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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force **Date:** February 2018

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605931F / <i>B-2 Defensive Management System</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	988.971	278.437	194.570	261.758	0.000	261.758	135.684	20.654	0.180	0.184	0.000	1,880.438
653844: <i>B-2 DMS</i>	988.971	278.437	194.570	261.758	0.000	261.758	135.684	20.654	0.180	0.184	0.000	1,880.438
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 431

A. Mission Description and Budget Item Justification

The Defensive Management System Modernization (DMS-M) program enhances the B-2 direct attack capability by addressing emerging and future 21st century threats and robust modern Integrated Air Defense Systems (IADS). By leveraging "state-of-the-art" electronic warfare antennae, processors, controllers and displays, B-2 aircrews will realize unprecedented situational battlespace awareness and dynamic, real-time threat avoidance in the most complex radio frequency emitter environments. The inherent increased sensitivity of the modernized DMS over the legacy system, with increased processing power, will build a battlespace picture that could be shared with joint force platforms by on-board communication systems. The current B-2 DMS was designed in the 1980s and has not received any upgrades to date. Also, many components of the legacy DMS are not supportable and will severely impact aircraft availability without significant investment in reliability and maintainability upgrades.

During development, the engineering baseline will be finalized and four production representative kits will be procured to support integrated development/operational test and a pre-Milestone C Operational Assessment, as well as B-2 Nuclear Certification testing. Diminishing manufacturing sources and materiel shortages for affected components and subassemblies, will be addressed to protect the planned production program by mitigating unplanned part redesign and requalification risks.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver B-2 DMS-M weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	315.615	194.570	213.844	0.000	213.844
Current President's Budget	278.437	194.570	261.758	0.000	261.758
Total Adjustments	-37.178	0.000	47.914	0.000	47.914
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-26.600	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-10.578	0.000			
• Other Adjustments	0.000	0.000	47.914	0.000	47.914

Change Summary Explanation

FY 2017 reduction was a Congressional reduction of \$26.600M due to excess funding in EMD, and \$10.578M for SBIR reductions. FY 2019 increased \$47.914M due to program delays; DMS-M production funding was reduced by the same amount in FY 2019.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
Title: B-2 Defensive Management System Modernization (DMS-M) EMD	278.437	194.570	261.758
Description: DMS Modernization program develops improved aircrew situational awareness through replacement of passive antennas, receiver/processors, and display processors. DMS-M also addresses critical system shortfalls, and improves legacy DMS component repair issues.			
FY 2018 Plans: Hold system CDR and start modification and instrumentation of the test aircraft.			
FY 2019 Plans: Continue working EMD efforts, complete PD7.1 software certification and begin ground/flight test.			
FY 2018 to FY 2019 Increase/Decrease Statement: B-2 DMS-M funding increased from FY 2018 to FY 2019 in accordance with program execution. FY 2018 had previously been reduced based on funds early to need.			
Accomplishments/Planned Programs Subtotals	278.437	194.570	261.758

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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item b2dms0: <i>B-2 DMS</i>	-	-	0.000	-	0.000	278.263	362.507	79.517	80.962	0.000	801.249
• APAF 06 Line Items 000999: <i>Acft Initial Spares & Repairs</i>	-	-	-	-	-	-	14.831	15.129	15.404	0.000	45.364
• APAF 07 Line Item 000075: <i>Other Production Charges</i>	-	-	-	-	-	1.503	12.418	12.665	12.895	0.000	39.481

Remarks

E. Acquisition Strategy

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman) who will perform subsystem and component competitions where appropriate, use of Firm Fixed Price (FFP) development contract, and the combination of developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations. The government will encourage the prime contractor to compete subsystems and key components to reduce cost and risk.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force **Date:** February 2018

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605931F / B-2 Defensive Management System	Project (Number/Name) 653844 / B-2 DMS
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Air Vehicle - Technology Development	SS/CPFF	Various : Various, NV	726.260	-		-		-		-		-	0.000	726.260	-
Air Vehicle - Engineering and Manufacturing Development (EMD)	SS/FFP	Various : Various, NV	221.648	255.438	Dec 2016	162.771	Oct 2017	199.925	Oct 2018	-		199.925	83.626	923.408	-
Subtotal			947.908	255.438		162.771		199.925		-		199.925	83.626	1,649.668	N/A

Remarks
 Northrop-Grumman, El Segundo, CA is the prime contractor and integrator.

 The Air Vehicle EMD contract was signed in March 2016 with an early effective date of February 2016.

 Major subsystem vendors are:
 Electronic Support Measures: BAE, Nashua NH
 Advanced Graphics Processor: Lockheed-Martin, Owego, NY
 Band 1 - 3 antennas: Randtron, Menlo Park CA
 Band 4 antenna: Ball Aerospace, Westminster, CO

 The acquisition phase formerly known as Technology Development (TD) is now referred to as Technology Maturation and Risk Reduction (TMRR)

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Trainers	C/CPIF	WPAFB : Dayton, OH	-	-		6.500	Dec 2017	15.000	Oct 2018	-		15.000	24.663	46.163	-
Mission Planning	C/CPIF	Hanscom : Boston, MA	-	-		5.203	Nov 2017	16.406	Feb 2019	-		16.406	4.391	26.000	-
Subtotal			-	-		11.703		31.406		-		31.406	29.054	72.163	N/A

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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Test	MIPR	AFFTC : Various, NV	8.364	13.062	Jan 2017	8.139	Oct 2017	11.107	Oct 2018	-		11.107	37.065	77.737	-
Subtotal			8.364	13.062		8.139		11.107		-		11.107	37.065	77.737	N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA	Various	Various : Various, NV	32.699	9.937	Dec 2016	11.957	Nov 2017	19.320	Nov 2018	-		19.320	6.957	80.870	-
Subtotal			32.699	9.937		11.957		19.320		-		19.320	6.957	80.870	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	988.971	278.437	194.570	261.758	-	261.758	156.702	1,880.438	N/A

Remarks
Northrop-Grumman, the prime contractor for the B-2 weapon system, is the integrator and major contractor for B-2 DMS activities.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force Date: February 2018

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FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

B-2 DMS	
DMS-M EMD	[Redacted]
DMS-M Critical Design Review	[Redacted]
DMS-M Combined Developmental Test / Operational Test (DT/OT)	[Redacted]
DMS-M Milestone C - Low Rate Initial Production (LRIP) Decision	[Redacted]
DMS-M Full Rate Production (FRP) Decision	[Redacted]
DMS-M Certification of Airworthiness	[Redacted]

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605931F / <i>B-2 Defensive Management System</i>	Project (Number/Name) 653844 / <i>B-2 DMS</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>B-2 DMS</i>				
DMS-M EMD	1	2017	1	2021
DMS-M Critical Design Review	4	2018	4	2018
DMS-M Combined Developmental Test / Operational Test (DT/OT)	4	2019	1	2021
DMS-M Milestone C - Low Rate Initial Production (LRIP) Decision	3	2020	3	2020
DMS-M Full Rate Production (FRP) Decision	1	2021	1	2021
DMS-M Certification of Airworthiness	2	2021	3	2022