWIL test event in response to CENTCOM Request for Analysis (RFA) 845 for testing and analysis support, which examined the feasibility of moving an AN/TPY-2 radar FBM at Site 4a to Site 4b.

Cyber Tests

GTD-07b (N/I) Adversarial Assessment (May 17-31, 2019): Successfully conducted an Adversarial Assessment (AA) of USNORTHCOM/USINDOPACOM, in cooperation with the DOT&E.

X-Band Radar (XBR) Increment 5 Cooperative Vulnerability Penetration & Assessments (CVPA) and AA (July 15-19, 2019): Successfully completed CVPA and AA of Increment 5 Sea-Based Radar XBR 4.0. Blue and red teams executed threat representative attacks to satisfy all operational requirements to ensure cybersecurity posture of the vessel.

GMD CVPA (July 8-12, 2019) and AA (July 15-26, 2019): Successfully completed CVPA and AA of Increment 4 GMD Ground System 7A. Blue and Red Teams executed threat representative attacks to satisfy all operational requirements to ensure cybersecurity posture of an interceptor silo, support infrastructure and the GMD operational network.

International Cooperation

MDA awarded AN/TPY-2 sensor and THAAD MDS contracts in support of the Kingdom of Saudi Arabia (KSA) Foreign Military Sales (FMS) case. This is the largest FMS case that MDA has awarded and includes seven THAAD batteries and radars.

David's Sling Test-6 (March 18, 2019): The Israeli Missile Defense Organization and MDA successfully completed a test series of the David's Sling Weapon System, which is a cooperative development effort between the U.S. and Israel and a central element of Israel's multi-layer defense array.

Formidable Shield 2019 (May 10-19, 2019): Conducted an Integrated Air and Missile Defense (IAMD) exercise with 13 ships, over 10 aircraft, and 3,300 personnel from 12 countries. These countries participated in a live-fire IAMD scenario, defending against a ballistic missile targets as well as anti-ship cruise missiles. Successfully engaged two dynamic test targets with two SM-3 Block IAs. The test demonstrated the reliability of the SM-3 Block IA fleet inventory.

Flight Test Arrow-01 (July 2019): The Israeli Missile Defense Organization and MDA successfully completed a flight test campaign with the Arrow-3 Interceptor Missile. Flight Test Arrow-01 demonstrated the Israeli Arrow Weapon System's ability to conduct a high altitude hit-to-kill engagement against exo-atmospheric missiles with the Arrow-3 interceptor.

BMD Technology Initiatives

MDA remains vigilant of the growing cyber threat and is working aggressively to ensure the nation's missile defenses are hardened, resilient, and able to operate in a highly contested cyber threat environment. MDA is strengthening the cyber defensive posture by ensuring the cybersecurity infrastructure has the latest upgrades. MDA, in cooperation with multiple partners/stakeholders, executed five Lab Based Risk Reduction (LBRR) events, two CVPAs, and three AAs in 2019. LBRRs provided valuable assessment data to inform systems owners of cybersecurity postures / mitigation strategies and initial opportunities to evaluate software builds prior to operational testing.

In July 2019, MDA participated in a cyber tabletop exercise focused on XBR 4.0 and the UEWRs supporting Section 1647 of FY 2016 NDAA activities.

MDA continues to conduct research in directed energy and its integration into the MDS architecture. Currently, Lawrence Livermore National Laboratory is on track with their Diode Pumped Alkali Laser (DPAL) to achieve key milestones on the way to achieving a 100-kilowatt-class demonstration. The Massachusetts Institute of Technology/Lincoln Laboratory has successfully demonstrated their Fiber Combined Laser, and are continuing to optimize performance while reducing size, weight and power.

MDA, in coordination with Defense Advanced Research Projects Agency (DARPA), plans to award two Glide Breaker (GB) Divert and Attitude Control System (DACS) contracts. The objective is to develop and demonstrate DACS technology that is critical for enabling an advanced interceptor capable of engaging maneuvering hypersonic threats.

MDA awarded Aerojet Rocketdyne a three-year contract to mature Axial Upper Stage (AUS) component technologies and analytical tools to demonstrate component, material, and architecture solutions to support future Hypersonic Defense (HD) development efforts.

MDA completed Laser Lethality Demonstration (LLD) testing at White Sands Missile Range, 3rd quarter FY 2019. This complex ground-based laser lethality demonstration was an integral step for the Agency's left-of-launch opportunities.

MDA completed three Industry Laser Scaling (formerly Low Power Laser Demonstrator) Technology Critical Design Reviews (CDR-T) in 4QFY2019 and successfully transferred technology to Boeing for a 100kW-Class laser demonstration scheduled for 1st quarter FY 2021.

General

In accordance with direction from the President, the Under Secretary of Defense for Research and Engineering (USD (R&E)), the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)), and the 2019 MDR, MDA is working diligently to identify ways to strengthen missile defense capabilities, rebalance homeland and theater defense priorities, and highlight priority funding areas. MDA uses an integrated approach that addresses U.S. missile defense policy, strategy, and capabilities to counter the challenges of the emerging missile threat environment.

Program funding and production quantities listed in this SAR are consistent with the FY 2021 PB.

There are no significant software-related issues with the program at this time.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
July 1999	President William J. Clinton signed the National Missile Defense Act of 1999 (Public Law 106-38) that required the United States to deploy an effective national missile defense system capable of defending the territory of the United States against limited ballistic missile attacks.
January 2001	Aegis cruiser USS Lake Erie conducted first successful flight test of newly-developed Standard Missile-3 (SM-3) interceptor.
September 2001	Following an unsuccessful test in July 2000, President Clinton announced that he was not going to initiate deployment of the national missile defense system.
January 2002	Secretary of Defense signed memorandum changing the name of the Ballistic Missile Defense Organization (BMDO) to the Missile Defense Agency (MDA).
January 2002	First successful intercept test of the SM-3.
December 2002	President George W. Bush directed that the Secretary of Defense "proceed with fielding an initial set of missile defense capabilities."
July 2004	First Ground-based Midcourse Defense Interceptor (GBI) was deployed to an underground silo at Fort Greely, Alaska. Four more GBIs were deployed before the end of the year.
March 2005	MDA completed first series of sea test of the Sea-Based X-Band Radar (SBX).
March 2007	The Airborne Laser completed the first in-flight test of the laser targeting system.
September 2007	Sea-Based X-Band Radar deployed for first time to collect data during GBI Test.
May 2008	U.S. Army activated the first Terminal High Altitude Area Defense (THAAD) Battery.
June 2008	The U.S. Navy successfully shot down a damaged U.S. satellite with an SM-3 interceptor. The non-functioning National Reconnaissance Office satellite was traveling at over 17,000 mph at an altitude of 153 nautical miles above the earth. The satellite's fuel (over 1000 pounds of hydrazine) represented a danger to people if allowed to reenter the atmosphere.
September 2008	AN/TPY-2 radar deployed to Israel.
September 2009	Deputy Secretary of Defense signed DoDD 5134.09, the MDA "Charter."
January 2012	AN/TPY-2 radar deployed to Turkey.
April 2013	THAAD battery deployed to Guam.
April 2017	THAAD battery deployed to South Korea.
May 2017	GBI with Redesigned Kill Vehicle successfully intercepted an ICBM target over the Pacific.
November 2017	44th GBI deployed to silo at Fort Greely, Alaska, completing a DoD-mandated plus-up before the end of the year.
August 2019	The first radar panel for the new Long Range Discriminating Radar (LRDR) delivered to Clear Air Force Station, Alaska.

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
O&S Cost		☐
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Schedule

No schedule events exist for BMDS.

Notes

For schedule milestones see the Unclassified BMDS Accountability Report (BAR) and BAR Classified Annex scheduled for release 2nd quarter FY 2020.

Performance

No performance characteristics exist for BMDS.

Notes

For performance characteristics see the Unclassified BMDS Accountability Report (BAR) and BAR Classified Annex scheduled for released 2nd quarter FY 2020.

Track to Budget

RDT&E

Appn	BA	PE		
Defense-Wide	0400	04	0305103C	
	Project		Name	
	MDCS		Cyber Security Initiative	
Defense-Wide	0400	03	0603176C	
	Project		Name	
	MC71		Cyber Operations	
	MD40		Program-Wide Support	
	MD71		Advanced Concepts and Performance Assessments	
Defense-Wide	0400	03	0603177C	
	Project		Name	
	MC95		Cyber Operations	(Sunk)
	MD40		Program-Wide Support	(Sunk)
	MD95		Discrimination Sensor Technology	(Sunk)
	MT95		Discrimination Sensor Tech-Flight Test Execution	(Sunk)
Defense-Wide	0400	03	0603178C	
	Project		Name	
	MD40		Program-Wide Support	(Sunk)
	MD69		Directed Energy Research	(Sunk)
	MD72		Interceptor Technology	(Sunk)
Defense-Wide	0400	03	0603179C	
	Project		Name	
	MD40		Program Wide Support	(Sunk)
	MD73		Advanced C4ISR	(Sunk)
Defense-Wide	0400	03	0603180C	
	Project		Name	
	MD25		Advanced Technology Development	
	MD40		Program-Wide Support	
Defense-Wide	0400	03	0603274C	
	Project		Name	
	MD81		Special Programs - MDA Technology	(Sunk)
Defense-Wide	0400	03	0603294C	
	Project		Name	
	MD40		Program-Wide Support	
	MD85		Common Kill Vehicle Technology	
Defense-Wide	0400	04	0603881C	
	Project		Name	
	MC07		BMDS Cyber Operations	

	MD06		Patriot Advanced Capability-3 (PAC-3)	
	MD07		THAAD	
	MD40		Program Wide Support	
Defense-Wide	0400	04	0603882C	
	Project		**Name**	
	MC08		BMDS Cyber Operations	
	MD08		Ground Based Midcourse	
	MD40		Program Wide Support	
Defense-Wide	0400	04	0603884C	
	Project		**Name**	
	MC11		BMDS Cyber Operations	
	MD11		BMDS Radars	
	MD40		Program Wide Support	
	MD41		Homeland Defense Radar - Hawaii (HDR-H)	(Sunk)
Defense-Wide	0400	04	0603890C	
	Project		**Name**	
	MC30		BMDS Cyber Operations	
	MC31		Engineering Cyber Operations	
	MD24		System Engineering & Integration	
	MD28		Intelligence & Security	
	MD29		Advanced Threat Missile Defeat Technology	(Sunk)
	MD30		BMD Information Management Systems	
	MD31		Modeling & Simulation	
	MD32		Quality, Safety, and Mission Assurance	
	MD40		Program Wide Support	
	MT23		Enabling - Test	
Defense-Wide	0400	04	0603891C	
	Project		**Name**	
	MD27		Special Programs	
Defense-Wide	0400	04	0603892C	
	Project		**Name**	
	MC09		BMDS Cyber Operations	
	MD09		Aegis BMD	
	MD40		Program Wide Support	
	MG09		Aegis BMD SM-3 Development Articles	(Sunk)
	MM09		Aegis BMD SM-3 Development	
	MX09		Aegis BMD Development Support	
Defense-Wide	0400	04	0603893C	
	Project		**Name**	
	MC12		BMDS Cyber Operations	(Sunk)
	MD12		Space Tracking & Surveillance System (STSS)	(Sunk)
	MD40		Program Wide Support	(Sunk)
Defense-Wide	0400	04	0603895C	

Project	Name	
MD33	MD Space Exp Center (MDSEC)	(Sunk)
MD40	Program Wide Support	(Sunk)

Defense-Wide 0400 04 0603896C

Project	Name
MC01	BMDS Cyber Operations
MD01	Command & Control, Battle Management, Communications (C2BMC)
MD40	Program Wide Support
MT01	C2BMC Test
MX01	C2BMC Development Support

Defense-Wide 0400 04 0603898C

Project	Name
MC03	BMDS Cyber Operations
MD03	Joint Warfighter Support
MD40	Program Wide Support
MT03	Joint Warfighter Support Test

Defense-Wide 0400 04 0603904C

Project	Name
MC22	BMDS Cyber Operations
MD22	Missile Defense Integration & Operations Center (MDIOC)
MD40	Program Wide Support

Defense-Wide 0400 04 0603906C

Project	Name
MD35	Regarding Trench

Defense-Wide 0400 04 0603907C

Project	Name
MD40	Program Wide Support
MX46	Sea Based X-Band Radar Development Support

Defense-Wide 0400 04 0603913C

Project	Name	
MD20	Israeli Upper Tier	(Sunk)
MD26	Israeli ARROW Program	
MD34	Short Range Ballistic Missile Defense (SRBMD)	

Defense-Wide 0400 04 0603914C

Project	Name	
MC04	BMDS Cyber Operations	
MD04	BMDS Combined Test Center	(Sunk)
MD40	Program Wide Support	
MT04	BMDS Test Program	

Defense-Wide 0400 04 0603915C

Project	Name

	MC05		BMDS Cyber Operations	
	MD40		Program Wide Support	
	MT05		BMDS Targets Program	
Defense-Wide	0400	04	0604115C	
	Project		**Name**	
	MC98		BMDS Cyber Operations	
	MD40		Program Wide Support	
	MD94		Neutral Particle Beam	(Sunk)
	MD98		Directed Energy Demonstrator Development	(Sunk)
	MD99		Discrimination Sensor Demonstrator Development	
	MT99		Technology Maturation Initiatives Test	(Sunk)
Defense-Wide	0400	04	0604181C	
	Project		**Name**	
	MD29		Hypersonic Defense	
	MD40		Program-Wide Support	
Defense-Wide	0400	04	0604672C	
	Project		**Name**	
	MD40		Program-Wide Support	(Sunk)
	MD41		Homeland Defense Radar (HDR) Hawaii	(Sunk)
Defense-Wide	0400	04	0604673C	
	Project		**Name**	
	MD40		Program-Wide Support	(Sunk)
	MD41		Homeland Defense Radar - Hawaii (HDR-H)	(Sunk)
	MD51		Pacific Radar (PAC Radar)	(Sunk)
Defense-Wide	0400	04	0604873C	
	Project		**Name**	
	MC96		Cyber Operations	(Sunk)
	MD40		Program Wide Support	
	MD96		Long Range Discrim Radar (LRDR)	
Defense-Wide	0400	04	0604874C	
	Project		**Name**	
	MD40		Program Wide Support	
	MD80		Next Generation Interceptor (NGI)	
	MD97		Improved Homeland Defense (IHLD) Interceptors	(Sunk)
Defense-Wide	0400	04	0604876C	
	Project		**Name**	
	MD40		Program Wide Support	
	MT07		THAAD Test	
Defense-Wide	0400	04	0604878C	
	Project		**Name**	
	MC13		Cyber Operations	
	MD40		Program Wide Support	

	MT09	Aegis BMD Test	
Defense-Wide	0400 04	0604879C	
	Project	**Name**	
	MD40	Program Wide Support	
	MT11	BMDS Radars Test	
Defense-Wide	0400 04	0604880C	
	Project	**Name**	
	MC68	BMDS Cyber Operations	
	MD40	Program-Wide Support	
	MD68	Aegis Ashore	
	MT68	Aegis Ashore Test	(Sunk)
Defense-Wide	0400 04	0604881C	
	Project	**Name**	
	MD09	SM-3 Block IIA Co-Development	(Sunk)
	MD40	Program-Wide Support	(Sunk)
	MT09	SM-3 Block IIA Co-Development Test	(Sunk)
Defense-Wide	0400 04	0604887C	
	Project	**Name**	
	MD40	Program Wide Support	
	MT08	Ground Based Midcourse Test	
Defense-Wide	0400 04	0604894C	
	Project	**Name**	
	MD40	Program-Wide Support	(Sunk)
	MD85	Multi Object Kill Vehicle	(Sunk)
Defense-Wide	0400 06	0605502C	
	Project	**Name**	
	MD45	Small Business Innovative Research	
Defense-Wide	0400 06	0606942C	
	Project	**Name**	
	MC39	Cyber Vulnerability	(Sunk)
Defense-Wide	0400 06	0901598C	
	Project	**Name**	
	MD38	Management Headquarters	
Defense-Wide	0400 04	1206893C	
	Project	**Name**	
	MC12	BMDS Cyber Operations	
	MD12	Space Tracking and Surveillance System (STSS)	
	MD40	Program-Wide Support	
Defense-Wide	0400 04	1206895C	
	Project	**Name**	
	MC33	Cyber Operations	
	MD33	MD Space Exp Center (MDSEC)	
	MD37	Space Sensor Layer	(Sunk)

MD40	Program-Wide Support	
MD42	HBTSS Prototype	(Sunk)

Procurement

Appn	BA	PE
Defense-Wide 0300	01	0208866C

Line Item	Name	
MD07	THAAD	
MD08	Ground Based Midcourse	
MD09	Aegis BMD	
MD11	BMDS AN/TPY-2 Radars	
MD14	SM-3 Block IIA Missiles	
MD20	Arrow Upper Tier	(Sunk)
MD26	Arrow 3 Upper Tier System	
MD34	Short Range Ballistic Missile Defense (SRBMD)	
MD73	Aegis Ashore Phase III	
MD83	Iron Dome	
MD90	Aegis BMD Hardware and Software	
MD97	Improved Homeland Defense (HLD) Interceptors	(Sunk)

MILCON

Appn	BA	PE
Defense-Wide 0500	01	0603882C

Project	Name	
21000673	Redundant Communications Building	
D1700653	Missile Defense Cmplx Switchgear Facility, Ft. Greely, AK	(Sunk)
D1900679	Missile Field #1 Expansion	(Sunk)
MDA67400	Missile Field #4	(Sunk)

Appn	BA	PE
Defense-Wide 0500	01	0603884C

Project	Name	
00000676	Pacific Radar Complex, Phase 1	(Sunk)

Appn	BA	PE
Defense-Wide 0500	02	0603890C

Project	Name	
17999902	Unspecified Minor Construction	(Sunk)
18999902	Unspecified Minor Construction	(Sunk)
19999902	Unspecified Minor Construction	(Sunk)

Appn	BA	PE
Defense-Wide 0500	03	0603890C

Project	Name	
19999903	Planning and Design	(Sunk)

Appn	BA	PE
Defense-Wide 0500	02	0603890C

Project	Name	
20999902	Worldwide Unspecified Minor	(Sunk)

			Construction	
Defense-Wide	0500	03	0603890C	
	Project		Name	
	20999903		Planning and Design	(Sunk)
Defense-Wide	0500	02	0603890C	
	Project		Name	
	21999902		Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C	
	Project		Name	
	21999903		Planning and Design	(Sunk)
Defense-Wide	0500	01	0603890C	
	Project		Name	
	22000675		Pacific IDT	(Sunk)
Defense-Wide	0500	02	0603890C	
	Project		Name	
	22999902		Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C	
	Project		Name	
	22999903		Planning and Design	(Sunk)
Defense-Wide	0500	02	0603890C	
	Project		Name	
	23999902		Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C	
	Project		Name	
	23999903		Planning and Design	(Sunk)
Defense-Wide	0500	02	0603890C	
	Project		Name	
	24999902		Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C	
	Project		Name	
	24999903		Planning and Design	(Sunk)
Defense-Wide	0500	02	0603890C	
	Project		Name	
	25999902		Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C	
	Project		Name	
	25999903		Planning and Design	
Defense-Wide	0500	01	0603914C	
	Project		Name	

	D1700662	Test Support Facility	(Sunk)
	D2200672	Consolidated Test Center	(Sunk)
Defense-Wide	0500 01	0604673C	
	Project	**Name**	
	D2100671	Homeland Defense Radar (HDR) - Hawaii	(Sunk)
Defense-Wide	0500 03	0604873C	
	Project	**Name**	
	17999903	Planning and Design	(Sunk)
Defense-Wide	0500 01	0604873C	
	Project	**Name**	
	D1900659	Long Range Discrimination Radar Cmplx, Clear AFS, AK, Ph 2	(Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY $M			BY 2002 $M	TY $M		
	SAR Baseline Planning Estimate	Current APB Objective/Threshold		Current Estimate	SAR Baseline Planning Estimate	Current APB Objective	Current Estimate
RDT&E	44740.1	--	--	140226.2	47217.1	--	173556.7
Procurement	0.0	--	--	19927.7	0.0	--	27456.3
Flyaway	--	--	--	19927.7	--	--	27456.3
Recurring	--	--	--	19927.7	--	--	27456.3
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	--	--	1139.3	0.0	--	1522.7
Acq O&M	0.0	--	--	0.0	0.0	--	0.0
Total	44740.1	--	--	161293.2	47217.1	--	202535.7

Cost Notes

For Major Defense Acquisition Programs, DoD requires an APB at program initiation. The APB establishes cost, quantity, schedule, and performance parameters that form the basis for unit cost reporting under 10 U.S.C. Sec. 2433. As a single integrated system of systems, the BMDS does not have an APB. In response to other statutory requirements, however, Missile Defense Agency provides the Congress with an annual BMDS Accountability Report (BAR), which includes schedule, technical, operational capacity, resource, and contract baselines that guide development of ballistic missile defense capabilities. The BAR includes unit cost baselines for key assets (e.g. SM-3 missiles and THAAD interceptors) comprising the BMDS.

Total Quantity			
Quantity	SAR Baseline Planning Estimate	Current APB	Current Estimate
RDT&E	0	0	0
Procurement	0	0	0
Total	0	0	0

Quantity Notes

Quantities of Key BMDS Assets (grouped by appropriation, total buys from FY 2002-25):

Edit Main Menu

Program	Component	RDT&E	Proc
Terminal High Altitude Area Defense (THAAD)	Batteries	2	5
	Interceptors	50	684
Aegis	SM-3 Block IA	79	71
	SM-3 Block IIA	17	150
	SM-3 Block IB	21	517
Ground-Based Midcourse Defense (GMD)	Ground-Based Interceptors (GBIs)	58	0
Sensors	AN/TPY-2	7	5

Cost and Funding

Funding Summary

Appropriation Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)									
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
RDT&E	129430.8	8138.2	7169.6	7324.7	7432.1	6685.8	7375.5	0.0	173556.7
Procurement	17191.7	1724.7	1458.2	1179.6	1208.3	2343.0	2350.8	0.0	27456.3
MILCON	1405.2	45.5	52.9	4.5	4.8	5.0	4.8	0.0	1522.7
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	148027.7	9908.4	8680.7	8508.8	8645.2	9033.8	9731.1	0.0	202535.7
PB 2020 Total	148030.3	8908.9	8720.5	8574.4	8162.9	8153.7	0.0	0.0	190550.7
Delta	-2.6	999.5	-39.8	-65.6	482.3	880.1	9731.1	0.0	11985.0

Quantity Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	0	0	0	0	0	0	0	0	0
PB 2021 Total	0	0	0	0	0	0	0	0	0	0
PB 2020 Total	0	0	0	0	0	0	0	0	0	0
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding 0400 | RDT&E | Research, Development, Test, and Evaluation, Defense-Wide							
		TY $M					
Fiscal Year	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2002	--	--	--	--	--	--	6618.8
2003	--	--	--	--	--	--	6446.3
2004	--	--	--	--	--	--	7566.8
2005	--	--	--	--	--	--	8826.7
2006	--	--	--	--	--	--	7690.3
2007	--	--	--	--	--	--	9382.8
2008	--	--	--	--	--	--	8655.3
2009	--	--	--	--	--	--	8411.9
2010	--	--	--	--	--	--	6945.9
2011	--	--	--	--	--	--	7406.7
2012	--	--	--	--	--	--	6809.2
2013	--	--	--	--	--	--	5867.3
2014	--	--	--	--	--	--	5731.0
2015	--	--	--	--	--	--	5645.2
2016	--	--	--	--	--	--	6219.7
2017	--	--	--	--	--	--	6201.2
2018	--	--	--	--	--	--	7759.6
2019	--	--	--	--	--	--	7246.1
2020	--	--	--	--	--	--	8138.2
2021	--	--	--	--	--	--	7169.6
2022	--	--	--	--	--	--	7324.7
2023	--	--	--	--	--	--	7432.1
2024	--	--	--	--	--	--	6685.8
2025	--	--	--	--	--	--	7375.5
Subtotal	--	--	--	--	--	--	173556.7

Annual Funding 0400 | RDT&E | Research, Development, Test, and Evaluation, Defense-Wide							
		BY 2002 $M					
Fiscal Year	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2002	--	--	--	--	--	--	6496.7
2003	--	--	--	--	--	--	6238.0
2004	--	--	--	--	--	--	7320.1
2005	--	--	--	--	--	--	8432.1
2006	--	--	--	--	--	--	7078.7
2007	--	--	--	--	--	--	8350.7
2008	--	--	--	--	--	--	7655.5
2009	--	--	--	--	--	--	7195.8
2010	--	--	--	--	--	--	5901.4
2011	--	--	--	--	--	--	6223.6
2012	--	--	--	--	--	--	5636.8
2013	--	--	--	--	--	--	4718.8
2014	--	--	--	--	--	--	4497.0
2015	--	--	--	--	--	--	4343.1
2016	--	--	--	--	--	--	4733.0
2017	--	--	--	--	--	--	4669.6
2018	--	--	--	--	--	--	5722.0
2019	--	--	--	--	--	--	5286.8
2020	--	--	--	--	--	--	5767.7
2021	--	--	--	--	--	--	4953.5
2022	--	--	--	--	--	--	4974.0
2023	--	--	--	--	--	--	4947.8
2024	--	--	--	--	--	--	4363.8
2025	--	--	--	--	--	--	4719.7
Subtotal	--	--	--	--	--	--	140226.2

Annual Funding 0300 | Procurement | Procurement, Defense-Wide							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2009	--	--	206.6	--	206.6	--	206.6
2010	--	--	835.7	--	835.7	--	835.7
2011	--	--	1070.8	--	1070.8	--	1070.8
2012	--	--	1347.2	--	1347.2	--	1347.2
2013	--	--	1464.2	--	1464.2	--	1464.2
2014	--	--	1785.2	--	1785.2	--	1785.2
2015	--	--	1757.2	--	1757.2	--	1757.2
2016	--	--	1489.2	--	1489.2	--	1489.2
2017	--	--	1610.4	--	1610.4	--	1610.4
2018	--	--	3052.8	--	3052.8	--	3052.8
2019	--	--	2572.4	--	2572.4	--	2572.4
2020	--	--	1724.7	--	1724.7	--	1724.7
2021	--	--	1458.2	--	1458.2	--	1458.2
2022	--	--	1179.6	--	1179.6	--	1179.6
2023	--	--	1208.3	--	1208.3	--	1208.3
2024	--	--	2343.0	--	2343.0	--	2343.0
2025	--	--	2350.8	--	2350.8	--	2350.8
Subtotal	--	--	27456.3	--	27456.3	--	27456.3

Annual Funding 0300 | Procurement | Procurement, Defense-Wide							
		BY 2002 $M					
Fiscal Year	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2009	--	--	174.6	--	174.6	--	174.6
2010	--	--	703.9	--	703.9	--	703.9
2011	--	--	892.1	--	892.1	--	892.1
2012	--	--	1106.0	--	1106.0	--	1106.0
2013	--	--	1165.5	--	1165.5	--	1165.5
2014	--	--	1388.3	--	1388.3	--	1388.3
2015	--	--	1337.9	--	1337.9	--	1337.9
2016	--	--	1123.2	--	1123.2	--	1123.2
2017	--	--	1201.9	--	1201.9	--	1201.9
2018	--	--	2227.0	--	2227.0	--	2227.0
2019	--	--	1846.1	--	1846.1	--	1846.1
2020	--	--	1202.0	--	1202.0	--	1202.0
2021	--	--	993.9	--	993.9	--	993.9
2022	--	--	788.3	--	788.3	--	788.3
2023	--	--	791.7	--	791.7	--	791.7
2024	--	--	1504.9	--	1504.9	--	1504.9
2025	--	--	1480.4	--	1480.4	--	1480.4
Subtotal	--	--	19927.7	--	19927.7	--	19927.7

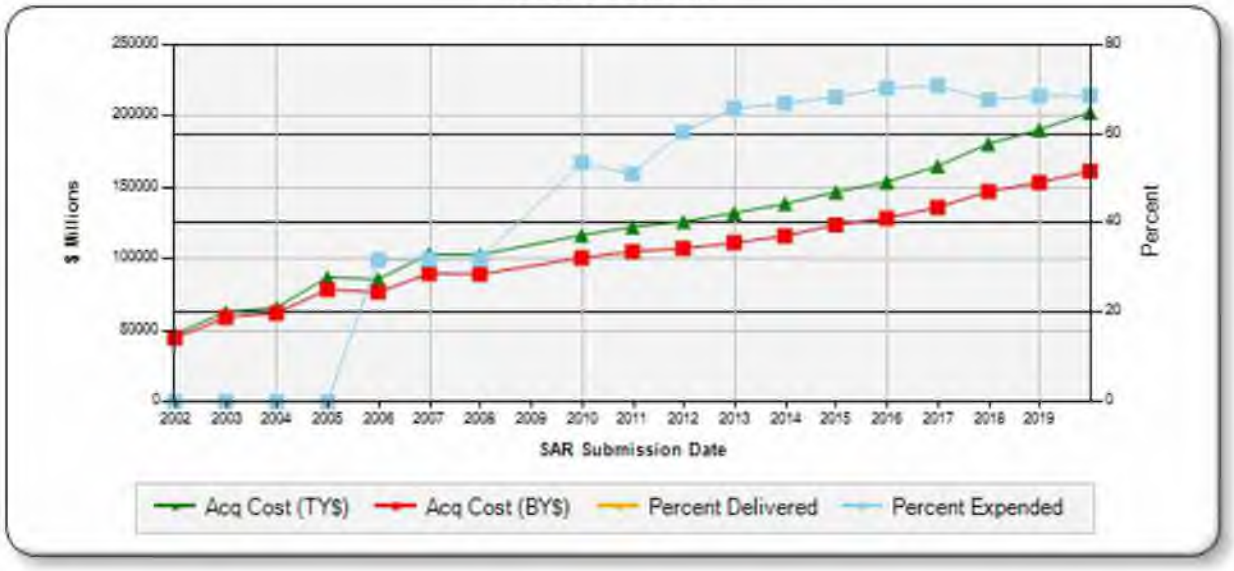
Annual Funding 0500 | MILCON | Military Construction, Defense-Wide	
Fiscal Year	TY $M Total Program
2002	8.2
2003	24.9
2004	24.4
2005	22.3
2006	4.9
2007	0.8
2008	--
2009	18.2
2010	96.7
2011	1.2
2012	71.9
2013	138.7
2014	188.1
2015	28.3
2016	181.8
2017	193.6
2018	203.0
2019	198.2
2020	45.5
2021	52.9
2022	4.5
2023	4.8
2024	5.0
2025	4.8
Subtotal	1522.7

Annual Funding 0500 | MILCON | Military Construction, Defense-Wide	
Fiscal Year	BY 2002 $M Total Program
2002	7.9
2003	23.7
2004	23.2
2005	21.0
2006	4.4
2007	0.7
2008	--
2009	15.3
2010	80.9
2011	1.0
2012	58.2
2013	108.4
2014	142.5
2015	21.0
2016	133.6
2017	139.9
2018	142.4
2019	137.5
2020	30.7
2021	35.0
2022	2.9
2023	3.1
2024	3.1
2025	2.9
Subtotal	1139.3

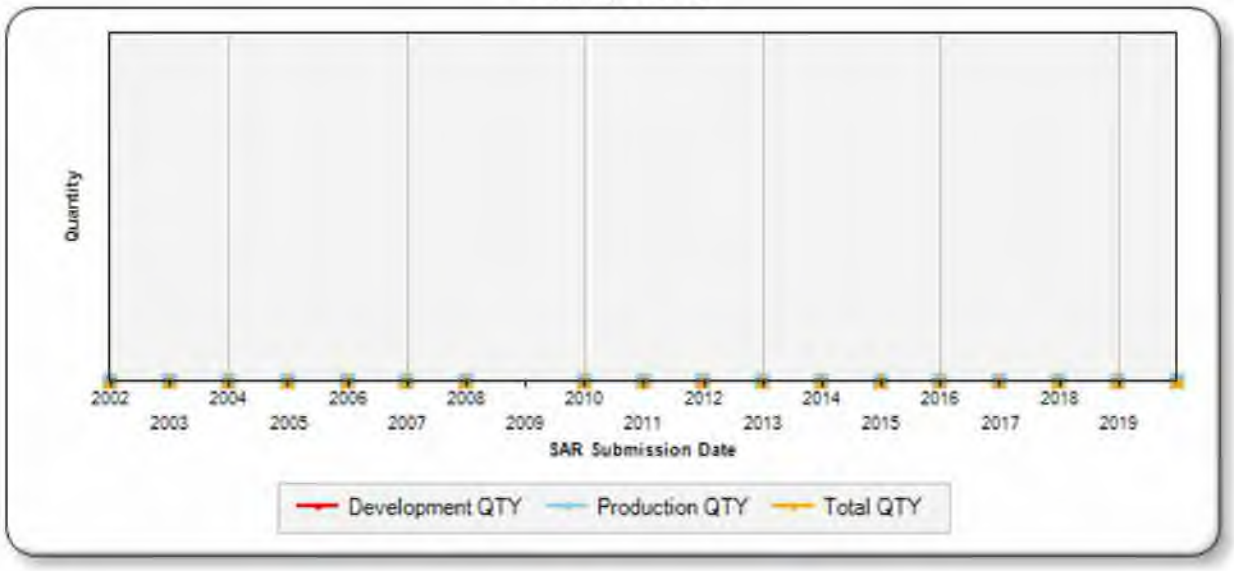
Charts

BMDS first began SAR reporting in December 2001

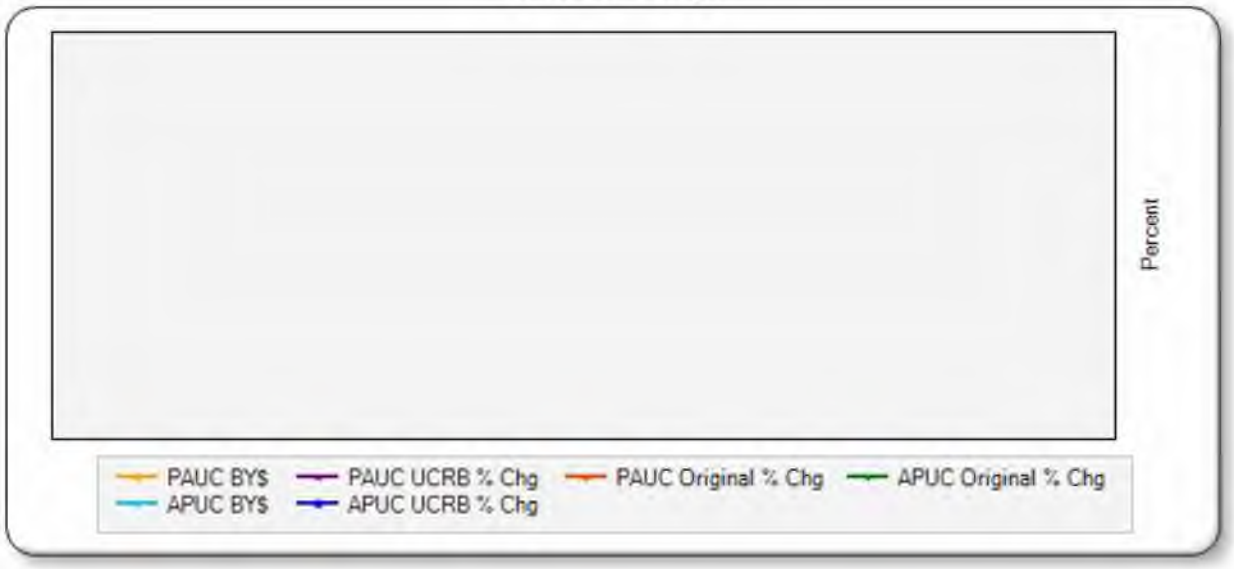
Program Acquisition Cost - BMDS
Base Year 2002 $M



Quantity - BMDS



Unit Cost - BMDS
Base Year 2002 $M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks
Current Estimate (December 2019)
None

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis
Current Baseline Estimate (N/A)
None
Original Baseline Estimate (N/A)
None
Revised Original Estimate (N/A)
None
Current Procurement Cost (December 2019)
None

Low Rate Initial Production

There is no LRIP for this program.

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost $M	Description
Japan	4/29/2019	2	1272.0	FMS Case JA-P-NCO; Aegis Ashore Japan sites and equipment support.
Germany	4/9/2019	0	11.5	FMS Case GY-P-GQK; BMD Risk Reduction and Analysis. No major deliveries. THAAD Interceptors.
Japan	4/1/2019	0	81.7	FMS Case JA-P-QDC; Support equipment and services to execute JFTM-07. No major deliveries.
Japan	4/1/2019	21	560.2	FMS Case JA-P-AUA; Delivery of eight (8) Standard Missile-3 (SM-3) Block IB and 13 SM-3 Block IIA All Up Rounds (AURs).
Japan	3/13/2019	4	5.2	FMS Case JA-CTB; SM-3 Block IA components and spare parts and associated support and services.
United Kingdom	12/12/2018	0	1.9	FMS Case UK-I-ZAA; Technical Assistance Case defining system performance requirements for BMDDR/C2BMC to include Site Survey Assessment & Foreign Liaison Officer.
Saudi Arabia	11/26/2018	360	5363.4	FMS Case SR-I-WIC; THAAD Interceptors.
Saudi Arabia	11/26/2018	7	7891.4	FMS Case SR-I-WIB; Seven (7) THAAD batteries, one (1) training battery, and associated equipment, facilities, and services.
Japan	10/22/2018	0	12.0	FMS Case JA-P-QCH; Standard Missile-3 (SM-3) Follow-On Technical Support (FOTS). No major deliveries.
Japan	7/10/2018	0	0.4	FMS Case: JA-I-UAB; USG Technical Assistance in support of Integrated Air and Missile Defense (IAMD) Exercise RESILIENT SHIELD 2019.
Finland	4/3/2018	0	0.9	FMS Case FI-I-YAA; Technical Assistance for an Integrated Air Defense Information Study (IADIS).
Japan	3/15/2018	0	0.4	FMS Case JA-P-QDM; Airborne Long Distance Observation Sensor System (ALOSS-AIRBOSS2) participation in Japanese Flight Test Mission-05 (JFTM-05). No major deliveries.
Japan	2/22/2018	0	24.8	FMS Case JA-P-QDS; Aegis Ashore Technical Assistance and Support. No major deliveries.
Japan	12/1/2017	4	133.3	FMS Case JA-P-ATB; SM-3 Block IIA All Up Rounds (AUPs) and Support. Major deliveries: Three (3) Tactical AURs and one (1) Flight Test Round (FTR).
Japan	11/24/2017	0	8.8	FMS Case JA-P-QAG; Standard Missile-3 (SM-3) Follow-On Technical Support (FOTS). No major deliveries.
Japan	10/27/2017	0	0.2	FMS Case JA-P-QDN; Aegis Ashore Site Survey. No major deliveries.

Japan	8/8/2017	0	0.4	FMS Case JA-I-UAA; USG Technical Assistance in support of the Integrated Air & Missile Defense (IAMD) Exercise Fleet Synthetic Training - Joint (FST-J). Deliveries: Technical services to support RESILIENT SHIELD 2018.
Japan	3/15/2017	6	10.3	FMS Case JA-P-CRT; SM-3 Block IA components and spare parts with support and services. Deliveries: Two (2) MK72 Rocket Motor Boosters, one (1) Third Stage Rocket Motor (TSRM), and three (3) Nosecones.
Japan	12/1/2016	0	10.6	FMS Case JA-P-FYW; SM-3 Technical Assistance including Block IIA maintenance concepts and Intermediate Level Maintenance Facility (ILMF) and magazine design and review, Block IA spares and consumables, life-cycle, recertification, follow-on technical, security, and weapon system services and support. No major deliveries.
Japan	9/1/2016	0	8.8	FMS Case JA-P-FYF; Technical Assistance and support to define the interface between the Japan Aerospace Defense Ground Environment (JADGE) and Japan Aegis Ballistic Missile Defense (BMD). No major deliveries.
Japan	3/22/2016	1	77.3	FMS Case JA-P-ASK; Japan Flight Test Mission-05 (JFTM-05). Deliveries: One (1) SM-3 Block IB Flight Test Round (FTR).
South Korea	12/24/2015	0	0.6	FMS Case KS-I-YOA; International Simulation (I-SIM) software and training. No major deliveries.
Japan	12/1/2015	0	6.1	FMS Case JA-P-FWV; SM-3 FOTS, spares and equipment. No major deliveries.
Japan	12/1/2015	0	12.5	FMS Case JA-P-FXU; SM-3 Cooperative Development (SCD) FTM execution. No major deliveries.
Japan	6/1/2015	0	8.0	FMS Case JA-P-FXY; SCD Pre-Flight Readiness Test (PFRT) for Third Stage Rocket Motor (TSRM). No major deliveries.
Saudi Arabia	12/14/2014	0	12.0	FMS Case SR-I-WIA; USG Technical Assistance. No major deliveries.
Japan	11/3/2014	0	3.8	FMS Case JA-P-FVE; ILMF security support and services. No major deliveries.
Japan	11/3/2014	0	5.3	FMS Case JA-P-FUV; SM-3 FOTS and Return, Repair, Reshipment (RRR) of SM-3 All Up Rounds (AURs). No major deliveries.
United Arab Emirates	12/25/2011	2	5202.2	FMS Case AE-B-UAF; Two (2) THAAD Batteries, consisting of 192 interceptors, two (2) Army Navy/Transportable Radar Surveillance Model-2 (AN/TPY-2) Radars, 12 Launchers, eight (8) Missile Round Pallets, seven (7) Multifunctional Information Distribution System (MIDS) Terminals, four (4) AMMPS, ten (10) PR4G TRC-9105 Radios, six (6) PR4G TRC-9301C Radios, various tactical vehicles, trucks, training aids and devices, spare parts, training, government and

				contractor technical assistance, Tracking Exercise, books and publications, and repair and return. Delivery is two (2) batteries.
United Arab Emirates	4/30/2010	0	13.8	FMS Case AE-B-UAE; Technical Assistance and Site Survey. Line closure activities are occurring for applicable lines. No major deliveries.
Japan	3/22/2010	2	20.0	FMS Case JA-P-FON; SM-3 Block IA Spares and RRR. Deliveries: One (1) SM-3 Kinetic Warhead (KW) and one (1) MK72 Rocket Motor Booster.
Japan	9/11/2008	0	12.1	FMS Case JA-P-FQV; SM-3 Block IA Spares. No major deliveries.
Netherlands	8/31/2006	0	18.7	FMS Case NE-P-GLK; BMD Sensor Integration Study (SIS). No major deliveries.

Notes

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2002 $M Current UCR Baseline	BY 2002 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	--	161293.2	
Quantity	--	0	
Unit Cost	--	--	--
Average Procurement Unit Cost			
Cost	--	19927.7	
Quantity	--	0	
Unit Cost	--	--	--

For Major Defense Acquisition Programs, DoD requires an APB at program initiation. The APB establishes cost, quantity, schedule, and performance parameters that form the basis for unit cost reporting under 10 U.S.C. Sec. 2433. As a single integrated system of systems, the BMDS does not have an APB. In response to other statutory requirements, however, Missile Defense Agency provides the Congress with an annual BMDS Accountability Report (BAR), which includes schedule, technical, test, operational capacity, resource, and contract baselines that guide development of ballistic missile defense capabilities. The BAR includes unit cost baselines for key assets (e.g. SM-3 missiles and THAAD interceptors) comprising the BMDS.

APB Unit Cost History					
Item	Date	BY 2002 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	N/A	N/A	N/A	N/A	N/A
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	N/A	N/A	N/A	N/A	N/A
Current APB	N/A	N/A	N/A	N/A	N/A
Prior Annual SAR	Dec 2018	N/A	N/A	N/A	N/A
Current Estimate	Dec 2019	N/A	N/A	N/A	N/A

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Planning Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.000	--	--	--	--	--	--	--	--	0.000

A PAUC Unit Cost History is not available, since no Initial PAUC Estimate had been calculated due to a lack of defined quantities.

Current SAR Baseline to Current Estimate (TY $M)									
Initial APUC Planning Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.000	--	--	--	--	--	--	--	--	0.000

An APUC Unit Cost History is not available, since no Initial APUC Estimate had been calculated due to a lack of defined quantities.

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	N/A	N/A	N/A
Milestone C	N/A	N/A	N/A	N/A
IOC	N/A	N/A	N/A	N/A
Total Cost (TY $M)	47217.1	N/A	N/A	202535.7
Total Quantity	0	N/A	N/A	0
PAUC	N/A	N/A	N/A	N/A

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (PlanningRDTE Estimate)	47217.1	--	--	47217.1
Previous Changes				
Economic	+42.8	-16.8	-16.0	+10.0
Quantity	--	+15.0	--	+15.0
Schedule	-1101.4	-307.6	-267.2	-1676.2
Engineering	+53296.0	-1296.1	-31.8	+51968.1
Estimating	-3153.3	+2003.1	+2068.1	+917.9
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+49084.1	+397.6	+1753.1	+51234.8
Current Changes				
Economic	+96.2	+17.1	-1.3	+112.0
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	-135.2	--	--	-135.2
Estimating	+4342.2	-896.5	-1168.6	+2277.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+4303.2	-879.4	-1169.9	+2253.9
Adjustments	+72952.3	+27938.1	+939.5	+101829.9
Total Changes	+126339.6	+27456.3	+1522.7	+155318.6
Current Estimate	173556.7	27456.3	1522.7	202535.7

Summary BY 2002 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (PlanningRDTE Estimate)	44740.1	--	--	44740.1
Previous Changes				
Economic	--	--	--	--
Quantity	--	+12.8	--	+12.8
Schedule	-999.2	-233.4	-171.9	-1404.5
Engineering	+44631.2	-977.2	-24.3	+43629.7
Estimating	-3104.1	+1405.1	+1477.2	-221.8
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+40527.9	+207.3	+1281.0	+42016.2
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	-90.4	--	--	-90.4
Estimating	+2938.3	-598.7	-750.2	+1589.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+2847.9	-598.7	-750.2	+1499.0
Adjustments	+52110.3	+20319.1	+608.5	+73037.9
Total Changes	+95486.1	+19927.7	+1139.3	+116553.1
Current Estimate	140226.2	19927.7	1139.3	161293.2

Previous Estimate: December 2018

Cost Variance Notes

Note: Below are the Adjustments from the current and prior SARs reflecting the inclusion of another year of funding since the prior submission

SAR	$ Then Year				$ Base Year 2002			
Submission	RDT&E	PROC	MILCON	Total	RDT&E	PROC	MILCON	Total
Dec 2009 SAR	14,302.0	9,520.3	38.1	**23,860.4**	11,204.2	7,582.5	29.4	**18,816.1**
Dec 2010 SAR	6,279.4	2,191.1	10.1	**8,480.6**	4,805.2	1,662.4	7.6	**6,475.2**
Dec 2011 SAR	5,895.6	1,533.8	10.5	**7,439.9**	4,368.4	1,126.6	7.6	**5,502.6**
Dec 2012 SAR	5,164.3	1,890.0	10.6	**7,064.9**	3,715.1	1,347.4	7.4	**5,069.9**
Dec 2013 SAR	4,791.0	1,964.8	68.7	**6,824.5**	3,406.6	1,382.3	47.2	**4,836.1**
Dec 2014 SAR	5,112.1	1,841.6	10.7	**6,964.4**	3,641.9	1,299.6	7.3	**4,948.8**
Dec 2015 SAR	5,289.4	1,781.8	10.8	**7,082.0**	3,680.6	1,228.2	7.2	**4,916.0**
Jun 2016 SAR	6,142.2	1,555.1	188.9	**7,886.2**	4,187.5	1,050.7	123.5	**5,361.7**
Dec 2017 SAR	6,665.0	1,486.4	190.8	**8,342.2**	4,494.6	985.7	122.3	**5,602.6**
Dec 2018 SAR	5,935.8	1,822.4	395.5	**8,153.7**	3,886.5	1,173.3	246.1	**5,305.9**
Dec 2019 SAR	7,375.5	2,350.8	4.8	**9,731.1**	4,719.7	1,480.4	2.9	**6,203.0**
Total	**72,952.3**	**27,938.1**	**939.5**	**101,829.9**	**52,110.3**	**20,319.1**	**608.5**	**73,037.9**

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+96.2
Reduced Discrimination capability as part of the Defense Wide Review. (Engineering)	-90.4	-135.2
Revised estimate to reflect cancellation of the Redesigned Kill Vehicle (RKV) program due to technical issues. (Estimating)	-766.5	-1112.2
Revised estimate to reflect initiation of the Next Generation Interceptor (NGI) program following RKV cancellation. (Estimating)	+2776.3	+4114.5
Revised estimate to reflect Congressional add in FY 2020 for Hypersonic and Ballistic Tracking Space Sensor (HBTSS). (Estimating)	+76.5	+108.0
Revised estimate to reflect the addition of funding for HBTSS competitive prototype development and launch. (Estimating)	+483.3	+711.0
Revised estimate to reflect the transfer of HBTSS funding to the Space Development Agency starting in FY 2021. (Estimating)	-483.3	-711.0
Revised estimate to reflect cancellation of High Power Laser development as part of the DWR. (Estimating)	-364.9	-544.1
Revised estimate to reflect cancellation of the Neutral Particle Beam program. (Estimating)	-260.5	-380.1
Revised estimate to reflect additional funding for a Layered Homeland Defense to include Aegis, THAAD, Midcourse and Sensors. (Estimating)	+1135.8	+1692.2
Revised estimate to reflect increased funding for Special Programs. (Estimating)	+390.9	+574.2
Revised estimate to reflect Test program changes. (Estimating)	+370.1	+565.8
Revised estimate to reflect additional funding for Cyber requirements. (Estimating)	+237.1	+342.1
Revised estimate to reflect the FY 2020 Congressional add to accelerate Hypersonic Defense and other Hypersonic adjustments. (Estimating)	+193.3	+273.1
Revised estimate to reflect additional funding for the Ground Based Interceptor (GBI) / Booster System Life Extension Program. (Estimating)	+177.2	+252.7
Revised estimate to reflect additional funding for the Aegis Ashore sites located in Poland and Romania. (Estimating)	+26.2	+38.5
Revised estimate to reflect the deferment of the Pacific Radar as part of the DWR. (Estimating)	-492.8	-744.7
Revised estimate to reflect the postponement of the Homeland Defense Radar planned for Hawaii as part of the DWR. (Estimating)	-354.3	-518.1
Revised estimate to reflect the deferment of the Consolidated Test Facility as part of the DWR. (Estimating)	-133.2	-200.4
Revised cost estimates and other adjustments. (Estimating)	-72.9	-119.3
RDT&E Subtotal	+2847.9	+4303.2

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+17.1
Revised estimate to reflect additional funding for Aegis SM-3 Block IIA missiles. (Estimating)	+220.5	+353.3
Revised estimate to reflect Congressional add in FY 2020 for additional boosters to maintain 44 deployed interceptors. (Estimating)	+104.6	+150.0

Revised estimate to reflect Congressional add in FY2020 for 66 Missile Field Launch Support Systems for Missile Fields 1& 4 (44 replacements, 22 new systems). (Estimating)	+94.1	+135.0
Revised estimate to reflect additional funding for THAAD interceptors; other THAAD adjustments. (Estimating)	+71.3	+103.5
Revised estimate to reflect additional funding for the Aegis Ashore site located in Poland. (Estimating)	+40.1	+59.6
Revised estimate to reflect cancellation of the RKV program and delayed additional Ground Based Interceptors due to technical issues. (Estimating)	-1004.7	-1514.4
Revised estimate to reflect additional funding for the Ground Based Interceptor (GBI) / Booster System Life Extension Program. (Estimating)	-42.3	-62.6
Revised estimate to reflect THAAD Interceptor cost savings due to Foreign Military Sales contract award synergy with U.S. interceptor buys. (Estimating)	-154.8	-233.9
Revised estimate to reflect additional Aegis funding for a Layered Homeland Defense. (Estimating)	+38.5	+60.0
Revised cost estimates and other adjustments. (Estimating)	+34.0	+53.0
Procurement Subtotal	-598.7	-879.4

MILCON	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-1.3
Revised estimate to reflect the postponement of the Homeland Defense Radar planned for Hawaii as part of the DWR. (Estimating)	-262.1	-400.1
Revised estimate to reflect the deferment of the Pacific Radar as part of the DWR. (Estimating)	-256.8	-410.8
Revised estimate to reflect the deferment of the Consolidated Test Facility as part of the DWR. (Estimating)	-218.8	-338.2
Revised cost estimates and other adjustments. (Estimating)	-12.5	-19.5
MILCON Subtotal	-750.2	-1169.9

Contracts

Contract Identification

Appropriation: RDT&E

Contract Name: Development and Sustainment Contract (DSC)

Contractor: The Boeing Company, Missile Defense Systems

Contractor Location: 499 Boeing Blvd., SW
Huntsville, AL 35824-3001

Contract Number: HQ0147-19-C-0004

Contract Type: Cost (CR), Cost Plus Fixed Fee (CPFF), Cost Plus Incentive Fee (CPIF), Cost Plus Award Fee (CPAF)

Award Date: December 30, 2011

Definitization Date: December 30, 2011

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
2816.8	N/A	N/A	10225.0	N/A	N/A	9154.1	9308.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract options and change proposals exercised as noted in prior year SARs.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	-254.8	-73.1
Previous Cumulative Variances	--	--
Net Change	-254.8	-73.1

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to Cost Variance is due to RKV technical issues, GBI Execution / Boost Stack, Prime/Subcontractor Supplier Management rate impacts, and Ground Systems Missile Field Infrastructure, rework, and material costs.

The unfavorable cumulative schedule variance is due to Schedule Variance is due to GBI Execution / Boost Stack, Ground Systems Missile Field Infrastructure, and RKV Stop Work/Termination.

General Contract Variance Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract options and change proposals exercised as noted in prior SARs. The -$336.3 million Target Price decrease since the 2018 SAR is driven by the DSC Extension Undefinitized Contract Action (UCA) definitization.

Notes

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract options and change proposals exercised as noted in the FY 2012 through FY 2017 SARs. The -$336.3M Target Price decrease since the 2018 SAR driven by the DSC Extension Undefinitized Contract Action (UCA) definitization.

- **2018**
  - **Options Exercised:** CLIN 409 Test Control System, CLIN 415 Increment 6 Ground Tests, CLIN 0518 Ground Systems (GS) Build 9, CLIN 0522 Long Lead Lot 1 Missile Field 4 (MF-4), CLIN 0524 Long Lead Lot 2 MF-4, CLIN 0525 Lot 1 MF-4, CLIN 0526 Lot 2 MF-4 and MF-1, CLIN 0631 Ground Based Interceptor (GBI) Maintenance, CLIN 0636 Long Lead for RKV/C2+ AUR Lot 1, CLIN 0705 ODC/Travel for O&M, CLIN 1301 Performance Based Logistics, CLIN 1313 GMD Training, CLIN 1319 GMD Exercises and Wargames, and CLIN 1325 DMETS Support.
  - **CCPs/ECPs:** CCP078 AUR, CCP091 RKV Definitization, CCP098 FTG-11 Configuration Change Definitization, CCP105 Multi-Echelon Training/DMETS Expansion, CCP106 DSC Extension UCA, CCP108 Over and Above Task Plan 18-022 Electronic Control Unit (ECU) Remove, Replace and Retest, and CCP118 GBI-51 Repair and Replace.
  - **Task Instructions (TI):** Amendments to existing TIs: TI-0800-15-49 GS Fie Control/Communications Build 7B and TI-0311-17-25 Stockpile Reliability Program Test Preparations for EKV IMU. Exercise of new TIs: TI-0800-17-64 NID Incident Manager (NIM) Enhancement, TI-0311-18-27 Stockpile Reliability Program (SRP) Asset #1 Booster Components & Aged Residual Parts, and TI-088-17-62 GS Build 8 Requirements.
- **2019**
  - **Options Exercised/Other:** CLIN 414 Test Management, Increase ceiling value of CLINs 9210 RKV Product Development and add 9603 RKV System Software (19-C P00004); CLIN 1100 Indian Incentive; CLIN 1326 Distributed Multi-Echelon Training System (DMETS) Support for FY20; CLIN 0706 ODC/Travel for O&M FY20; CLIN 1302 Performance Based Logistics FY20; CLIN 1314 GMD Training FY20; CLIN 1320 GMB Exercises & Wargames FY20; Period 7 De-earned Award Fee and CLIN 103 Defense Industrial Base (DIB) Controlled Unclassified Information (CUI) Pilot Execution; Adjust 03xx series (PBL) CLINs for final closeout values.
  - **CCPs/ECPS:** Definitize CCP-111 Spare EKVs Pedigree Review; Definitize CCP-106 DSC Extension; CCP-120 Fort Greely, Alaska (FGA) RC Equipment Relocation; CCP-098 FTG-11 Configuration Change; CCP-117 Request for Equitable Adjustment for Replacement of Metal Electrode Leaderless Face (MELF) Resistors for State of the Art (SOTA) Resistors in Flight Controllers and Definitize CCP-118 Over and Above Task Plan 18-024 GBI 51 Removal, Repair, and Emplace at FGA.
  - **Task Instructions:** Award/Amend the following TIs: 0311-18-26 Testing of GBI Stockpile & EKV Components; 0800-18-73 Ground Systems Removal of Formerly Restricted Data; 0800-18-76 GMD Conduct of Fire Trainer Trade Study; Over and Above Task Plan 0311-18-25 GBI 8 Upgrade; 800-15-49 Ground Systems GMD Fire Control/Communications 7B Build Amendment; 0800-17-64 GS NIM Enhancement; 0800-17-65 GS Readiness and Control; 0311-18-27 Stockpile Reliability Program Test Execution; 0800-17-64 GS NIM Enhancement; 0800-15-47 Cyber Security Risk Management Framework Assessment; 0800-18-69 Cyber Warrior Training Capability Support; and 800-19-77 GBI Parts Testing.

Contract Identification

Appropriation: RDT&E

Contract Name: SM-3 Block IB All Up Rounds

Contractor: Raytheon Missile Systems

Contractor Location: PO Box 11337
1151 East Hermans Rd
Tucson, AZ 85745-1337

Contract Number: HQ0276-15-C-0005

Contract Type: Cost Plus Incentive Fee (CPIF), Cost Plus Fixed Fee (CPFF), Firm Fixed Price (FFP), Fixed Price Incentive(Firm Target) (FPIF)

Award Date: April 30, 2015

Definitization Date: December 18, 2015

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
559.0	559.0	N/A	1840.0	1840.0	N/A	1138.0	1142.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the initial contract price having increased in value due to the award of additional Missile Production CLINs supporting FY 2016 and FY 2017

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	+26.0	-5.0
Previous Cumulative Variances	+29.0	-74.0
Net Change	-3.0	+69.0

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to Tucson Factory Support for FY 2015 and FY 2016 All-Up-Rounds (AUR) work ramping up slower than planned.

The favorable net change in the schedule variance is due to the clarification of scope, program inefficiencies, addition of unexpected tasks, and personnel changes associated with Digital Data Link (DDL) efforts on CLIN 3033. The need date for the DDL has shifted to the right and all DDL development efforts have been suspended. A no cost PoP extension was given to close out current DDL efforts on CLIN 3033 through 2nd quarter FY 2020. Reviews with the Program Office and Raytheon are ongoing to determine the path forward. Schedule improvement from the previous reporting period is due to the completion of the FY 2016 AUR deliveries in October 2019.

General Contract Variance Explanation

The initial contract price has increased in value due to the award of additional Missile Production CLINs supporting FY 2016 and FY 2017. The delta between the Current Contract Price and Estimate At Complete is due to no EV reporting on FFP CLINs.

Notes

This contract is more than 90% complete; therefore, this is the final report for this contract.

Contract Identification

Appropriation: RDT&E

Contract Name: IRBM/ICBM Targets

Contractor: Northrop Grumman Space Systems (NGSS) / Orbital Sciences Corporation (OSC)

Contractor Location: 1575 South Price Road
Chandler, AZ 85286

Contract Number: HQ0147-11-C-0006

Contract Type: Cost Plus Award Fee (CPAF), Cost Plus Incentive Fee (CPIF), Firm Fixed Price (FFP), Cost Plus Fixed Fee (CPFF), Cost (CR)

Award Date: March 07, 2011

Definitization Date: March 07, 2011

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
935.0	N/A	N/A	1317.8	N/A	N/A	1048.8	1050.1

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the major efforts to include: exercise of option for eight (8) additional IRBM target launch vehicles, ICBM kits, purchase of three (3) motor sets, and additional IRBM/ICBM targets to support Ballistic Missile Defense System (BMDS) Acceleration and other Department of Defense (DoD) agencies.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	-21.5	+15.3
Previous Cumulative Variances	--	--
Net Change	-21.5	+15.3

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to overruns in initial IRBM Non-Recurring Engineering (NRE) and overruns in the development of the ICBM capability. Unfavorable cost variance has been partially offset by material costing less due to bulk buys and production/test labor efficiencies.

The favorable cumulative schedule variance is due to early receipt of material and completion of motor and carriage extraction system (CES) production ahead of baseline.

Notes

Program 2019 Highlights: The Intermediate Range Ballistic Missile/ Intercontinental Ballistic Missile (IRBM/ICBM) Targets Program successfully completed the Flight Test Standard Missile (FTM)-44 Mission System Requirement Review (MSRR), Flight Test Ground-based (FTG)-11 Pre-Ship Readiness Review, and Flight Test Integrated (FTI)-03.1 Flight Test in 1st quarter FY 2019. The Program successfully supported and executed the FTG-11 Flight Test in 2nd quarter FY 2019. The Program successfully conducted multiple major reviews such as the FTM-44 Mission Design Review (MDR) in 4th quarter FY 2019, the Flight Test Other (FTX)-43 MSRR, Flight Test Operational (FTO)-03.1, and FTO-03.3 MDRs in 1st quarter FY 2020.

Contract Identification

Appropriation: RDT&E
Contract Name: SM-3 Block IIA All Up Rounds
Contractor: Raytheon Missile Systems
Contractor Location: P.O. Box 11337
1151 East Hermans Road
Tucson, AZ 85745-1337
Contract Number: HQ0276-15-C-0003
Contract Type: Cost Plus Incentive Fee (CPIF), Cost Plus Fixed Fee (CPFF), Firm Fixed Price (FFP)
Award Date: June 11, 2015
Definitization Date: August 28, 2017

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
634.0	N/A	N/A	2490.0	N/A	N/A	1402.0	1406.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the award of additional Missile Production CLINs supporting FY2016, FY2018, and FY2019.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	-37.0	-59.0
Previous Cumulative Variances	--	--
Net Change	-37.0	-59.0

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to additional labor required to complete FY 2016 All-Up-Rounds (AURs), resulting from the Flight Test Integrated-03 (FTI-03) Attitude Control System (ACS) Flight Test anomaly. Rework is required on motors prior to AUR delivery. It was also driven by additional labor required to support Parts Testing and the Flight Test Mission-29 (FTM-29) Failure Review Board (FRB).

The unfavorable cumulative schedule variance is due to delayed Second Stage Rocket Motor (SSRM) deliveries, Armed Firing Device (AFD) rework per FTM-29 FRB recommendations, and delayed TSRM deliveries due to FTI-03 test anomaly.

General Contract Variance Explanation

The initial contract price has increased in value due to the award of additional Missile Production CLINs supporting FY 2016, FY 2018 and FY 2019. FY 2018 and 2019 efforts are not reflected in the Estimate At Complete. These efforts were definitized and awarded in December 2019.

Contract Identification

Appropriation: RDT&E

Contract Name: MRBM T1/T2 Targets

Contractor: Aerojet Rocketdyne / Coleman Aerospace

Contractor Location: 7675 Municipal Drive
Orlando, FL 32819

Contract Number: HQ0147-14-C-0001

Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP), Cost Plus Fixed Fee (CPFF), Cost Plus Incentive Fee (CPIF), Cost (CR)

Award Date: October 31, 2013

Definitization Date: October 31, 2013

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
409.1	N/A	N/A	581.4	N/A	N/A	338.5	347.2

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the major efforts executed to include: the completion of the Ironbird risk reduction flight test for a new parachute configuration, the awarding of options for six (6) additional MRBM T1/T2 targets, and the development and production of two (2) enhanced Solid Rocket (eSR)-19 rocket motor sets.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	-6.2	-4.9
Previous Cumulative Variances	--	--
Net Change	-6.2	-4.9

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to challenges encountered during Non-Recurring Engineering (NRE) development and qualification testing portion of the contract; improperly resourced scope for integration and test; and material price escalations from original contract pricing.

The unfavorable cumulative schedule variance is due to resource reprioritization from Target Number 2 in support of integration and testing of Target Number 1 to support best estimated test date. Reprioritization will not impact any program milestones.

Notes

The Medium Range Ballistic Missile Type 1/Type 2 (MRBM T1/T2) Targets Program executed a successful Flight Test Terminal High Altitude Area Defense (THAAD) (FTT)-23 in 4th Quarter Fiscal Year 2019 (4Q FY2019), which was the first MRBM T1 target program. The Program awarded contract options for six additional MRBM T1/T2 targets and the development and production of two (2) enhanced Solid Rocket (eSR)-19 rocket motor sets.

Contract Identification

Appropriation: RDT&E

Contract Name: Medium Range Ballistic Missile (MRBM) Type 3 Configuration 2 (T3c2) Targets

Contractor: Northrop Grumman Space Systems (NGSS) / Orbital Sciences Corporation (OSC)

Contractor Location: 1575 South Price Road
Chandler, AZ 85286

Contract Number: HQ0147-16-C-0035

Contract Type: Fixed Priced with Award Fee (FPAF), Fixed Price Incentive(Firm Target) (FPIF), Cost Plus Award Fee (CPAF), Cost Plus Fixed Fee (CPFF)

Award Date: July 21, 2016

Definitization Date: July 21, 2016

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
182.1	N/A	N/A	219.0	N/A	N/A	199.5	201.2

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the major efforts executed to include: Flight test schedule and launch site changes, pending contract negotiations for Target Hardware replacements and contract Period of Performance extension.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	-20.4	-6.2
Previous Cumulative Variances	--	--
Net Change	-20.4	-6.2

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to late manning/junior personnel resulting in senior engineering management engagement, additional Non-Recurring Engineering (NRE) issues, unplanned costs associated with Critical Design Review (CDR), Safety and Mission Critical (S&MC) component growth to achieve technical baseline, Qualification Test issues/failures, and rate adjustments.

The unfavorable cumulative schedule variance is due to changes in production priorities and production material behind schedule.

Notes

Program 2019 Highlights: The Medium Range Ballistic Missile (MRBM) Type 3 Configuration 2 (T3c2) Targets Program successfully accomplished Integrated Baseline Review #3 in 1st Quarter Fiscal Year 2019 (1Q FY2019). The Program also executed a successful Pathfinder (a risk mitigation activity demonstrating hardware/software operation under actual environments) and Mission Design Review (MDR) in 2Q FY2019. Most notably, the Program transferred a Target Front End (3Q FY2019) and provided engineering Subject Matter Experts to support another Government Agency in the successful execution (1Q FY2020) of its high priority DoD mission.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	0	--
Total Program Quantity Delivered	0	0	0	--

Expended and Appropriated (TY $M)			
Total Acquisition Cost	202535.7	Years Appropriated	19
Expended to Date	138962.0	Percent Years Appropriated	79.17%
Percent Expended	68.61%	Appropriated to Date	157936.1
Total Funding Years	24	Percent Appropriated	77.98%

The above data is current as of February 10, 2020.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:

Source of Estimate:

Quantity to Sustain:

Unit of Measure:

Service Life per Unit:

Fiscal Years in Service:

The Missile Defense Agency (MDA) is predominately a research and development organization that is responsible for the development and fielding of several subsystems that comprise the BMDS. MDA works with the Services to transition subsystems as they mature, allowing MDA to return to focusing on its core research mission. Although MDA does budget for a subsystem's BMDS unique mission costs leading up to transition, it does not capture the Service's portion of the cost. Therefore, since the MDA portion does not represent the entire operating and support cost of each subsystem, MDA does not report these in the SAR.

Sustainment Strategy

None

Antecedent Information

None

Annual O&S Costs BY2002 $M		
Cost Element	**BMDS**	**No Antecedent (Antecedent)**
Unit-Level Manpower	0.000	0.000
Unit Operations	0.000	0.000
Maintenance	0.000	0.000
Sustaining Support	0.000	0.000
Continuing System Improvements	0.000	0.000
Indirect Support	0.000	0.000
Other	0.000	0.000
Total	--	--

Item	Total O&S Cost $M			
	BMDS			No Antecedent (Antecedent)
	APB Objective/Threshold		Current Estimate	
Base Year	N/A	N/A	N/A	N/A
Then Year	N/A	N/A	N/A	0.0

O&S Cost Variance

Category	BY 2002 $M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	0.0	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	0.0	

Disposal Estimate Details

Date of Estimate:

Source of Estimate:

Disposal/Demilitarization Total Cost (BY 2002 $M):