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## Selected Acquisition Report (SAR)

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



## Ballistic Missile Defense System (BMDS)

As of FY 2019 President's Budget

Defense Acquisition Management  
Information Retrieval  
(DAMIR)

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## Sensitivity Originator

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## 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)

## Program Information

**Program Name**

Ballistic Missile Defense System (BMDS)

**DoD Component**

DoD

## Responsible Office

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## 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, test, and field a layered Ballistic Missile Defense System (BMDS) to defend the United States (U.S.), its deployed forces, allies, and friends from ballistic missile attacks of all ranges and in all phases of flight.

Following guidance from the President, the Secretary of Defense approved the Ballistic Missile Defense (BMD) Review Report (dated February 2010), which established the following policy priorities to frame missile defense development and acquisition program strategies:

1. The U.S. will continue to defend the homeland against the threat of ballistic missile attack (note: Section 1681 of FY 2017 National Defense Authorization Act (NDAA) removed the word "limited" from the National Missile Defense Policy).
2. The U.S. will defend against regional missile threats to U.S. forces, while protecting allies and partners and enabling them to defend themselves.
3. Before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions.
4. The commitment to new capabilities must be fiscally sustainable over the long term.
5. U.S. BMD capabilities must be flexible enough to adapt as threats change.
6. The U.S. will seek to lead expanded international efforts for missile defense.

In 2017, the President directed an updated Ballistic Missile Defense Review (now referred to as the Missile Defense Review) which is currently in final review within the Department of Defense.

## Executive Summary

### Introduction

The Missile Defense Agency (MDA) is committed to strengthening and expanding the defenses for our nation, deployed forces, allies, and international partners against increasingly capable missile threats. The missile defense program will continue to support the warfighter and needs of the Combatant Commanders with the development, testing, deployment, integration and sustainment of interceptors, sensors, and the command, control, battle management and communications (C2BMC) system for the Ballistic Missile Defense System (BMDS). The program continues to invest in Homeland and Regional missile defense priorities and in advanced technology development and future capabilities to counter the proliferation of increasingly complex and diverse threats.

North Korea has expanded the size and sophistication of its ballistic missile forces and is committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States. In July 2017 North Korea launched two Intercontinental Ballistic Missiles (ICBMs) on highly-lofted trajectories that impacted in the Sea of Japan. On November 28, 2017 it launched another, larger ICBM that could potentially reach the entire continental United States.

To address these developments, the Missile Defeat and Defense Enhancement (MDDE) effort was initiated by the Department and approved by Congress after the President certified MDDE as an emergency requirement. The MDDE provided MDA with an additional \$2.3 billion in FY 2017 and FY 2018 to improve and expand the capacity, capability and reliability of the BMDS. MDA is addressing BMDS capacity concerns by adding a new missile field at Fort Greely, AK to accommodate additional Ground Based Interceptors (GBIs). MDA is also adding Aegis Standard Missile (SM)-3 Block IIA and THAAD interceptors. The MDDE also expands and improves the BMDS sensor reliability and coverage by extending the life of the COBRA DANE radar and upgrading the Sea-Based X-Band Radar (SBX), both of which provide critical coverage of the North Korean threat to the Homeland. MDA has also initiated the studies and evaluations to address gaps in coverage and better protect Homeland and Regional allies with a new Homeland Defense Radar in the Pacific region.

### Highlights from Last SAR

The GBI is the nation's primary defense against long-range and intercontinental ballistic missiles. In CY 2013, the Secretary of Defense directed MDA to expand the GBI fleet from 30 to 44 by the end of CY 2017 in response to provocations from North Korea. In November 2017, MDA emplaced the 44th GBI at Fort Greely, Alaska (FGA).

As part of the MDDE, the Ground-based Midcourse Defense (GMD) program will field an additional 20 Redesigned Kill Vehicle (RKV)-tipped GBIs at a new missile field at FGA. The GMD program initiated efforts to extend the Development and Sustainment Contract for the 20 additional GBIs, the 20 silos in Missile Field (MF) #4, and two silos in MF #1.

GMD added Ground System software 6B3 in January 2017 and the Exo-atmospheric Kill Vehicle version 10.1 software in March 2017 to the Operational Capacity Baseline. In June 2017, GMD completed MF #1 at Fort Greely, AK and delivered the first Capability Enhancement II Block 1 GBI with a 3-stage configuration booster.

MDA is continuing with capability upgrades and technology modernization of key ground support and fire control systems components such as the GMD Fire Control (GFC) equipment, the Communications Network, and the In-Flight Interceptor Communication System Data Terminal. The capability upgrades include: replacing the Command Launch Equipment, GFC-Warfighter interface and logic improvements, 2-/3-stage selectable GBI battle management, discrimination improvements, enhancements to the kill vehicle Target Object Map, and On-Demand Communications required for the RKV.

Sea Based X-Band Radar (SBX) completed 250 days at-sea and traveled over 5,800 nautical miles during CY 2017. SBX X-Band Radar (XBR) 3.3.1 was added to the OCB in January 2017, and XBR 4.0 completed Critical Design Review (CDR) in June 2017. SBX completed a Developmental Baseline Review (DBR) on July 26, 2017, and the revised SBX baselines were approved to continue in the Limited Fielding acquisition phase. The SBX participates in flight tests to demonstrate

discrimination and debris mitigation improvements. To address the continued missile test activity of North Korea, MDA continues to fund extended days-at-sea and conduct contingency operations for defense of the homeland in the U.S. Pacific Command and U.S. Northern Command areas of responsibility.

The Long Range Discrimination Radar (LRDR) successfully completed its Preliminary Design Review (PDR) in March 2017 and CDR in September 2017. LRDR was baselined at a DBR in the Product Development acquisition phase in July 2017.

As part of the MDDE, MDA will add a second radar in the Pacific Theater to provide persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of the homeland against long-range missile threats.

MDA successfully delivered Phase 2 of the European Phased Adaptive Approach, which includes the Aegis Ashore site in Deveselu, Romania. This site, operationally certified by the United States Navy (USN), houses the first operational land-based Aegis BMD weapon system with the capability to launch SM-3 Block IAs and IBs to protect European NATO allies and deployed U.S. forces in Europe. MDA successfully completed Aegis Ashore Romania final acceptance with the USN in September 2017. The U.S. Navy will continue to operate the Aegis Ashore site in Romania as an integral part of NATO's BMD architecture.

SM-3 Block IIA Cooperative Development Flight Test Mission (SFTM)-01 successfully completed on 03 Feb 2017. The test successfully demonstrated an organic engagement (intercept) of an Medium Range Ballistic Missile (MRBM) target with a SM-3 Blk IIA missile from an Aegis BL 9.C2 (BMD 5.1) ship.

SFTM-02 completed on 21 Jun 17. The primary test objective was to demonstrate an organic engagement (lethal intercept) of an MRBM target with an SM-3 Blk IIA missile from an Aegis BL 9.C2 (BMD 5.1) configured ship, the USS John Paul Jones. While intercept was not achieved, the missile performed as designed when the shipboard operator inadvertently issued a destruct command to the missile.

In September 2017, MDA delivered THAAD Battery #7 ground components four months ahead of schedule. MDA also awarded a THAAD contract modification on December 22, 2017 for \$553.1 million for Lot 9/10 Interceptors. THAAD awarded another \$492.2M contract modification for additional Lot 10 Interceptors on January 26, 2018.

MDA's is committed to building regional missile defense forces that are interoperable with systems deployed by international partners. MDA responded to the U.S. Forces Korea Commander's urgent requirement requesting integration of the Lower Tier and Upper Tier missile defense systems to improve defensive capability through a more efficient and effective use of the systems available in theater. This requirement is supported by United States Strategic Command (USSTRATCOM) and approved by the Chairman of the Joint Chiefs of Staff (CJCS). MDA continues this urgent work for the U.S. Pacific Command (USPACOM) Joint Emergent Operational Need (JEON). In coordination with the Army's Lower Tier Program Office, MDA began a concerted effort in May 2017 to develop an integrated, phased approach to incrementally field capability. This JEON will deliver improved BMDS capability to the Korean Peninsula, including integration of existing BMD assets to improve engagement options and coverage.

## Testing

In 2017, MDA improved the confidence in missile defense and conducted 17 U.S.-only flight test events and three flight tests with international partners. MDA also completed 13 system/element-level ground tests. Finally, MDA participated in 32 multi-event exercises and war games, which are critical to the Warfighter. Test highlights include:

### Flight Tests

Flight Test THAAD (FTT)-18 (July 11, 2017)-Successfully intercepted a separating air-launched Intermediate Range Ballistic Missile (IRBM) target using THAAD radar, launcher, fire control and communications, interceptor closed-loop operations, and engagement functions.

Flight Experiment THAAD (FET)-01 (July 29, 2017)-Demonstrated the ability of the THAAD weapon system to detect, track, and discriminate a complex, air-launched Medium Range Ballistic Missile (MRBM) Re-entry Vehicle. The test demonstrated interceptor performance against a threat operating in a challenging operational environment and provided data to enhance THAAD's modeling and simulation capabilities. Although intercept was not an objective, the THAAD intercepted the target.

Flight Test Standard Missile (FTM)-27 E2: (August 29, 2017), MDA and USN sailors aboard the USS John Paul Jones Arleigh Burke-class guided-missile destroyer (DDG)-53 successfully conducted a complex missile defense flight test, resulting in the intercept of a MRBM target using Standard Missile (SM)-6 guided missiles. This test marked the second time that an SM-6 missile had successfully intercepted an MRBM target.

SM Controlled Test Vehicle (SM CTV)-03 (October 15, 2017): MDA and USN sailors aboard the USS McFaul successfully test fired a SM-6 during a non-intercept, developmental test. This demonstrated the successful performance of a SM-6 launched from an Aegis Ballistic Missile Defense 4.1 capable DDG-74, and provides a critical self-defense capability to our ships at sea, against airborne threats, surface targets and now ballistic missiles in their terminal phase.

Formidable Shield (FS)-17 (October 15, 2017): Naval Striking and Support Forces NATO conducted Formidable Shield on behalf of the U.S. 6th Fleet. During the collective self-defense scenario, the USS Donald Cook, DDG-75, successfully detected, tracked and intercepted a MRBM target with a SM-3 Block IB guided missile.

MDA Associated Operations participated in several Glory Trips, which are important opportunities for BMDS sensors to gather data on ICBM targets.

### **Ground Tests**

Integrated Ground Test (GTI)- 07a (May 10– June 28, 2017) was a Hardware-in-the-Loop (HWIL) test event that provided a body of evidence supporting the system-level assessment of the Enhanced Homeland Defense capabilities as part of the BMDS Increment 4.

GTI-07b (U.S. European Command (EUCOM)/ U.S. Central Command (CENTCOM)) Early Integration Event (August 21– September 20, 2017) was an HWIL event conducted as risk reduction prior to the GTI-07b (E/C) test event.

Distributed Ground Test (GTD)- 07a (September 14-29, 2017) collected evidence that supports the system-level assessment of the EHD capabilities as part of BMDS Increment 4, assessing strategic and theater/regional capabilities in the U.S. Northern Command (USNORTHCOM)/U.S. Pacific Command (USPACOM) Areas of Responsibility.

### **International Cooperation**

Formidable Shield 2017 (October 14, 2017): More than 14 ships, 10 aircraft, and approximately 3,300 personnel from Belgium, Canada, Denmark, France, Germany, Italy, the Netherlands, Spain, the U.K., and the U.S., are participated in a live -fire integrated air and missile defense scenario, defending against a ballistic missile targets as well as three anti-ship cruise missiles. During the collective self-defense scenario, the USS Donald Cook, DDG 75, successfully detected, tracked and intercepted an MRBM target with a SM-3 Block IB missile.

The United Arab Emirates THAAD interceptor deliveries continue as scheduled.

The Kingdom of Saudi Arabia has submitted a Foreign Military Sales Letter of Request for seven THAAD Batteries. The FMS case is worth \$13.5 billion. MDA is finalizing a Letter of Offer and Acceptance for the case.

Japan's cabinet approved a plan to purchase of two Aegis Ashore systems (December 2017).

### **BMD Technology Initiatives**

A high priority / high payoff is developing advanced BMD technologies that can be integrated into the BMDS to adapt to future threat changes. Areas for technology investment include: persistent discrimination in the current and future BMDS sensor architecture, high power laser scaling for Boost Phase Intercept (BPI), Multi Object Kill Vehicle technology and other advanced technology for high-risk/high-pay off breakthroughs. The advanced technology investments are informed by capability gap assessments and focus on concepts that bring upgraded capability to the warfighter. The goal is to provide transformative capabilities that enable the future BMDS to keep pace with new and evolving threats.

MDA is committed to developing and demonstrating directed energy and laser technologies that could be integrated into the

BMDS and is actively testing a broad range of potential concepts. This year saw progress on both the tracking and defensive laser fronts, and MDA conducted ground tests using new types of fiber-based tracking lasers.

MDA took Distributed Gain laser technology to the next level by building an extremely compact tracking laser system for integration into MDA-configured multi-role, remotely piloted (MQ)-9 Reaper unmanned aerial vehicles (UAV). The new laser system successfully participated in BMDS testing and precisely tracked from horizon to horizon a representative Hypersonic Vehicle with two MDA-configured MQ-9 Reapers.

Massachusetts Institute of Technology- Lincoln Laboratory, under an MDA/ Defense Advanced Research Projects Agency joint venture, completed a packaged laser system that includes the laser amplifier, the thermal control system, and the battery power pack. The compact packaging requirement is unique to MDA's future boost phase intercept technology development effort. This was the "first-of-a-kind" tracking laser with the precision and at the range necessary for missile defense.

MDA continues to make progress on three technology risk reduction contracts for the Multi-Object Kill Vehicle. MDA completed the Solid Divert and Attitude Control System design and component level requirements reviews.

MDA successfully achieved a passing grade in the Defense Information Systems Agency Command Cyber Readiness Inspection (November 27-December 8, 2017) in Huntsville, AL. The CCRI is an assessment required every three years that focuses on evaluating an organization's compliance with Department of Defense cyber security policy and directives.

### **General**

In accordance with direction from the President in National Security Presidential Memorandum 1, the Department is finalizing a new Missile Defense Review, which identifies ways of strengthening missile defense capabilities, rebalancing homeland and theater defense priorities, and highlighting priority funding areas. This review will shape Missile Defense development and acquisition program strategies moving forward.

The MDA conducted a change of responsibility on June 16, 2017 with U.S. Air Force Lt. Gen. Samuel A. Greaves succeeding USN Vice Admiral James D. Syring.

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

### 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 3Q FY 2018.

## 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 3Q FY 2018.

## Track to Budget

RDT&E			
Appn	BA	PE	
Defense-Wide	0400	04	0305103C
	<b>Project</b>	<b>Name</b>	
	MDCS	Cyber Security Initiative	
Defense-Wide	0400	03	0603176C
	<b>Project</b>	<b>Name</b>	
	MC71	BMDS Cyber Operations	
	MD40	Program-Wide Support	
	MD71	Advanced Concepts and Performance Assessments	
Defense-Wide	0400	03	0603177C
	<b>Project</b>	<b>Name</b>	
	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
	<b>Project</b>	<b>Name</b>	
	MD40	Program-Wide Support	(Sunk)
	MD69	Directed Energy Research	
	MD72	Interceptor Technology	(Sunk)
Defense-Wide	0400	03	0603179C
	<b>Project</b>	<b>Name</b>	
	MD40	Program Wide Support	(Sunk)
	MD73	Advanced C4ISR	(Sunk)
Defense-Wide	0400	03	0603180C
	<b>Project</b>	<b>Name</b>	
	MD25	Advanced Technology Development	
	MD40	Program-Wide Support	
Defense-Wide	0400	03	0603274C
	<b>Project</b>	<b>Name</b>	
	MD81	Special Programs - MDA Technology	(Sunk)
Defense-Wide	0400	03	0603294C
	<b>Project</b>	<b>Name</b>	
	MD40	Program-Wide Support	
	MD85	Common Kill Vehicle Technology	
Defense-Wide	0400	04	0603881C
	<b>Project</b>	<b>Name</b>	
	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)

Defense-Wide 0400 04 0603890C

Project	Name
MC30	BMDS Cyber Operations
MC31	M&S Cyber Operations
MD24	System Engineering & Integration
MD28	Intelligence & Security
MD29	Advanced Threat Missile Defeat Technology
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
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
	<b>Project</b>	<b>Name</b>	
	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
	<b>Project</b>	<b>Name</b>	
	MC03	BMDS Cyber Operations	
	MD03	Joint Warfighter Support	
	MD40	Program Wide Support	
	MT03	Joint Warfighter Support Test	
Defense-Wide	0400	04	0603904C
	<b>Project</b>	<b>Name</b>	
	MC22	BMDS Cyber Operations	
	MD22	Missile Defense Integration & Operations Center (MDIOC)	
	MD40	Program Wide Support	
Defense-Wide	0400	04	0603906C
	<b>Project</b>	<b>Name</b>	
	MD35	Regarding Trench	
Defense-Wide	0400	04	0603907C
	<b>Project</b>	<b>Name</b>	
	MD40	Program Wide Support	
	MX46	Sea Based X-Band Radar Development Support	
Defense-Wide	0400	04	0603913C
	<b>Project</b>	<b>Name</b>	
	MD20	Israeli Upper Tier	
	MD26	Israeli ARROW Program	
	MD34	Short Range Ballistic Missile Defense (SRBMD)	
Defense-Wide	0400	04	0603914C
	<b>Project</b>	<b>Name</b>	
	MC04	BMDS Cyber Operations	
	MD04	BMDS Test Development Program	
	MD40	Program Wide Support	
	MT04	BMDS Test Program	
Defense-Wide	0400	04	0603915C
	<b>Project</b>	<b>Name</b>	
	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
		MD98	Directed Energy Prototype Development
		MD99	Discrimination Sensor Prototype Development
		MT99	Technology Maturation Initiatives Test
Defense-Wide	0400 04	0604181C	
		Project	Name
		MD29	Hypersonic Defense
		MD40	Program-Wide Support
Defense-Wide	0400 04	0604673C	
		Project	Name
		MD41	Homeland Defense Radar - Hawaii (HDR-H)
		MD51	Homeland Defense Radar - Pacific (HDR-P)
Defense-Wide	0400 04	0604873C	
		Project	Name
		MD40	Program Wide Support
		MD96	Long Range Discrim Radar (LRDR)
Defense-Wide	0400 04	0604874C	
		Project	Name
		MD40	Program Wide Support
		MD97	Improved HD Interceptors
Defense-Wide	0400 04	0604876C	
		Project	Name
		MD40	Program Wide Support
		MT07	THAAD Test
Defense-Wide	0400 04	0604878C	
		Project	Name
		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
Defense-Wide	0400 04	0604881C	(Sunk)
		Project	Name
		MD09	SM-3 Block IIA Co-Development
		MD40	Program-Wide Support

	MT09		SM-3 Block IIA Co-Development Test	(Sunk)
Defense-Wide	0400	04	0604887C	
	<b>Project</b>		<b>Name</b>	
	MD40		Program Wide Support	
	MT08		Ground Based Midcourse Test	
Defense-Wide	0400	04	0604894C	
	<b>Project</b>		<b>Name</b>	
	MD40		Program-Wide Support	
	MD85		Multi Object Kill Vehicle	
Defense-Wide	0400	06	0605502C	
	<b>Project</b>		<b>Name</b>	
	MD45		Small Business Innovative Research	
Defense-Wide	0400	06	0606942C	
	<b>Project</b>		<b>Name</b>	
	MC39		Cyber Vulnerability	
Defense-Wide	0400	06	0901598C	
	<b>Project</b>		<b>Name</b>	
	MD38		Management Headquarters	
Defense-Wide	0400	04	1206893C	
	<b>Project</b>		<b>Name</b>	
	MC12		BMDS Cyber Operations	
	MD12		Space Tracking and Surveillance System (STSS)	
	MD40		Program-Wide Support	
Defense-Wide	0400	04	1206895C	
	<b>Project</b>		<b>Name</b>	
	MD33		MD Space Exp Center (MDSEC)	
	MD40		Program-Wide Support	

<b>Procurement</b>
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	<b>Appn</b>	<b>BA</b>	<b>PE</b>	
Defense-Wide	0300	01	0208866C	
	<b>Line Item</b>		<b>Name</b>	
	MD07		THAAD	
	MD08		Ground Based Midcourse	
	MD09		Aegis BMD	
	MD11		BMDS AN/TPY-2 Radars	
	MD20		Arrow Upper Tier	(Sunk)
	MD26		Israeli Programs	
	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)

<b>MILCON</b>			
<b>Appn</b>	<b>BA</b>	<b>PE</b>	
Defense-Wide	0500	01	0603882C
	<b>Project</b>	<b>Name</b>	
	D1700653	Missile Defense Cmplx Switchgear Facility, Ft. Greely, AK (Sunk)	
	D1900679	Missile Field #1 Expansion	
Defense-Wide	0500	01	0603884C
	<b>Project</b>	<b>Name</b>	
	00000676	MRDR System Complex, Phase 1	
Defense-Wide	0500	02	0603890C
	<b>Project</b>	<b>Name</b>	
	17999902	Unspecified Minor Construction (Sunk)	
	18999902	Unspecified Minor Construction	
	19999902	Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C
	<b>Project</b>	<b>Name</b>	
	19999903	Planning and Design	
Defense-Wide	0500	02	0603890C
	<b>Project</b>	<b>Name</b>	
	20999902	Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C
	<b>Project</b>	<b>Name</b>	
	20999903	Planning and Design	
Defense-Wide	0500	02	0603890C
	<b>Project</b>	<b>Name</b>	
	21999902	Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C
	<b>Project</b>	<b>Name</b>	
	21999903	Planning and Design	
Defense-Wide	0500	01	0603890C
	<b>Project</b>	<b>Name</b>	
	22000675	Pacific IDT	
Defense-Wide	0500	02	0603890C
	<b>Project</b>	<b>Name</b>	
	22999902	Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C
	<b>Project</b>	<b>Name</b>	
	22999903	Planning and Design	
Defense-Wide	0500	02	0603890C
	<b>Project</b>	<b>Name</b>	
	23999902	Worldwide Unspecified Minor Construction	
Defense-Wide	0500	03	0603890C

		Project	Name	
		23999903	Planning and Design	
Defense-Wide	0500 01	0603914C		
		Project	Name	
		D1700662	Test Support Facility	(Sunk)
		D2200672	Consolidated Test Center	
Defense-Wide	0500 01	0604673C		
		Project	Name	
		D2100671	Homeland Defense Radar (HDR) - Hawaii	
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	

## 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	--	--	128381.5	47217.1	-- 155228.1
Procurement	0.0	--	--	16987.3	0.0	-- 22812.2
Flyaway	--	--	--	16987.3	--	-- 22812.2
Recurring	--	--	--	16987.3	--	-- 22812.2
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	--	--	1767.0	0.0	-- 2481.7
Acq O&M	0.0	--	--	0.0	0.0	-- 0.0
Total	44740.1	--	--	147135.8	47217.1	-- 180522.0

#### Cost Notes

In accordance with Section 842 of the National Defense Authorization Act for FY 2017, which amended title 10 U.S.C. § 2334, the Director of Cost Assessment and Program Evaluation, and the Secretary of the military department concerned or the head of the Defense Agency concerned, must issue guidance requiring a discussion of risk, the potential impacts of risk on program costs, and approaches to mitigate risk in cost estimates for MDAPs and major subprograms. The information required by the guidance is to be reported in each SAR. This guidance is not yet available; therefore, the information on cost risk is not contained in this SAR.

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. Ground-Based Interceptors and AN/TPY-2 radars) 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 2002-23):

[Edit Main Menu](#)

Program	Component	RDT&E	Proc
Terminal High Altitude Area Defense (THAAD)	Batteries	2	5
	Interceptors	50	545
Aegis	SM-3 Block IA	79	71
	SM-3 Block IIA	23	55
	SM-3 Block IB	21	470
Ground-Based Midcourse Defense (GMD)	Ground-Based Interceptors (GBIs)	58	20
Sensors	AN/TPY-2	7	5

## Cost and Funding

### Funding Summary

Appropriation Summary									
FY 2019 President's Budget / December 2017 SAR (TY\$ M)									
Appropriation	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
RDT&E	114425.1	6798.2	6777.3	6868.5	6878.6	6815.4	6665.0	0.0	155228.1
Procurement	11566.5	2417.5	2432.0	1945.1	1669.8	1294.9	1486.4	0.0	22812.2
MILCON	1004.0	203.0	206.2	52.2	178.0	647.5	190.8	0.0	2481.7
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2019 Total	126995.6	9418.7	9415.5	8865.8	8726.4	8757.8	8342.2	0.0	180522.0
PB 2018 Total	126737.0	7382.1	7507.6	7699.3	7781.9	7886.2	0.0	0.0	164994.1
Delta	258.6	2036.6	1907.9	1166.5	944.5	871.6	8342.2	0.0	15527.9

Quantity Summary										
FY 2019 President's Budget / December 2017 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	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 2019 Total	0	0	0	0	0	0	0	0	0	0
PB 2018 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							
Fiscal Year	Quantity	TY \$M					
		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	--	--	--	--	--	--	6798.2
2019	--	--	--	--	--	--	6777.3
2020	--	--	--	--	--	--	6868.5
2021	--	--	--	--	--	--	6878.6
2022	--	--	--	--	--	--	6815.4
2023	--	--	--	--	--	--	6665.0
Subtotal	--	--	--	--	--	--	155228.1

Annual Funding							
0400   RDT&E   Research, Development, Test, and Evaluation, Defense-Wide							
Fiscal Year	Quantity	BY 2002 \$M					
		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	--	--	--	--	--	--	5021.9
2019	--	--	--	--	--	--	4944.8
2020	--	--	--	--	--	--	4915.2
2021	--	--	--	--	--	--	4826.1
2022	--	--	--	--	--	--	4688.0
2023	--	--	--	--	--	--	4494.6
Subtotal	--	--	--	--	--	--	128381.5

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	--	--	2417.5	--	2417.5	--	2417.5	--
2019	--	--	2432.0	--	2432.0	--	2432.0	--
2020	--	--	1945.1	--	1945.1	--	1945.1	--
2021	--	--	1669.8	--	1669.8	--	1669.8	--
2022	--	--	1294.9	--	1294.9	--	1294.9	--
2023	--	--	1486.4	--	1486.4	--	1486.4	--
Subtotal	--	--	22812.2	--	22812.2	--	22812.2	--

Annual Funding 0300   Procurement   Procurement, Defense-Wide							
Fiscal Year	Quantity	BY 2002 \$M					
		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	--	--	1765.9	--	1765.9	--	1765.9
2019	--	--	1745.4	--	1745.4	--	1745.4
2020	--	--	1368.9	--	1368.9	--	1368.9
2021	--	--	1152.1	--	1152.1	--	1152.1
2022	--	--	875.9	--	875.9	--	875.9
2023	--	--	985.7	--	985.7	--	985.7
Subtotal	--	--	16987.3	--	16987.3	--	16987.3

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		206.2
2020		52.2
2021		178.0
2022		647.5
2023		190.8
Subtotal		2481.7

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	142.3
2019	143.1
2020	35.5
2021	118.7
2022	423.4
2023	122.3
Subtotal	1767.0

## Low Rate Initial Production

There is no LRIP for this program.

## Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost \$M	Description
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 and 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 (BLK) 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 BLK IIA maintenance concepts and Intermediate Level Maintenance Facility (ILMF) and magazine design and review, BLK 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 BLK 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. Deliveries: 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 (TSRM). No major deliveries.
Japan	1/2/2015	0	2.8	FMS Case JA-P-FUN: Insensitive Munition (IM) Inspection and Testing of SM-3 BLK IIA Second Stage Rocket Motors (SSRMs) and TSRMs. No major deliveries.
Saudi Arabia	12/14/2014	0	12.0	FMS Case SR-I-WIA: United States Government (USG) technical assistance. No major deliveries.

## BMDS

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.
Japan	10/7/2014	0	12.7	FMS Case JA-P-FVG: SCD (FTM) Preparation. No major deliveries.
Japan	8/22/2014	0	2.4	FMS Case JA-P-FWD: SCD (PFRT) Preparation for TSRM. No major deliveries.
Japan	6/9/2014	0	8.8	FMS Case JA-P-FVO: Transportation of SCD SM-3 BLK IIA components. No major deliveries.
Japan	8/5/2013	0	7.5	FMS Case JA-P-FTZ: SM-3 SCD Control Test Vehicle (CTV) Test Execution. No major deliveries.
United Arab Emirates	12/25/2011	2	5202.2	FMS Case AE-B-UAF: Two Terminal High Altitude Area Defense (THAAD) Batteries, consisting of 192 interceptors, 2 Army Navy/Transportable Radar Surveillance Model 2 (AN/TPY-2) Radars, 12 Launchers, 8 Missile Round Pallets, 7 Multifunctional Information Distribution System (MIDS) Terminals, 4 AMMPS, 10 PR4G TRC-9105 Radios, 6 PR4G TRC-9301C Radios, various tactical vehicles, trucks, training aids & devices, spare parts, training, government and contractor technical assistance, Tracking Exercise, books & publications, and repair & return. [Quantity is 2 batteries]
United Arab Emirates	4/30/2010	0	13.8	FMS Case AE-B-UAE: Technical Assistance & 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 BLK IA Spares and RRR. Deliveries: One (1) SM-3 Kinetic Warhead (KW); One (1) MK72 Rocket Motor Booster.
Japan	9/11/2008	0	12.1	FMS Case JA-P-FQV: SM-3 BLK IA Spares. No major deliveries.
Japan	8/19/2008	0	59.4	FMS Case JA-P-CAN: JFTM-04 Firing Event. No major deliveries.
Japan	3/3/2008	9	202.4	FMS Case JA-P-LWA: Japan Aegis BMD Block 2004 Upgrade of JS KIRISHIMA (DDG 174). Deliveries: 1 JBMD BLK 04 Computer Program, Peripherals, and SM-3 BLK IA Missiles.
Japan	1/18/2008	0	53.0	FMS Case JA-P-CAE: FTM-03 No major deliveries.
Netherlands	8/31/2006	0	18.7	FMS Case NE-P-GLK: BMD Sensor Integration Study (SIS). No major deliveries.
Japan	8/21/2006	9	209.7	FMS Case JA-P-LVK: Japan Aegis BMD Block 2004 Upgrade of JS MYOKO (DDG 175). Deliveries: 1 JBMD BLK 04 Computer Program, Peripherals, and SM-3 BLK IA Missiles.

## Notes

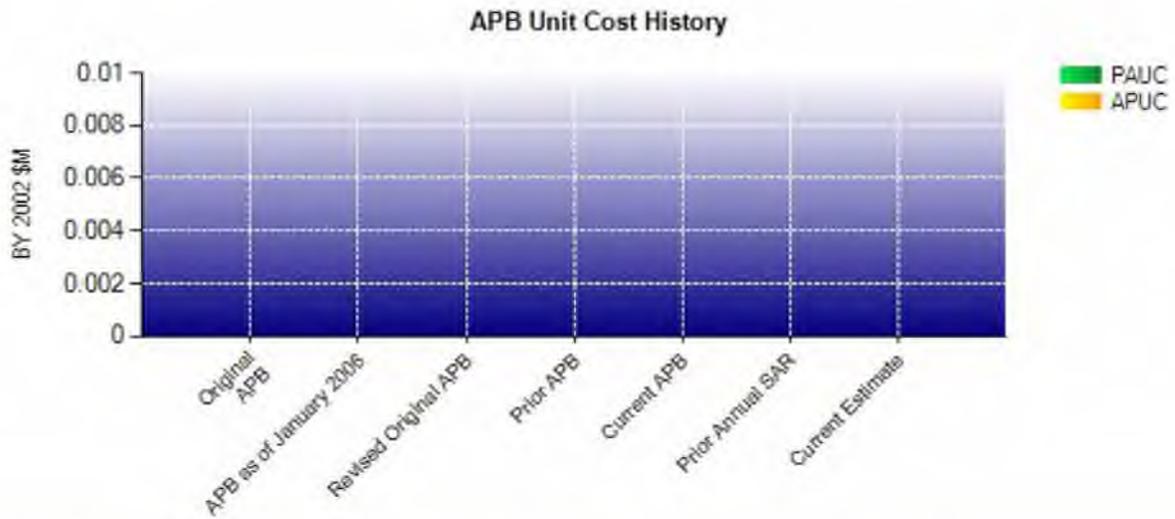
## **Nuclear Costs**

None

## Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2002 \$M	BY 2002 \$M	% Change
	Current UCR Baseline	Current Estimate (Dec 2017 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	--	147135.8	
Quantity	--	0	
Unit Cost	--	--	--
<b>Average Procurement Unit Cost</b>			
Cost	--	16987.3	
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. Ground-Based Interceptors and AN/TPY-2 radars) 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 2016	N/A	N/A	N/A	N/A
Current Estimate	Dec 2017	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	180522.0
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	-18.8	-77.4	-26.2	-122.4
Quantity	--	+15.0	--	+15.0
Schedule	-880.5	-124.7	--	-1005.2
Engineering	+52121.4	-1296.1	-31.8	+50793.5
Estimating	-6941.8	-1895.6	+1330.6	-7506.8
Other	--	--	--	--
Support	--	--	--	--
<b>Subtotal</b>	<b>+44280.3</b>	<b>-3378.8</b>	<b>+1272.6</b>	<b>+42174.1</b>
Current Changes				
Economic	-216.2	-5.4	--	-221.6
Quantity	--	--	--	--
Schedule	-138.2	--	--	-138.2
Engineering	+794.5	--	--	+794.5
Estimating	+3649.6	+2431.5	+669.9	+6751.0
Other	--	--	--	--
Support	--	--	--	--
<b>Subtotal</b>	<b>+4089.7</b>	<b>+2426.1</b>	<b>+669.9</b>	<b>+7185.7</b>
Adjustments	+59641.0	+23764.9	+539.2	+83945.1
Total Changes	+108011.0	+22812.2	+2481.7	+133304.9
CE - Cost Variance	155228.1	22812.2	2481.7	180522.0
CE - Cost & Funding	155228.1	22812.2	2481.7	180522.0

Summary BY 2002 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Planning RDTE Estimate)	44740.1	--	--	44740.1
Previous Changes				
Economic	--	--	--	--
Quantity	--	+12.8	--	+12.8
Schedule	-839.1	-91.5	--	-930.6
Engineering	+43813.3	-977.2	-24.3	+42811.8
Estimating	-5922.2	-1384.8	+981.4	-6325.6
Other	--	--	--	--
Support	--	--	--	--
<b>Subtotal</b>	<b>+37052.0</b>	<b>-2440.7</b>	<b>+957.1</b>	<b>+35568.4</b>
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	-102.3	--	--	-102.3
Engineering	+556.4	--	--	+556.4
Estimating	+2631.2	+1762.6	+450.4	+4844.2
Other	--	--	--	--
Support	--	--	--	--
<b>Subtotal</b>	<b>+3085.3</b>	<b>+1762.6</b>	<b>+450.4</b>	<b>+5298.3</b>
Adjustments	+43504.1	+17665.4	+359.5	+61529.0
<b>Total Changes</b>	<b>+83641.4</b>	<b>+16987.3</b>	<b>+1767.0</b>	<b>+102395.7</b>
CE - Cost Variance	128381.5	16987.3	1767.0	147135.8
CE - Cost & Funding	128381.5	16987.3	1767.0	147135.8

Previous Estimate: December 2016

#### Cost Variance Notes

Note: Below are the adjustments from prior SARs reflecting the inclusion of another year of funding since the prior submission.

SAR Submission	\$ Then Year				\$ Base Year 2002			
	RDT&E	PROC	MILCON	Total	RDT&E	PROC	MILCON	Total
Dec 2009-14	41,544.4	18,941.6	148.7	<b>60,634.7</b>	31,141.4	14,400.8	106.5	<b>45,648.7</b>
Dec 2015	5,289.4	1,781.8	10.8	<b>7,082.0</b>	3,680.6	1,228.2	7.2	<b>4,916.0</b>
Jun 2016	6,142.2	1,555.1	188.9	<b>7,886.2</b>	4,187.5	1,050.7	123.5	<b>5,361.7</b>
Dec 2017	6,665.0	1,486.4	190.8	<b>8,342.2</b>	4,494.6	985.7	122.3	<b>5,602.6</b>
	<b>59,641.0</b>	<b>23,764.9</b>	<b>539.2</b>	<b>83,945.0</b>	<b>43,504.1</b>	<b>17,665.4</b>	<b>359.5</b>	<b>61,529.0</b>

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-216.2
Rephased Multi Object Kill Vehicle program to extend risk reduction activities. (Schedule)	-102.3	-138.2
Congressional add in FY 2018 to begin development of a new discriminating radar for the Pacific Theater. (Engineering)	+3.7	+5.0
Added funding to continue development of the new discriminating radar for the Pacific Theater. (Engineering)	+511.4	+734.5
Added funding for increased Hawaii Radar sensitivity capability. (Engineering)	+143.9	+203.0
Congressional add in FY 2018 for a Missile Defense Tracking System design trade study. (Engineering)	+10.3	+14.0
Deferred funding for THAAD III software upgrades pending requirement definition. (Engineering)	-112.9	-162.0
Transferred Israeli Program funding from Procurement to RDT&E to align with the continued development and production profiles. (Estimating)	+536.0	+756.0
Increased funding for Special Programs. (Estimating)	+468.6	+659.5
Revised the BMDS Test Program. (Estimating)	+289.6	+399.2
Congressional adds in FY 2017-FY 2018 to begin 20 additional Ground Based Interceptors (GBIs) at Fort Greely, AK. (Estimating)	+248.6	+335.0
Added funding to complete the 20 additional GBIs at Fort Greely, AK. (Estimating)	+260.3	+358.9
Congressional adds in FY 2017-FY 2018 to begin adding 20 silos at Fort Greely, AK. (Estimating)	+44.5	+60.0
Added funding to complete the 20 additional silos at Fort Greely, AK. (Estimating)	+250.3	+350.0
Added funding to complete two silos at Missile Field 1 at Fort Greely, AK and six boosters to maintain 44/64 deployed GBIs. (Estimating)	+177.3	+247.0
Extended Sea Based X-Band Radar operational days at sea and added funds for necessary software upgrades. (Estimating)	+145.6	+204.1
Congressional adds in FY 2017-FY 2018 to support the United States Forces Korea (USFK) Joint Emergent Operational Need (JEON). (Estimating)	+90.5	+122.5
Added funding to continue support to the USFK JEON effort. (Estimating)	+32.9	+45.2
Refined cost estimates and other adjustments. (Estimating)	+82.2	+105.7
Adjustment for current and prior escalation. (Estimating)	+4.8	+6.5
<b>RDT&amp;E Subtotal</b>	<b>+3085.3</b>	<b>+4089.7</b>

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-5.4
Congressional add in FY 2018 to begin 20 GBIs at Fort Greely, AK. (Estimating)	+40.9	+56.0
Added funding to complete the 20 additional GBIs at Fort Greely, AK. (Estimating)	+873.3	+1243.0
Congressional adds in FY 2017-FY 2018 to begin 20 additional silos at Fort Greely, AK. (Estimating)	+190.0	+259.0
Added funding to complete the 20 additional silos at Fort Greely, AK. (Estimating)	+152.1	+212.0
Congressional add in FY 2018 for 50 additional THAAD interceptors. (Estimating)	+368.9	+505.0
Added funding in FY 2019 for 50 additional THAAD interceptors. (Estimating)	+290.9	+405.0

Congressional add in FY 2018 for 16 additional SM-3 Block IIA missiles. (Estimating)	+329.4	+451.0
Reduced 20 SM-3 Block IIA missiles starting in FY 2020. (Estimating)	-345.0	-504.2
Congressional adds in FY 2017-FY 2018 to support the United States Forces Korea (USFK) Joint Emergent Operational Need (JEON). (Estimating)	+17.9	+24.1
Added funding to continue support to the USFK JEON effort. (Estimating)	+27.1	+37.8
Implemented SM-3 Block IB Multi Year Procurement and added 62 missiles. (Estimating)	+382.6	+553.5
Transferred Israeli Program funding from Procurement to RDT&E to align with the continued development and production profiles. (Estimating)	-527.0	-756.0
Refined cost estimates and other adjustments. (Estimating)	-37.5	-53.3
Adjustment for current and prior escalation. (Estimating)	-1.0	-1.4
<b>Procurement Subtotal</b>	<b>+1762.6</b>	<b>+2426.1</b>

MILCON	\$M	
	Base Year	Then Year
<b>Current Change Explanations</b>		
Congressional add in FY 2018 for Missile Field 4 construction at Fort Greely, AK. (Estimating)	+140.2	+200.0
Added funding for the new discriminating radar in the Pacific Theater. (Estimating)	+268.8	+409.9
Increased funding for alternative sites for the Hawaii Radar and included an In-Flight Interceptor Communications System Data Terminal. (Estimating)	+122.7	+189.6
Added funding for Phase 2 of the Long Range Discrimination Radar System Complex. (Estimating)	+16.6	+24.0
Added funding to complete two silos at Missile Field 1 at Fort Greely, AK to maintain 44/64 deployed GBIs. (Estimating)	+5.6	+8.0
Revised the Consolidated Test Complex construction start from FY 2022 to FY 2023. (Estimating)	-116.3	-177.9
Refined cost estimates and other adjustments. (Estimating)	+12.8	+16.3
<b>MILCON Subtotal</b>	<b>+450.4</b>	<b>+669.9</b>

## Contracts

### Contract Identification

**Appropriation:** RDT&E  
**Contract Name:** Development and Sustainment Contract  
**Contractor:** The Boeing Co., Missile Defense Systems  
**Contractor Location:** 499 Boeing Blvd., SW  
 Huntsville, AL 35824-3001  
**Contract Number:** HQ0147-12-C-0004  
**Contract Type:** Cost (CR), Cost Plus Fixed Fee (CPFF), Cost Plus Incentive Fee (CPIF), Cost Plus Award Fee (CPAF), Fixed Price Incentive(Firm Target) (FPIF)  
**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	2816.8	N/A	6137.0	6137.0	N/A	6038.4	6080.1

### Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the development options and change proposals exercised (identified in prior SARs). The +\$1,518M increase since the 2016 SAR was primarily driven by effort associated with the Redesigned Kill Vehicle (RKV), All-Up-Round, 2/3 Stage Boost Vehicle, and C2 Booster Avionics.

### Contract Variance

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	-103.7	-32.0
Previous Cumulative Variances	-127.2	-30.9
Net Change	+23.5	-1.1

### Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to catch-up in performance for FTG-15, favorable performance in Special Studies consisting of multiple Task Instructions, and credit for unearned major subcontractor fee.

The unfavorable net change in the schedule variance is due to multiple low dollar variances equating to a nominal change in performance.

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** Targets and Countermeasures Prime Contract  
**Contractor:** Lockheed Martin Corporation Space Systems Company  
**Contractor Location:** 4800 Bradford Drive NW  
 Huntsville, AL 35805-1930  
**Contract Number:** HQ0006-04-D-0006  
**Contract Type:** Cost Plus Award Fee (CPAF)  
**Award Date:** December 09, 2003  
**Definitization Date:** April 19, 2004

**Contract Price**

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
210.7	N/A	N/A	2607.4	N/A	N/A	2714.8	2715.3

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to evolving BMDS test requirements. These requirements, documented through semi-annual changes to the Integrated Master Test Plan, drive modifications to the Targets and Countermeasures Lockheed Martin Prime Contract. The modifications have resulted in additional costs which increased the current contract price target.

**Contract Variance**

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	-135.5	-0.2
Previous Cumulative Variances	-143.9	+0.5
Net Change	+8.4	-0.7

**Cost and Schedule Variance Explanations**

The favorable net change in the cost variance is due to early completion of the last T3 Target delivery to support MDA's accelerated test execution. Target was delivered several months early and required less resources due to lessons learned from previous Ship Sets.

The unfavorable net change in the schedule variance is due to the Modified Ballistic Re-Entry Vehicle (MBRV) -7 (Delivery Order 29), buildup and top coating of the Re-entry Vehicle Separation Module (RVSM) structures being interrupted and lengthened by MBRV-8 adhesive moisture anomaly issue resulting in addition inspection. Lockheed Martin's Targets and Countermeasures Prime Contract is on track to complete as planned.

**Notes**

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

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** Block IIA AUR Development & Integration  
**Contractor:** Raytheon Company  
**Contractor Location:** PO Box 11337  
 1151 East Hermans Rd  
 Tucson, AZ 85745-1337  
**Contract Number:** HQ0276-10-C-0005  
**Contract Type:** Cost Plus Incentive Fee (CPIF), Cost Plus Award Fee (CPAF), Cost Plus Fixed Fee (CPFF)  
**Award Date:** September 08, 2010  
**Definitization Date:** September 08, 2010

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
160.0	N/A	N/A	1649.0	N/A	N/A	1874.0	1913.0

**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 Development efforts including Post-Preliminary Design Review, Guidance Electronics Unit Engineering Change Proposal Phase I, Software Upgrades & Guidance and Simulation Evaluation Laboratory Support, Flight Test Support, and Aegis Weapon System Integration for Block IIA.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	-59.0	-20.0
Previous Cumulative Variances	-63.0	-2.0
Net Change	+4.0	-18.0

**Cost and Schedule Variance Explanations**

The favorable net change in the cost variance is due to subcontractor efforts at Aerojet. Aerojet efforts are now complete.

The unfavorable net change in the schedule variance is due to delays in manufacturing and Systems Engineering efforts.

**Notes**

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

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** SM-3 Technology Development of Block IB/IA Missiles  
**Contractor:** Raytheon Missile Systems  
**Contractor Location:** PO Box 11337  
 1151 East Hermans Rd  
 Tucson, AZ 85745-1337  
**Contract Number:** HQ0276-11-C-0002  
**Contract Type:** Cost Plus Award Fee (CPAF)  
**Award Date:** January 15, 2011  
**Definitization Date:** March 15, 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
594.0	N/A	N/A	673.0	N/A	N/A	657.0	665.0

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to Flight Test Support, continued verification of technology insertion, discrimination improvement and service life extension.

**Contract Variance**

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	+14.0	0.0
Previous Cumulative Variances	+14.0	0.0
Net Change	+0.0	+0.0

**Cost and Schedule Variance Explanations**

None

**Notes**

New CLIN structures are currently in work to extend EV reporting through December 31, 2018. This will include Flight Test Support, continued verification of technology insertion, discrimination improvement and service life evaluation. This contract is more than 90% complete; therefore, this is the final report for this contract.

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

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** THAAD Advanced Capability Development  
**Contractor:** Lockheed Martin Corporation  
**Contractor Location:** 4800 Bradford Drive NW  
 Huntsville, AL 35805-1930  
**Contract Number:** HQ0147-12-D-0001  
**Contract Type:** Cost Plus Fixed Fee (CPFF), Firm Fixed Price (FFP), Cost Plus Incentive Fee (CPIF), Cost Plus Award Fee (CPAF), Firm Fixed Price Level of Effort Term (FFPLOE)  
**Award Date:** February 01, 2012  
**Definitization Date:** February 01, 2012

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
961.2	N/A	N/A	1735.0	N/A	N/A	1735.0	1735.0

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to major efforts executed during this timeframe including Electronic Protection/Objective Debris Mitigation/Remote Launcher (EP/ODM/RL), Joint Emergent Operational Need (JEON) efforts consisting of Test bed and Launcher Upgrades from a C1 to C2 configuration, Phase IV Missile Segment Enhancement (MSE), Phase IV Regional Peer to Peer Coordination (RP2PC), Radar Digital Signal Injection System (RDSIS), and System Power Architecture (SPA). Other efforts executed in this timeframe included THAAD Active Leak Sensor System (TALSS) Redesign, Test Engineering Services, five new production obsolescence tasks, and three new technical studies for Launcher Carrier Electronics Module (CEM) redesign, Defense Advanced Global Positioning Receiver (DAGR) power cable redesign, and conceptual design efforts in support of an alternative THAAD Launcher power architecture.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	+1.4	-2.9
Previous Cumulative Variances	+2.0	-2.7
Net Change	-0.6	-0.2

**Cost and Schedule Variance Explanations**

The unfavorable net change in the cost variance is due to added cost for unbudgeted Task Order (TO) 39 Obsolescence qualification failure investigations/corrective actions; and increased cost to accelerate Software Build 4.0 in TO45 System Development Support & Integration to satisfy Joint Emergent Operational Need Statement (JEONS) requirements.

The unfavorable net change in the schedule variance is due to multiple low dollar variances equating to minimal deterioration in schedule performance.

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** Long Range Discrimination Radar (LRDR)  
**Contractor:** Lockheed Martin  
**Contractor Location:** 199 Borton Martin Road  
 Moorestown, NJ 08057  
**Contract Number:** HQ0147-16-C-0011  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** October 21, 2015  
**Definitization Date:** October 21, 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
667.6	732.0	N/A	681.9	747.2	N/A	672.5	672.5

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to additional scope incorporated on the contract. MDA added Element Specification 2.1 which includes quantified performance against a broader range of threats, quantified advanced discrimination performance and revisions to performance tables. This capability will be part of LRDR Configuration 1 delivered as part of BMDS Increment 6.

**Contract Variance**

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	0.0	-1.6
Previous Cumulative Variances	+3.0	-6.2
Net Change	-3.0	+4.6

**Cost and Schedule Variance Explanations**

The unfavorable net change in the cost variance is due to additional effort required to complete the Critical Design Review (CDR).

The favorable net change in the schedule variance is due to the initiation of Sub Array Suite (SAS) low rate manufacturing, receipt of test material, and completion of post-CDR analysis reports. The schedule risk assessment indicates an on-time completion of contract efforts. To date, the prime contractor completed all Major Milestones on schedule.

**Notes**

The next Integrated Baseline Review (IBR) is on track for April 2018. The program remains on schedule for initial fielding of the LRDR at Clear Air Force Station, Alaska, in CY 2020.

## 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	180522.0	Years Appropriated	17
Expended to Date	122204.0	Percent Years Appropriated	77.27%
Percent Expended	67.69%	Appropriated to Date	136414.3
Total Funding Years	22	Percent Appropriated	75.57%

The above data is current as of February 12, 2018.

## 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

Cost Element	Annual O&S Costs BY2002 \$K	
	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 2016 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):