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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Air Force **Date:** February 2020

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	605.292	50.728	55.384	51.799	0.000	51.799	54.993	50.485	32.037	68.185	97.894	1,066.797
673777: <i>AMRAAM</i>	605.292	50.728	55.384	51.799	0.000	51.799	54.993	50.485	32.037	68.185	97.894	1,066.797
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 185

**A. Mission Description and Budget Item Justification**

The Air Force and Navy continue to develop improvements to the Advanced Medium Range Air-to-Air Missile (AMRAAM) to counter existing and emerging air vehicle threats operating at high or low altitude, and having advanced Electronic Attack (EA) capabilities. The development program also enables AMRAAM compatibility with advanced fighters, enhances AMRAAM capability and operational flexibility against current and projected threats, incorporates high payoff technology development, performs risk reduction activities, and investigates new variants and/or alternate missions that may use AMRAAM attributes. The latest AMRAAM variant, the AIM-120D, delivers improved performance via Global Positioning System (GPS)-aided navigation; two-way datalink capability for enhanced aircrew survivability and improved network compatibility; and incorporates new guidance software that improves kinematic performance and weapon effectiveness. Operational Testing (OT) was completed in Jul 14 and the Air Force and Navy authorized operational fielding in Jan 15. The Navy declared Initial Operational Capability (IOC) in Jan 15 and the Air Force declared IOC in Jul 15. The program continues to address aircraft integration efforts to maintain compatibility/performance of the missile with changes occurring on threshold AMRAAM platforms per the Capability Production Document (CPD). To keep the existing inventory as effective as possible and address findings from the field, the Air Force and Navy also develop, test, and field improvements that are implemented via software upgrades reprogrammed into fielded AMRAAMs, and/or hardware upgrades inserted into production units. AMRAAM is a joint Air Force/Navy, Acquisition Category IC (ACAT IC) program with Air Force as lead service.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AMRAAM weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	57.293	55.384	52.794	0.000	52.794
Current President's Budget	50.728	55.384	51.799	0.000	51.799
Total Adjustments	-6.565	0.000	-0.995	0.000	-0.995
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-4.741	0.000			
• SBIR/STTR Transfer	-1.824	0.000			
• Other Adjustments	0.000	0.000	-0.995	0.000	-0.995
 <b>Change Summary Explanation</b>					
FY 2019 reduction of \$4.741M for higher Air Force Priorities					
FY 2019 reduction of \$1.824M for SBIR					
FY 2021 reduction of \$0.995M for decreased development activities					

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> System Improvement Program (SIP)	27.201	30.096	27.323
<b>Description:</b> Continuation of System Improvement Program (SIP) / Risk Reduction (RR) efforts for the AMRAAM weapons system. These include systems engineering, program management, missile software and/or hardware upgrades to increase capability, survivability, lethality, as well as aircraft Operational Flight Program (OFP) updates on a recurring basis.			
<b>FY 2020 Plans:</b> Continue SIP-3 Engineering and Manufacturing Development (EMD), and conduct a Functional Configuration Audit (FCA) and Operational Test Readiness Review (OTRR) to begin Operational Test (OT). Begin SIP-3F software development on the AIM-120D3 missile hardware configuration. Continue SIP-4 RR and early software development builds. Continue the AIM-120 Candidate Selection Process (CSP) to analyze warfighters' priority deficiencies and enhancements. Continue AIM-120C3-C7 software development to address emerging threats.			
<b>FY 2021 Plans:</b>			

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Complete SIP-3 OT and deliver the tactical AIM-120D software to the field. Continue SIP-3F software development builds and complete SIP-4 RR to mature software for the AIM-120D3 (F3R) configuration. Continue the AIM-120 CSP to analyze warfighters' priority deficiencies and enhancements. Continue AIM-120C3-C7 software development to address emerging threats. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreased due to completion of SIP-3 EMD.				
<b>Title:</b> Test and Evaluation <b>Description:</b> Provides support to Developmental Testing/Operational Testing (DT/OT); develops test resources and equipment necessary to complete DT/OT events; provides contractor field team support personnel and services. <b>FY 2020 Plans:</b> Continue to develop new test resources and provide support personnel necessary to meet AIM-120 DT/OT test requirements. <b>FY 2021 Plans:</b> Continue to develop new test resources and provide support personnel necessary to meet AIM-120 DT/OT test requirements. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreased due to end of Developmental Test for SIP 3 EMD.		19.788	20.578	19.402
<b>Title:</b> Aircraft Integration <b>Description:</b> Supports the integration of AIM-120 on multiple aircraft platforms as AIM-120 and/or software and hardware is updated. <b>FY 2020 Plans:</b> Continue integration and testing of AIM-120 on multiple aircraft platforms. <b>FY 2021 Plans:</b> Continue integration and testing of AIM-120 on multiple aircraft platforms. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding increased due to inflation indices applied to program office estimate.		3.739	4.710	5.074
<b>Accomplishments/Planned Programs Subtotals</b>		50.728	55.384	51.799

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

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• MPAF 02 Line Item MAMRA0: <i>Missile Procurement, Air Force</i>	307.486	311.730	453.223	-	453.223	406.999	444.464	454.837	597.133	305.747	3,281.619
• MPAF 04 Line Item 000999: <i>Initial Spares/Repair Parts</i>	0.023	0.529	2.091	-	2.091	3.049	3.087	2.211	2.251	2.296	15.537
• MPAF 04 Line Item 000999 <i>Replen: Replen Spares/Repair Parts</i>	0.839	0.854	0.868	-	0.868	0.886	0.902	0.918	0.935	0.954	7.156
• MPAF 02 Line Item 2206: <i>Weapons Procurement, Navy</i>	188.441	211.827	326.952	-	326.952	344.998	363.244	227.255	240.051	0.000	1,902.768
• RDTE 07 Line Item 0981: <i>RDTE, Navy</i>	27.698	34.191	44.323	-	44.323	33.258	25.599	26.121	26.151	80.542	297.883

**Remarks**

**E. Acquisition Strategy**

System Improvement Program (SIP) is underway as part of the AIM-120 missile upgrade program. SIP-2 fielding planned for 3QFY20. SIP-3 EMD is a Cost Plus Incentive Fee (CPIF) effort that was awarded in Sep 17 and primarily incorporates Electronic Protection Improvement Program (EPIP) Advanced software capabilities in the AIM-120D. SIP-3 fielding is planned for 4QFY21. SIP-4 RR is a Cost Plus Fixed Fee (CPFF) effort that was awarded in May 19. SIP 4 Development planned to begin 4QFY21.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
3600 / 7				PE 0207163F / Advanced Medium Range Air-to-Air Missile (AMRAAM)						673777 / AMRAAM					
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Electronic Protection Improvement Program (EPIP)	Various	Raytheon : Tucson, AZ	86.959	-		-		-		-		-	0.000	86.959	86.959
System Improvement Program (SIP)	Various	Raytheon : Tucson, AZ	183.460	26.143	Jun 2019	28.270	Jun 2020	26.163	Jun 2021	-		26.163	126.030	390.066	382.104
F-22 Aircraft Integration	MIPR	Wright-Patterson AFB : Dayton, OH	114.890	-		-		-		-		-	0.000	114.890	114.890
Aircraft Integration Support	SS/CPFF	Raytheon : Tucson, AZ	10.530	3.739	May 2019	4.710	May 2020	5.074	May 2021	-		5.074	29.440	53.493	56.746
<b>Subtotal</b>			395.839	29.882		32.980		31.237		-		31.237	155.470	645.408	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Test	Various	Various : Various	79.510	4.199	Jan 2019	8.630	Jan 2020	6.306	Jan 2021	-		6.306	43.772	142.417	136.151
Test Support	SS/CPFF	Raytheon : Various	114.128	15.589	Jan 2019	11.948	Jan 2020	13.096	Jan 2021	-		13.096	92.411	247.172	245.425
<b>Subtotal</b>			193.638	19.788		20.578		19.402		-		19.402	136.183	389.589	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : Various	15.815	1.058	Jan 2019	1.826	Jan 2020	1.160	Jan 2021	-		1.160	11.940	31.799	37.706
<b>Subtotal</b>			15.815	1.058		1.826		1.160		-		1.160	11.940	31.799	N/A
<b>Project Cost Totals</b>			605.292	50.728		55.384		51.799		-		51.799	303.593	1,066.796	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Air Force</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / AMRAAM

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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>AMRAAM Development Program</b>																												
AIM-120D SIP-2 EMD																												
AIM-120D SIP-2 IOC																												
AIM-120D SIP-3 EMD																												
AIM-120D SIP-3 FCA																												
AIM-120D SIP-3 IOC																												
AIM-120D SIP-3F Development																												
AIM-120D SIP-3F FCA																												
AIM-120D SIP-3F IOC																												
AIM-120D SIP-4 RR																												
AIM-120D SIP-4 Development																												
AIM-120D SIP-4 FCA																												
AIM-120D SIP-4 IOC																												
AIM-120D SIP-5 Development																												
EPIP Advanced Tape 2 IOC																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Air Force		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / <i>AMRAAM</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>AMRAAM Development Program</i></b>				
AIM-120D SIP-2 EMD	1	2019	3	2020
AIM-120D SIP-2 IOC	3	2020	3	2020
AIM-120D SIP-3 EMD	1	2019	4	2021
AIM-120D SIP-3 FCA	3	2020	3	2020
AIM-120D SIP-3 IOC	4	2021	4	2021
AIM-120D SIP-3F Development	2	2020	1	2023
AIM-120D SIP-3F FCA	2	2022	2	2022
AIM-120D SIP-3F IOC	1	2023	1	2023
AIM-120D SIP-4 RR	3	2019	4	2021
AIM-120D SIP-4 Development	4	2021	3	2025
AIM-120D SIP-4 FCA	3	2024	3	2024
AIM-120D SIP-4 IOC	3	2025	3	2025
AIM-120D SIP-5 Development	2	2024	4	2025
EPIP Advanced Tape 2 IOC	2	2019	2	2019

**Note**

Actual Dates:

SIP-2 EMD began 03 Jul 2015  
 SIP-3 EMD began 05 Sep 2017  
 SIP-5 Development ends 3QFY27