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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0207163F <i>I Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	555.883	51.374	57.293	55.384	0.000	55.384	52.794	65.576	46.476	71.012	145.665	1,101.457
673777: <i>AMRAAM</i>	555.883	51.374	57.293	55.384	0.000	55.384	52.794	65.576	46.476	71.012	145.665	1,101.457
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Program MDAP/MAIS Code: 185												
<p>A. Mission Description and Budget Item Justification</p> <p>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.</p> <p>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, 0605833F, and 0605898F.</p> <p>As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.</p> <p>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.</p>												

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B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	61.322	61.393	65.965	0.000	65.965
Current President's Budget	51.374	57.293	55.384	0.000	55.384
Total Adjustments	-9.948	-4.100	-10.581	0.000	-10.581
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-4.100			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-8.040	0.000			
• SBIR/STTR Transfer	-1.908	0.000			
• Other Adjustments	0.000	0.000	-10.581	0.000	-10.581
Change Summary Explanation					
FY18 reduction of \$1.908M for SBIR and \$8.040M for Below Threshold Reprogramming (BTR) activities to higher Air Force priorities.					
FY19 reduction of \$4.100M due to Congressional mark.					
FY20 reduction of \$10.581M for higher Air Force priorities.					
C. Accomplishments/Planned Programs (\$ in Millions)			FY 2018	FY 2019	FY 2020
Title: System Improvement Program (SIP) / Electronic Protection Improvement Program (EPIP)			21.238	31.329	32.137
Description: Provide system and electronic protection improvements to ensure inventory effectiveness.					
FY 2019 Plans:					
1. Advanced EPIP: 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 Risk Reduction (RR) and conduct a System Requirements Review. Continue the AIM-120D SIP Candidate Selection Process (CSP) to analyze solutions of the warfighters' priority deficiencies and enhancements.					
FY 2020 Plans:					
1. AIM-120D SIP: Continue SIP-3 EMD, and conduct a Functional Configuration Audit and Operational Test Readiness Review (OTRR) to begin OT. Award the contract to begin SIP-3F, which is the re-host of SIP-3 software on the Form, Fit, and Function					

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
Refresh (F3R) missile hardware configuration. Continue SIP-4 RR and conduct a System Functional Review. Continue the AIM-120D SIP CSP to analyze solutions of the warfighters' priority deficiencies and enhancements. FY 2019 to FY 2020 Increase/Decrease Statement: FY19 budget included one-time cost to increase program footprint/seating via relocatable, temporary equipment to support workforce and management of programs. FY20 budget increase due to SIP-3F starting.				
Title: Test and Evaluation Description: 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. FY 2019 Plans: Continue to develop new test equipment necessary to meet SIP-3 and beyond requirements. Continue to provide support personnel and test resources to complete AIM-120 DT and OT events. Continue infrastructure investments to support AIM-120D SIP, Advanced EPIP and F3R DT/OT activities. FY 2020 Plans: Continue to develop new test equipment necessary to meet SIP-3 and beyond requirements. Continue to provide support personnel and test resources to complete AIM-120 DT and OT events. Continue infrastructure investments to support AIM-120D SIP and F3R DT/OT activities. FY 2019 to FY 2020 Increase/Decrease Statement: Budget decrease due to completing SIP-2 DT/OT in FY19.		28.083	23.476	18.997
Title: Aircraft Integration Description: Supports the integration of AIM-120D on multiple aircraft platforms as AIM-120D and/or software and hardware is updated. FY 2019 Plans: Continue integration and testing of AIM-120D on multiple threshold aircraft platforms. FY 2020 Plans: Continue integration and testing of AIM-120D on multiple threshold aircraft platforms. FY 2019 to FY 2020 Increase/Decrease Statement: Budget increase due to training curriculum updates.		2.053	2.488	4.250
Accomplishments/Planned Programs Subtotals		51.374	57.293	55.384

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D. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost	
• MPAF 02 Line Item MAMRA0: Missile Procurement, Air Force	264.327	307.486	332.250	-	332.250	461.724	438.070	470.882	455.956	1,203.122	3,933.817	
• MPAF 04 Line Item 000999: Initial Spares/Repair Parts	2.067	2.023	0.529	-	0.529	2.094	3.052	3.091	2.214	4.571	19.641	
• MPAF 04 Line Item 000999 Replen: Replen Spares/Repair Parts	0.834	0.839	0.854	-	0.854	0.869	0.887	0.903	0.919	1.914	8.019	
• MPAF 02 Line Item 2206: Weapons Procurement, Navy	185.285	188.441	224.502	-	224.502	354.160	359.358	367.390	374.737	0.000	2,053.873	
• RDTE 07 Line Item 0981: RDTE, Navy	29.486	28.235	39.029	-	39.029	37.319	28.190	25.622	26.133	49.446	263.460	
Remarks												
E. Acquisition Strategy												
The Advanced Electronic Protection Improvement Program (EPIP) 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 was completed in Mar 18 with IOC planned for 3QFY19.												
System Improvement Program (SIP) is underway as part of the AIM-120D missile upgrade program. SIP-2 EMD, which incorporates basic EPIP in the AIM-120D is a Cost Plus Incentive Fee (CPIF) contract that was awarded in Jul 15 and completed software development in Jul 18. SIP-3 TMRR is a CPFF contract that was awarded in Sep 15 and completed in Jul 17. SIP-3 EMD is a CPIF effort that was awarded in Sep 17 and primarily incorporates Advanced EPIP software capabilities in the AIM-120D. SIP-3 EMD completion is planned for 4QFY21. SIP-4 RR is planned to award in 3QFY19.												
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 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>						Project (Number/Name) 673777 / <i>AMRAAM</i>			
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	87.736	-		-		-		-		-	0.000	87.736	87.736
System Improvement Program (SIP)	Various	Raytheon : Tucson, AZ	164.588	20.058	Jun 2018	23.128	Jun 2019	30.899	Jun 2020	-		30.899	143.510	382.183	382.183
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	8.477	2.053	May 2018	2.488	May 2019	4.250	May 2020	-		4.250	32.570	49.838	49.838
Subtotal			375.691	22.111		25.616		35.149		-		35.149	176.080	634.647	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	69.797	5.495	Jan 2018	12.885	Jan 2019	5.968	Jan 2020	-		5.968	84.899	179.044	179.044
RMS Test	SS/CPFF	Raytheon : Various	95.700	22.588	Jan 2018	10.591	Jan 2019	13.029	Jan 2020	-		13.029	104.600	246.508	246.508
Subtotal			165.497	28.083		23.476		18.997		-		18.997	189.499	425.552	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	14.695	1.180	Jan 2018	8.201	Jan 2019	1.238	Jan 2020	-		1.238	13.510	38.824	38.824
Subtotal			14.695	1.180		8.201		1.238		-		1.238	13.510	38.824	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			555.883	51.374		57.293		55.384		-		55.384	379.089	1,099.023	N/A

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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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks										

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force			Date: February 2019		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>			Project (Number/Name) 673777 / AMRAAM

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
AMRAAM Development Program																												
AIM-120D SIP-2 EMD																												
AIM-120D SIP-2 IOC																												
AIM-120D SIP-3 EMD																												
AIM-120D SIP-3 CDR																												
AIM-120D SIP-3 IOC																												
AIM-120D SIP-3F																												
AIM-120D SIP-4 RR																												
AIM-120D SIP-4 EMD																												
AIM-120D SIP-4 IDR																												
EPIP Adv Tape 2 IOC																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force			Date: February 2019
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>AMRAAM Development Program</i>				
AIM-120D SIP-2 EMD	1	2018	1	2020
AIM-120D SIP-2 IOC	1	2020	1	2020
AIM-120D SIP-3 EMD	1	2018	4	2021
AIM-120D SIP-3 CDR	4	2018	4	2018
AIM-120D SIP-3 IOC	4	2021	4	2021
AIM-120D SIP-3F	2	2020	1	2023
AIM-120D SIP-4 RR	2	2019	3	2021
AIM-120D SIP-4 EMD	3	2021	4	2024
AIM-120D SIP-4 IDR	2	2022	2	2022
EPIP Adv Tape 2 IOC	3	2019	3	2019

Note

Actual Dates:

SIP-2 EMD began 03 Jul 2015
 SIP-3 EMD began 05 Sep 2017
 SIP-4 EMD ends 3QFY25