

UNCLASSIFIED



## Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-431



### **B-2 Defensive Management System - Modernization (B-2 DMS-M)**

As of FY 2020 President's Budget

Defense Acquisition Management  
Information Retrieval  
(DAMIR)

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**Table of Contents**

Sensitivity Originator .....	3
Common Acronyms and Abbreviations for MDAP Programs .....	4
Program Information .....	6
Responsible Office .....	6
References .....	7
Mission and Description .....	8
Executive Summary .....	9
Threshold Breaches .....	12
Schedule .....	13
Performance .....	15
Track to Budget .....	17
Cost and Funding .....	17
Low Rate Initial Production .....	26
Foreign Military Sales .....	27
Nuclear Costs .....	27
Unit Cost .....	28
Cost Variance .....	31
Contracts .....	34
Deliveries and Expenditures .....	35
Operating and Support Cost .....	36

## **Sensitivity Originator**

No originator information is available at this time.

## 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**

B-2 Defensive Management System - Modernization (B-2 DMS-M)

**DoD Component**

Air Force

## Responsible Office

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**Date Assigned:** June 27, 2016

## References

**SAR Baseline (Development Estimate)**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated May 16, 2016

**Approved APB**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated May 16, 2016

## Mission and Description

The B-2 Defensive Management System-Modernization (B-2 DMS-M) is a principal enabler of survivability for the B-2 stealth bomber aircraft. The legacy Defensive Management System Threat Emitter Locator System (TELS) detects, identifies, and locates enemy radar systems and provides real-time threat avoidance, threat warning, and threat situational awareness information to the aircrew. Shortcomings within the TELS limits overall B-2 operational capability and survivability, necessitating modernization.

A B-2 equipped with DMS-M must be capable of operating in current and projected threat environments during all mission phases and against a broad range of threats. Continued and rapid developments and/or technological improvements in worldwide air defense capabilities will place a premium on developing flexible and expandable B-2 aircraft survivability systems.



## Executive Summary

### Program Highlights Since Last Report

B-2 DMS-M is an ACAT ID program in the EMD Phase.

After completing the Technology Maturation and Risk Reduction phase and System Preliminary Design Review (PDR), the DMS-M program was deemed ready to enter the EMD phase. The USD(AT&L) signed the Milestone B ADM on March 24, 2016 authorizing entrance into the EMD phase and contract award. A Cost-Plus Incentive Fee contract for the EMD portion of the DMS-M Program was awarded to Northrop Grumman Aerospace Systems Corporation on March 25, 2016. Production will be via LRIP and FRP contracts awarded at a future date.

Milestone B Certification was made pursuant to 10 United States Code 2366b; however, provision (a)(3)(D) was waived by the USD(AT&L). The program required a USD(AT&L) waiver because the Air Force FY 2017 President's Budget position was less than the SCP reflected in the FYDP and the Department would have been unable to meet critical national security objectives if there was a delay in obtaining the DMS-M capability for the B-2. Per the program ADM dated March 24, 2016, the Air Force updated the SCP in November 2016 and fully funded the DMS-M program to the updated SCP. This closes out the 2366B waiver and will be the last time this waiver is reported.

On May 11, 2017, the MDA approved an updated Acquisition Strategy. The MDA authorized the program to change the technical architecture and contract type via Engineering Change Proposal (ECP). The program awarded an Undefined Contract Action (UCA) on May 24, 2017 to implement the changes. EMD period of performance was extended through July 2022. The revised program strategy leverages development from other Air Force Family of Systems programs and implements additional capability to improve weapon system survivability in contested airspace. The strategy also provides risk reduction and addresses obsolescence concerns for these other programs.

Since UCA award the program has successfully conducted a delta System Requirements Review and System Functional Review on August 28, 2017 (Integrated Master Plan (IMP) Event B), a delta PDR March 19-22, 2018 (IMP Event C), a schedule-focused Integrated Baseline Review on March 27, 2018 (IMP Event D), and the system Critical Design Review (CDR) November 6-8, 2018 (IMP Event E). On June 4, 2018 Secretary of the Air Force/Financial Management and Comptroller published an updated SCP to account for the architecture changes in the May 2017 ECP. The PAUC increased by 11.5% above the current APB. It is important to note this increase is not constrained to the Firm Fixed Price Not to Exceed Value. The budget growth can also be attributed to the increase in scope for the new capability and hardware, plus the risk reduction and obsolescence investments that will benefit the other programs the DMS-M program is leveraging. The SCP also corrects inadequate Milestone B estimates for war readiness spare kits, interim contractor support, and other government costs.

Systems engineering design efforts are complete as presented at the system CDR. The program authorized DMS-M installation into the B-2 flight test aircraft after successful completion of the airframe CDR on August 13-14, 2018. The critical path to beginning flight test is completion of software development and Program Development 7.1 certification efforts.

Despite increasing emphasis from Northrop Grumman leadership, the contractor is underperforming on its software development get well plan. Inaccurate estimates to scope the software development effort prior to design completion resulted in aggressive timelines. Manpower challenges experienced by the software development teams have caused lower than anticipated development velocity. Northrop Grumman leadership, including the Chief Executive Officer, committed additional experienced software developers from other programs to the DMS-M program to alleviate manpower concerns. Additionally, Northrop Grumman has established Engineering Scrum Teams to further mitigate risk by embedding systems engineers with software developers to create higher fidelity detail sprint plans.

Despite these mitigations, the DMS-M program office anticipates that Northrop Grumman will not achieve the PD 7.1 APB date. Northrop Grumman is in the process of revising its software development plan and goals to include a revised completion date. Based on currently available data, the program office anticipates achieving PD 7.1 certification in February

2020. A more refined completion date will be provided once supporting information within Northrop Grumman's revised plan is obtained and approved. Future APB dates are likely to need revision as well due to Northrop Grumman's software development performance and design completion, which has provided more fidelity into the installation timelines.

To date, Northrop Grumman has successfully demonstrated significant functionality in a B-2 representative lab environment to include rehosting legacy display functionality and pilot vehicle interface to integrate the new liquid crystal displays and advanced graphics processor (AGP) into the B-2. The contractor has also successfully demonstrated functioning Electronic Support Measures controllers and mass data storage infrastructure. To ensure quality software is being developed, Northrop Grumman built a robust testing methodology to include automated tests to ensure safety of flight and flight critical functions are thoroughly tested. Additionally, Northrop Grumman provides monthly software demonstrations to provide a view of the progress made by each sprint. Results of integration test efforts have been overwhelmingly positive with an increase in the number of individual test points and an encouraging significant decrease in defects found over previous integration efforts.

For the future sprints, Northrop Grumman will be focusing on integrating the survivability management functionality such as jeopardy assessment and auto-router functions that have already been developed. Additionally, they will focus on completing development of legacy display formats and display formats for the new functionality, which appear to drive the software critical path.

A cost and schedule breach program deviation report is currently in process.

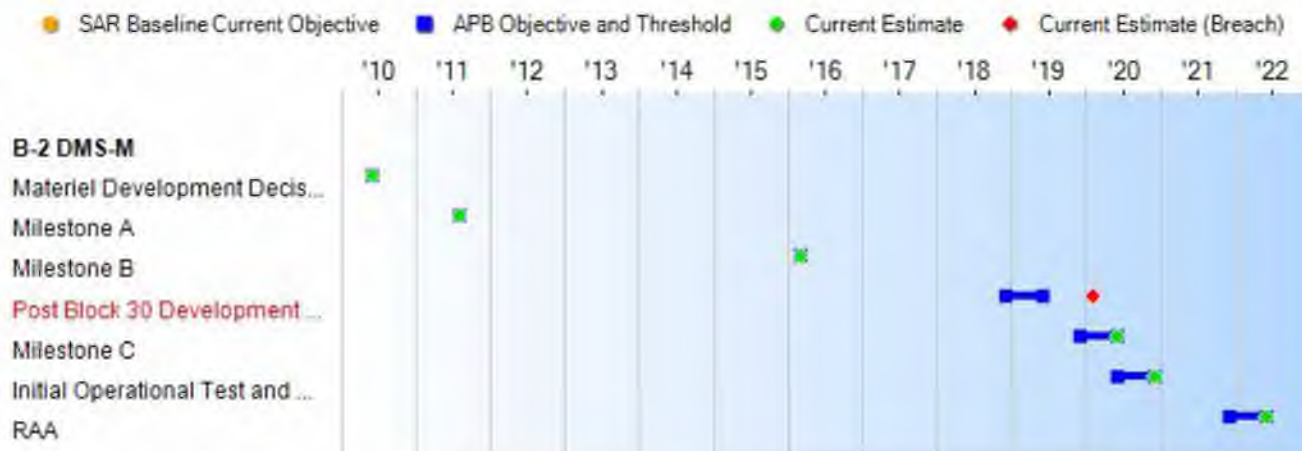
The program is fully funded in the near term execution and budget years. The definitization proposal pricing update to account for the January 2018 architecture modification was received on July 20, 2018 and the Defense Contract Audit Agency audit and technical evaluation is complete. The program is completing pricing activities to prepare for business clearance reviews. The contract information in this report will be updated upon UCA definitization.

<b>History of Significant Developments Since Program Initiation</b>	
History of Significant Developments Since Program Initiation	
<b>Date</b>	<b>Significant Development Description</b>
March 2016	<b>Milestone B was approved on March 24, 2016.</b>
May 2017	<b>MDA approved an Acquisition Strategy on May 11, 2017.</b>
May 2017	<b>A Undefined Contract Action was awarded on May 24, 2017.</b>
January 2018	<b>A cost capability trade analysis was approved by Air Force Global Strike Command on January 30, 2018.</b>
March 2018	<b>Delta PDR was completed on March 22, 2018.</b>
June 2018	<b>Updated SCP was signed on June 4, 2018.</b>
November 2018	<b>Critical Design Review was completed on November 8, 2018.</b>

## Threshold Breaches

APB Breaches			Explanation of Breach
<b>Schedule</b>		<input checked="" type="checkbox"/>	<p>RDT&amp;E, PAUC Breach: On June 4, 2018, the Secretary of the Air Force/Financial Management and Comptroller published an updated SCP to account for the architecture changes in the May 2017 Engineering Change Proposal. There is an increase in PAUC of 11.5 percent above the current APB, as well as, the potential for delays to future APB schedule milestones. It is important to note this increase is not constrained to the Firm Fixed Price Not to Exceed Value. The budget growth can also be attributed to the increase in scope for the new capability and hardware, plus the risk reduction and obsolescence investments that will benefit the other programs the DMS-M program is leveraging. The SCP also corrects inadequate Milestone B estimates for war readiness spare kits, interim contractor support, and other government costs.</p> <p>Schedule Breach: Post Block 30 Development 7.1 Certification has breached the schedule threshold and is now anticipated in February 2020. Northrop Grumman has been underperforming on its software development get well plan due to inaccurate estimates and manpower challenges. Northrop Grumman has committed to mitigation plans to address these issues.</p> <p>A cost and schedule breach program deviation report is in process.</p>
<b>Performance</b>		<input type="checkbox"/>	
<b>Cost</b>	RDT&E	<input checked="" type="checkbox"/>	
	Procurement	<input type="checkbox"/>	
	MILCON	<input type="checkbox"/>	
	Acq O&M	<input type="checkbox"/>	
<b>O&amp;S Cost</b>		<input type="checkbox"/>	
<b>Unit Cost</b>	PAUC	<input checked="" type="checkbox"/>	
	APUC	<input type="checkbox"/>	
Nunn-McCurdy Breaches			
<b>Current UCR Baseline</b>			
	PAUC	None	
	APUC	None	
<b>Original UCR Baseline</b>			
	PAUC	None	
	APUC	None	

### Schedule



Schedule Events				
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold	Current Estimate	Current Estimate
Material Development Decision	Jun 2010	Jun 2010	Jun 2010	Jun 2010
Milestone A	Aug 2011	Aug 2011	Aug 2011	Aug 2011
Milestone B	Mar 2016	Mar 2016	Mar 2016	Mar 2016
Post Block 30 Development 7.1 Certification	Dec 2018	Dec 2018	Jun 2019	<b>Feb 2020<sup>†</sup></b>
Milestone C	Dec 2019	Dec 2019	Jun 2020	Jun 2020
Initial Operational Test and Evaluation Start	Jun 2020	Jun 2020	Dec 2020	Dec 2020
RAA	Dec 2021	Dec 2021	Jun 2022	Jun 2022

(Ch-1)

<sup>†</sup> APB Breach

#### Change Explanations

(Ch-1) Post Block 30 Development 7.1 Certification changed from June 2019 to February 2020 due to inaccurate estimates to scope the software development effort prior to design completion which resulted in aggressive timelines, and manpower challenges experienced by the software development teams have caused lower than anticipated development velocity.

**Notes**

Post Block 30 Development 7.1 Certification:

- Full B-2 DMS-M software capability required to complete DT&E
- Required software version to conduct system verification in support of Milestone C

Mitigation: Northrop Grumman leadership, including the Chief Executive Officer, has committed additional experienced software developers from other programs to the DMS-M program to alleviate manpower concerns. Additionally, Northrop Grumman has established Engineering Scrum Teams to further mitigate risk by embedding systems engineers with software developers to create higher fidelity detail sprint plans.

RAA is defined by Air Force Global Strike Command as:

- Eight aircraft modified with operational B-2 DMS-M system
- Sufficient spare parts to support modified aircraft
- Sufficient support equipment for modified aircraft
- Updated aircrew and maintenance technical manuals, maintenance training and academic courseware
- Mission planning system software updated to provide B-2 DMS-M compatibility

**Acronyms and Abbreviations**

DT&E - Developmental Testing and Evaluation

RAA - Required Assets Available

## Performance

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Development Objective/Threshold	Demonstrated Performance	Current Estimate	
<b>Survivability</b>				
The aircraft with B-2 DMS Mod installed shall meet RCS levels of the B-2 WSS, Appendix 70	The aircraft with B-2 DMS Mod installed shall meet RCS levels of the B-2 WSS, Appendix 70	(T=O) The aircraft with B-2 DMS Mod installed shall meet RCS levels of the B-2 WSS, Appendix 70	TBD	The aircraft with B-2 DMS Mod installed shall meet RCS levels of the B-2 WSS, Appendix 70
<b>Sustainment (Availability) has two components: Ao &amp; Am</b>				
The Ao of the B-2 DMS Mod upgrade shall be a minimum of 99.7% at system maturity. B-2 DMS Mod shall support the B-2 DMS Mod B-2 fleet platform Am target of 60% without the need for component cannibalizations.	The Ao of the B-2 DMS Mod upgrade shall be a minimum of 99.7% at system maturity. B-2 DMS Mod shall support the B-2 DMS Mod B-2 fleet platform Am target of 60% without the need for component cannibalizations.	(T=O) The Ao of the B-2 DMS Mod upgrade shall be a minimum of 99.7% at system maturity. B-2 DMS Mod shall support the B-2 DMS Mod B-2 fleet platform Am target of 60% without the need for component cannibalizations.	TBD	The Ao of the B-2 DMS Mod upgrade shall be a minimum of 99.7% at system maturity. B-2 DMS Mod shall support the B-2 DMS Mod B-2 fleet platform Am target of 60% without the need for component cannibalizations.
<b>DPU Functionality</b>				
B-2 DMS Mod shall maintain mission-critical legacy DPU capability in addition to enhancements provided by B-2 DMS Mod consistent with Integrated Functional Capability Production Version 6 baseline.	B-2 DMS Mod shall maintain mission-critical legacy DPU capability in addition to enhancements provided by B-2 DMS Mod consistent with Integrated Functional Capability Production Version 6 baseline.	(T=O) B-2 DMS Mod shall maintain mission-critical legacy DPU capability in addition to enhancements provided by B-2 DMS Mod consistent with Integrated Functional Capability Production Version 6 baseline.	TBD	B-2 DMS Mod shall maintain mission-critical legacy DPU capability in addition to enhancements provided by B-2 DMS Mod consistent with Integrated Functional Capability Production Version 6 baseline.

Classified Performance information is provided in the classified annex to this submission.

### Requirements Reference

CDD - JROC approved April 15, 2013 and Air Force Requirements Oversight Council revalidated June 12, 2015

### Change Explanations

None

**Acronyms and Abbreviations**

AFROC - Air Force Requirements Oversight Council  
Am - Materiel Availability  
Ao - Aircraft Availability  
DMS - Defensive Management System  
DPU - Display Processing Unit  
RCS - Radar Cross Section  
WSS - Weapons System Specification



## Track to Budget

### General Notes

3010 and 3600 funding for the B-2 DMS-M program were originally embedded within the primary B-2 Program Element. These lines are shared with other B-2 programs that support the B-2 weapon system. B-2 DMS-M RDT&E was realigned to PE 605931F in 2013.

### RDT&E

Appn	BA	PE		
Air Force	3600	07	0101127F	
	<b>Project</b>		<b>Name</b>	
	675345		B-2 Modernization	(Sunk)
	676023		B-2 DMS-M	(Sunk)
Air Force	3600	05	0605931F	
	<b>Project</b>		<b>Name</b>	
	653844		B-2 Defensive Management System	

### Procurement

Appn	BA	PE		
Air Force	3010	07	0101127F	
	<b>Line Item</b>		<b>Name</b>	
	000075		Other Production Charges	(Shared)
Air Force	3010	06	0101127F	
	<b>Line Item</b>		<b>Name</b>	
	000999		Initial Spares/Repair Parts	(Shared)
Air Force	3010	05	0101127F	
	<b>Line Item</b>		<b>Name</b>	
	B00200		B-2 Defensive Management System: Modifications	(Shared)
Air Force	3010	07	0101127F	
	<b>Line Item</b>		<b>Name</b>	
	B00200		B-2 Defensive Management System: Depot Activation	(Shared)
Air Force	3010	05	0101127F	
	<b>Line Item</b>		<b>Name</b>	
	B2DMS0		B-2 Defensive Management System: Modifications	

## Cost and Funding

### Cost Summary

Total Acquisition Cost							
Appropriation	BY 2016 \$M			BY 2016 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	1821.9	1821.9	2004.1	2119.8 <sup>1</sup>	1846.2	1846.2	2191.9
Procurement	734.3	734.3	807.7	731.7	838.3	838.3	860.0
Flyaway	--	--	--	620.3	--	--	729.3
Recurring	--	--	--	620.3	--	--	729.3
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	111.4	--	--	130.7
Other Support	--	--	--	25.4	--	--	30.3
Initial Spares	--	--	--	86.0	--	--	100.4
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2556.2	2556.2	N/A	2851.5	2684.5	2684.5	3051.9

<sup>1</sup> APB Breach

#### Current APB Cost Estimate Reference

B-2 DMS Mod SCP dated October 02, 2015

#### Cost Notes

A cost and schedule breach program deviation report is in process and will be followed by APB update.

If an Independent Cost Estimate, Component Cost Estimate, or Program Office Estimate has been completed for the program in the previous year, list any program risks identified in the estimates, the potential impacts of the risks on program cost, and approaches to mitigate the risks. Received a new SCP on June 4, 2018.

Risks to the program are as follows:

- If PD7.1 software development does not maintain required manpower to execute necessary velocity to certify incremental software releases as scheduled in the revised software plan, then the software development critical path effort will impact when capabilities can be flight tested and ultimately impact the completion of flight test. No cost impact due to Firm Fixed Price contract.
- If developmental flight test window schedule is delayed due to reduced software availability, then program execution schedule will be delayed. However, current program funding contains sufficient flight test risk dollars to complete engineering and manufacturing development.

Total Quantity				
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate	
RDT&E	4	4	4	4
Procurement	16	16	16	16
Total	20	20	20	20

## Cost and Funding

### Funding Summary

Appropriation Summary									
FY 2020 President's Budget / December 2018 SAR (TY\$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	1416.2	244.4	294.4	164.6	72.1	0.2	0.0	0.0	2191.9
Procurement	0.0	0.0	0.0	328.5	367.4	81.8	64.2	18.1	860.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2020 Total	1416.2	244.4	294.4	493.1	439.5	82.0	64.2	18.1	3051.9
PB 2019 Total	1461.9	261.8	415.5	410.4	107.5	109.5	0.0	0.0	2766.6
Delta	-45.7	-17.4	-121.1	82.7	332.0	-27.5	64.2	18.1	285.3

Quantity Summary										
FY 2020 President's Budget / December 2018 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	4	0	0	0	0	0	0	0	0	4
Production	0	0	0	0	3	6	5	2	0	16
PB 2020 Total	4	0	0	0	3	6	5	2	0	20
PB 2019 Total	4	0	0	6	10	0	0	0	0	20
Delta	0	0	0	-6	-7	6	5	2	0	0

## Cost and Funding

### Annual Funding By Appropriation

Annual Funding							
3600   RDT&E   Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2011	--	--	--	--	--	--	85.2
2012	--	--	--	--	--	--	46.8
2013	--	--	--	--	--	--	249.8
2014	--	--	--	--	--	--	249.0
2015	--	--	--	--	--	--	95.4
2016	--	--	--	--	--	--	262.7
2017	--	--	--	--	--	--	278.4
2018	--	--	--	--	--	--	148.9
2019	--	--	--	--	--	--	244.4
2020	--	--	--	--	--	--	294.4
2021	--	--	--	--	--	--	164.6
2022	--	--	--	--	--	--	72.1
2023	--	--	--	--	--	--	0.2
Subtotal	4	--	--	--	--	--	2191.9

Annual Funding							
3600   RDT&E   Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2016 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2011	--	--	--	--	--	--	90.5
2012	--	--	--	--	--	--	48.9
2013	--	--	--	--	--	--	256.5
2014	--	--	--	--	--	--	252.1
2015	--	--	--	--	--	--	95.6
2016	--	--	--	--	--	--	259.5
2017	--	--	--	--	--	--	269.5
2018	--	--	--	--	--	--	141.2
2019	--	--	--	--	--	--	227.2
2020	--	--	--	--	--	--	268.3
2021	--	--	--	--	--	--	147.1
2022	--	--	--	--	--	--	63.2
2023	--	--	--	--	--	--	0.2
Subtotal	4	--	--	--	--	--	2119.8

Annual Funding								
3010   Procurement   Aircraft Procurement, Air Force								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2021	3	285.2	--	--	285.2	43.3	328.5	
2022	6	294.6	--	--	294.6	72.8	367.4	
2023	5	67.2	--	--	67.2	14.6	81.8	
2024	2	64.2	--	--	64.2	--	64.2	
2025	--	18.1	--	--	18.1	--	18.1	
Subtotal	16	729.3	--	--	729.3	130.7	860.0	

Annual Funding								
3010   Procurement   Aircraft Procurement, Air Force								
Fiscal Year	Quantity	BY 2016 \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2021	3	247.1	--	--	247.1	37.5	284.6	
2022	6	250.3	--	--	250.3	61.8	312.1	
2023	5	56.0	--	--	56.0	12.1	68.1	
2024	2	52.4	--	--	52.4	--	52.4	
2025	--	14.5	--	--	14.5	--	14.5	
Subtotal	16	620.3	--	--	620.3	111.4	731.7	



Cost Quantity Information		
3010   Procurement   Aircraft Procurement, Air Force		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2016 \$M
2021	3	116.3
2022	6	232.6
2023	5	193.8
2024	2	77.6
2025	--	--
Subtotal	16	620.3

## Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
<b>Approval Date</b>	3/24/2016	3/24/2016
<b>Approved Quantity</b>	6	6
<b>Reference</b>	Milestone B ADM	Milestone B ADM
<b>Start Year</b>	2020	2020
<b>End Year</b>	2020	2020

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the B-2 being a small fleet of only 20 aircraft. The need for six kits during LRIP is based on lessons learned and factors experienced during other B-2 development and production programs (i.e., Radar Modernization and Extremely High Frequency).

## **Foreign Military Sales**

None

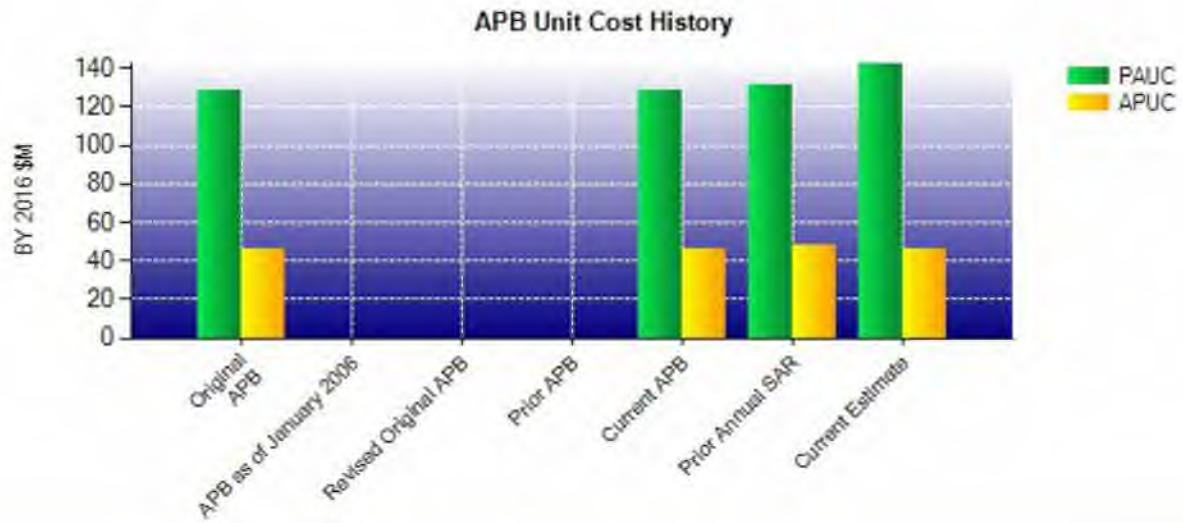
## **Nuclear Costs**

None

**Unit Cost**

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 \$M	BY 2016 \$M	% Change
	Current UCR Baseline (May 2016 APB)	Current Estimate (Dec 2018 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	2556.2	2851.5	
Quantity	20	20	
Unit Cost	127.810	<b>142.575<sup>1</sup></b>	+11.55
<b>Average Procurement Unit Cost</b>			
Cost	734.3	731.7	
Quantity	16	16	
Unit Cost	45.894	45.731	-0.36
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 \$M	BY 2016 \$M	% Change
	Original UCR Baseline (May 2016 APB)	Current Estimate (Dec 2018 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	2556.2	2851.5	
Quantity	20	20	
Unit Cost	127.810	142.575	+11.55
<b>Average Procurement Unit Cost</b>			
Cost	734.3	731.7	
Quantity	16	16	
Unit Cost	45.894	45.731	-0.36

<sup>1</sup> APB Unit Cost Breach



APB Unit Cost History					
Item	Date	BY 2016 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	May 2016	127.810	45.894	134.225	52.394
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	May 2016	127.810	45.894	134.225	52.394
Prior Annual SAR	Dec 2017	131.200	48.412	138.330	55.381
Current Estimate	Dec 2018	142.575	45.731	152.595	53.750

### SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
134.225	0.540	0.000	0.000	18.150	5.770	0.000	-6.090	18.370	152.595

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
52.394	0.262	0.000	0.000	0.000	8.706	0.000	-7.612	1.356	53.750

<b>SAR Baseline History</b>				
<b>Item</b>	<b>SAR Planning Estimate</b>	<b>SAR Development Estimate</b>	<b>SAR Production Estimate</b>	<b>Current Estimate</b>
Milestone A	N/A	Aug 2011	N/A	Aug 2011
Milestone B	N/A	Mar 2016	N/A	Mar 2016
Milestone C	N/A	Dec 2019	N/A	Jun 2020
IOC	N/A	Dec 2021	N/A	Jun 2022
Total Cost (TY \$M)	N/A	2684.5	N/A	3051.9
Total Quantity	N/A	20	N/A	20
PAUC	N/A	134.225	N/A	152.595

**Cost Variance**

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1846.2	838.3	--	2684.5
Previous Changes				
Economic	-0.1	-4.5	--	-4.6
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+34.4	+219.3	--	+253.7
Other	--	--	--	--
Support	--	-167.0	--	-167.0
<b>Subtotal</b>	<b>+34.3</b>	<b>+47.8</b>	<b>--</b>	<b>+82.1</b>
Current Changes				
Economic	+6.7	+8.7	--	+15.4
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+363.0	--	--	+363.0
Estimating	-58.3	-80.0	--	-138.3
Other	--	--	--	--
Support	--	+45.2	--	+45.2
<b>Subtotal</b>	<b>+311.4</b>	<b>-26.1</b>	<b>--</b>	<b>+285.3</b>
<b>Total Changes</b>	<b>+345.7</b>	<b>+21.7</b>	<b>--</b>	<b>+367.4</b>
CE - Cost Variance	2191.9	860.0	--	3051.9
CE - Cost & Funding	2191.9	860.0	--	3051.9

Summary BY 2016 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1821.9	734.3	--	2556.2
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+27.5	+187.8	--	+215.3
Other	--	--	--	--
Support	--	-147.5	--	-147.5
Subtotal	+27.5	+40.3	--	+67.8
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+325.8	--	--	+325.8
Estimating	-55.4	-81.6	--	-137.0
Other	--	--	--	--
Support	--	+38.7	--	+38.7
Subtotal	+270.4	-42.9	--	+227.5
Total Changes	+297.9	-2.6	--	+295.3
CE - Cost Variance	2119.8	731.7	--	2851.5
CE - Cost & Funding	2119.8	731.7	--	2851.5

Previous Estimate: December 2017



RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+6.7
New Engineering Change due to increase scope and capability to align to the updated June 4, 2018 SCP. (Engineering)	+325.8	+363.0
Revised Estimate due to Congressional mark in FY 2018-FY 2019. (Estimating)	-46.0	-48.7
Revised Estimate due to Small Business Innovative Research and MDAP Penalty in FY 2018-FY 2019. (Estimating)	-13.5	-14.4
Revised Estimate in FY 2020-FY 2022 to align to the updated June 4, 2018 SCP. (Estimating)	+9.0	+10.0
Adjustment for current and prior escalation. (Estimating)	-4.9	-5.2
<b>RDT&amp;E Subtotal</b>	<b>+270.4</b>	<b>+311.4</b>

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+8.7
Revised Estimate in FY 2020-FY 2025 to align to the updated June 4, 2018 SCP. (Estimating)	-81.6	-80.0
Decrease in Other Support to align to the updated June 4, 2018 SCP. (Support)	-8.5	-9.5
Increase in Initial Spares to align to the updated June 4, 2018 SCP. (Support)	+47.2	+54.7
<b>Procurement Subtotal</b>	<b>-42.9</b>	<b>-26.1</b>

## Contracts

### Contract Identification

**Appropriation:** RDT&E  
**Contract Name:** FAST II Delivery Order: EMD DMS-M  
**Contractor:** Northrop Grumman Corporation Aerospace Systems  
**Contractor Location:** 3520 E. Avenue M  
 Palmdale, CA 93550  
**Contract Number:** FA8616-14-D-6060/2  
**Contract Type:** Firm Fixed Price (FFP), Cost Plus Fixed Fee (CPFF)  
**Award Date:** May 24, 2017  
**Definitization Date:**

### Contract Price

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
741.0	N/A	0	741.0	N/A	0	741.0	741.0

### Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP/CPFF) contract.

### General Contract Variance Explanation

Cost and schedule variance are not reported for this contract because no EVM reporting is required on a FFP contract. EVM reporting will begin with flight test for the CPFF portion of the contract.

## Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	4	0.00%
Production	0	0	16	0.00%
Total Program Quantity Delivered	0	0	20	0.00%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	3051.9	Years Appropriated	9
Expended to Date	1271.6	Percent Years Appropriated	60.00%
Percent Expended	41.67%	Appropriated to Date	1660.6
Total Funding Years	15	Percent Appropriated	54.41%

The above data is current as of March 22, 2019.

## 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:

B-2 DMS-M O&S costs are not included in the APB or SAR per direction of the MDA. The associated O&S cost is included and tracked at the overall B-2 system level. Per signed ADM, B-2 DMS-M O&S costs are estimated to be less than 1% of the total B-2 fleet O&S costs.

### Sustainment Strategy

### Antecedent Information

Annual O&S Costs BY2016 \$M		
Cost Element	B-2 DMS-M	No Antecedent (Antecedent)
Unit-Level Manpower	--	--
Unit Operations	--	--
Maintenance	--	--
Sustaining Support	--	--
Continuing System Improvements	--	--
Indirect Support	--	--
Other	--	--
Total	--	--

Item	Total O&S Cost \$M			
	B-2 DMS-M		No Antecedent (Antecedent)	
	Current Development APB Objective/Threshold	Current Estimate		
Base Year	0.0	0.0	0.0	0.0
Then Year	0.0	N/A	0.0	0.0

### O&S Cost Variance

Category	BY 2016 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 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 2016 \$M):