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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Air Force	<b>Date:</b> February 2018
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<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>I Advanced Medium Range Air-to-Air Missile (AMRAAM)</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	502.562	53.320	61.322	61.393	0.000	61.393	65.965	67.114	68.508	69.756	21.800	971.740
673777: <i>AMRAAM</i>	502.562	53.320	61.322	61.393	0.000	61.393	65.965	67.114	68.508	69.756	21.800	971.740
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 which 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 which 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 Capability Production Document (CPD). To keep the existing inventory as effective as possible, 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 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.

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. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	62.470	61.322	65.254	0.000	65.254
Current President's Budget	53.320	61.322	61.393	0.000	61.393
Total Adjustments	-9.150	0.000	-3.861	0.000	-3.861
• 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	-7.207	0.000			
• SBIR/STTR Transfer	-1.943	0.000			
• Other Adjustments	0.000	0.000	-3.861	0.000	-3.861
Change Summary Explanation					
FY17 changes consist of -\$7.207M of below threshold reprogrammings to higher Air Force priorities and \$1.943M for Small Business Innovative Research (SBIR)					
FY19 adjustment of -\$3.861M for better program phasing					
C. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: System Improvement Program (SIP) / Electronic Protection Improvement Program (EPIP)	35.223	23.755	35.179	-	35.179
Description: Provide system improvements/electronic protection improvements					
FY 2018 Plans:					
1. EPIP Advanced: Conduct Tape 2 dedicated OT live fire shots, complete residual OT tasks, and field Tape 2 EPIP Advanced capability improvements in AIM-120C-7 missiles (Tape 9 Rev 6).					
2. AIM-120D SIP: Complete SIP-2 Functional Configuration Audit (FCA) and begin support of dedicated OT. Begin SIP-3 captive testing of development software builds and continue EMD to Critical Design Review (CDR). Continue the AIM-120D SIP Candidate Selection Process to analyze solutions to the warfighters' priority deficiencies, develop enhancements, and integrate solutions.					
FY 2019 Base Plans:					
1. EPIP Advanced: Support Advanced EPIP fielding recommendation.					
2. AIM-120D SIP: Complete SIP-2 OT and support USAF and USN fielding decisions. Continue SIP-3 EMD to include Developmental Testing (DT) of SIP-3 incremental software builds. Begin SIP-4 Technology					

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Maturation and Risk Reduction (TMRR) and conduct a System Requirements Review. Continue the AIM-120D SIP Candidate Selection Process to analyze solutions of the warfighters' priority deficiencies and enhancements. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Budget increase due to SIP 4 starting in FY19.						
<b>Title:</b> Test and Evaluation  <b>Description:</b> Test and evaluation; Provides support to Developmental Testing/Operational Testing (DT/OT); Develop test resources equipment necessary to complete DT/OT events; Provide field team support personnel and services  <b>FY 2018 Plans:</b> Continue infrastructure investments to support AIM-120D SIP and AEPIP DT/OT activities. Develop new test equipment necessary to meet SIP-3 and beyond requirements. Procurement of a new dual variant AMRAAM Captive Equipment (ACE) pod in support of flight test. Provide support personnel and test resources to complete AEPIP OT. Continue to provide support personnel and test resources to complete AIM-120D SIP DT and OT events.  <b>FY 2019 Base Plans:</b> Continue infrastructure investments to support AIM-120D SIP, AEPIP and Form, Fit, and Function (F3R) DT/OT activities. Continue to develop new equipment necessary to meet SIP-3 and beyond requirements. Provide support personnel and test resources to complete the AEPIP program and support a fielding recommendation. Continue to provide support personnel and test resources to complete AIM-120D SIP DT and OT events.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Budget decreased as spike in FY18 was due to a one time purchase of a dual variant ACE pod.		16.281	33.067	21.314	-	21.314
<b>Title:</b> Aircraft Integration  <b>Description:</b> Aircraft Integration - Integrate AIM-120D on multiple aircraft platforms  <b>FY 2018 Plans:</b> Continue integration and testing of AIM-120D on multiple threshold aircraft platforms.  <b>FY 2019 Base Plans:</b>		1.816	4.500	4.900	-	4.900

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C. Accomplishments/Planned Programs (\$ in Millions)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue integration and testing of AIM-120D on multiple threshold aircraft platforms.														
FY 2018 to FY 2019 Increase/Decrease Statement: Budget increase due to increased costs associated with bench test support of new F3R capability.														
Accomplishments/Planned Programs Subtotals										53.320	61.322	61.393	-	61.393
D. Other Program Funding Summary (\$ in Millions)														
Line Item	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			
• MPAF 02 Line Item MAMRA0: Missile Procurement, Air Force	325.944	304.327	337.886	-	337.886	392.150	464.324	421.970	425.182	1,443.786	4,115.569			
• MPAF 04 Line Item 000999: Initial Spares/Repair Parts	1.793	2.067	2.023	-	2.023	2.060	2.094	2.136	2.175	6.849	21.197			
• MPAF 04 Line Item 000999 Replen: Replen Spares/Repair Parts	0.707	0.834	0.839	-	0.839	0.854	0.869	0.887	0.903	2.843	8.736			
• MPAF 02 Line Item 2206: Weapons Procurement, Navy	197.229	197.109	211.058	1.183	212.241	284.895	348.246	359.433	367.486	385.083	2,351.722			
• RDTE 07 Line Item 0981: RDTE, Navy	34.010	25.364	32.473	-	32.473	35.853	38.499	29.394	26.866	49.446	271.905			
Remarks														
E. Acquisition Strategy														
The EPIP Advanced program is underway to keep AIM-120C missiles capable against the growing electronic attack threat environment. This effort was awarded in Jun 12 as a Cost Plus Fixed Fee (CPFF) with performance awards. This development effort is planned for completion in Mar 18.														
System Improvement Program (SIP) is underway as part of the AIM 120D missile upgrade program. SIP Increment 1 (SIP-1) was a CPFF effort to improve baseline AIM-120D capabilities and was fielded in May 17. SIP-2 EMD, which incorporates basic EPIP in the AIM-120D, was awarded in Jul 15. This Cost Plus Incentive Fee (CPIF) effort was awarded for 40 months. SIP-3 TMRR was awarded in Sep 15 as a 19-month CPFF effort, completing in Jul 17. SIP-3 EMD was awarded in Sep 17 and primarily incorporates AEPIP software capabilities in the AIM-120D.														
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 / 7						R-1 Program Element (Number/Name) PE 0207163F / Advanced Medium Range Air-to-Air Missile (AMRAAM)				Project (Number/Name) 673777 / AMRAAM					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
System Improvement Program (SIP)/Electronic Protection (EP)	SS/CPFF	Raytheon : Tucson, AZ	218.683	33.952	Jun 2017	21.714	Jun 2018	33.082	Jun 2019	-		33.082	191.348	498.779	498.779
F-22 Aircraft Integration	MIPR	Wright-Patterson AFB : Dayton, OH	114.890	-		-		-		-		-	0.000	114.890	114.890
RMS Aircraft Integration	SS/CPFF	Raytheon : Tucson, AZ	6.662	1.815	May 2017	4.500	May 2018	4.900	May 2019	-		4.900	26.000	43.877	43.877
Subtotal			340.235	35.767		26.214		37.982		-		37.982	217.348	657.546	N/A
Remarks SIP/EP Cost Plus Fixed Fee (CPFF) software development design implementation contracts include incentive events which must be achieved in order to earn full fixed fee amount.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	65.371	4.220	Jan 2017	9.882	Jan 2018	7.154	Jan 2019	-		7.154	25.855	112.482	112.482
RMS Test	SS/CPFF	Raytheon : Various	83.523	12.062	Jan 2017	23.185	Jan 2018	14.160	Jan 2019	-		14.160	42.450	175.380	175.380
Subtotal			148.894	16.282		33.067		21.314		-		21.314	68.305	287.862	N/A
Remarks Various = T&E activities take place at numerous locations across the US. Too many activities and locations to list.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	13.433	1.271	Jan 2017	2.041	Jan 2018	2.097	Jan 2019	-		2.097	7.490	26.332	26.332
Subtotal			13.433	1.271		2.041		2.097		-		2.097	7.490	26.332	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force											Date: February 2018				
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207163F / Advanced Medium Range Air-to-Air Missile (AMRAAM)					Project (Number/Name) 673777 / AMRAAM					
			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			502.562	53.320		61.322		61.393		-		61.393	293.143	971.740	N/A

Remarks

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2019 Air Force			<b>Date:</b> February 2018		
<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 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>AMRAAM Development Program</b>																												
AIM-120D SIP-1 IOC																												
AIM-120D SIP-2 EMD																												
AIM-120D SIP-2 IOC																												
AIM-120D SIP-3 TMRR																												
AIM-120D SIP-3 EMD																												
AIM-120D SIP-3 CDR																												
AIM-120D SIP-3 IOC																												
AIM-120D SIP-4 TMRR																												
AIM-120D SIP-4 EMD																												
AIM-120D SIP-4 CDR																												
EPIP Adv Tape 2 IOC																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207163F / Advanced Medium Range Air-to-Air Missile (AMRAAM)	Project (Number/Name) 673777 / AMRAAM	

## Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>AMRAAM Development Program</b>				
AIM-120D SIP-1 IOC	3	2017	3	2017
AIM-120D SIP-2 EMD	1	2017	4	2019
AIM-120D SIP-2 IOC	4	2019	4	2019
AIM-120D SIP-3 TMRR	1	2017	4	2017
AIM-120D SIP-3 EMD	4	2017	4	2021
AIM-120D SIP-3 CDR	4	2018	4	2018
AIM-120D SIP-3 IOC	4	2021	4	2021
AIM-120D SIP-4 TMRR	1	2019	2	2021
AIM-120D SIP-4 EMD	3	2021	4	2023
AIM-120D SIP-4 CDR	2	2022	2	2022
EPIP Adv Tape 2 IOC	3	2019	3	2019

### Note

Actual Dates:

SIP-1 IOC occurred 02 May 2017  
 SIP-2 EMD began 03 Jul 2015  
 SIP-3 TMRR began 30 Sep 2015  
 SIP-3 EMD began 05 Sep 2017