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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0207163N / AMRAAM
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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	222.750	27.698	34.191	44.323	-	44.323	33.258	25.599	26.121	26.151	80.542	520.633
0981: AMRAAM	222.750	27.698	34.191	44.323	-	44.323	33.258	25.599	26.121	26.151	80.542	520.633

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 185

A. Mission Description and Budget Item Justification

This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the Advanced Medium Range Air-to-Air Missile (AMRAAM) into Navy aircraft with analysis of Navy unique applications, aircraft missile integration tasks, product improvement efforts including missile software upgrade development and procurement of hardware to support Navy test and evaluation tasks. The development program 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. To maximize effectiveness of existing inventory and address findings from the field, the Navy and Air Force also develop, test, and field improvements, via software upgrades, into fielded missiles. Funding in FY 2021 through FY 2025 supports Navy unique Test & Evaluation for fielding of improved capability via System Improvement Program (SIP).

This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	28.235	39.029	37.319	-	37.319
Current President's Budget	27.698	34.191	44.323	-	44.323
Total Adjustments	-0.537	-4.838	7.004	-	7.004
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-4.838			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.537	0.000			
• Program Adjustments	0.000	0.000	8.400	-	8.400
• Rate/Misc Adjustments	0.000	0.000	-1.396	-	-1.396

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<u>Change Summary Explanation</u> The FY 2021 funding request was increased by \$8.4 million to improve missile and aircraft interface (\$4.350 million) and develop software solutions for AIM-120C3-C7 to improve missile performance against a rapidly advancing threat (\$4.050 million). The program was reduced by \$1.396 million in FY 2021 for rate and other miscellaneous adjustments. Technical: FY 2021 includes funding for improved missile performance at longer range, increased survivability, improved lethality via System Improvement Program (SIP) efforts through software development, simulation and test efforts and 5th generation aerial target emulation efforts. Zone Acquisition Process (ZAP) interface improvements are incorporated into System Improvement Program (SIP) efforts to ensure new capabilities are available upon software update fielding. Schedule: Due to AMRAAM production Lot 33 (FY19) prolonged negotiations required to achieve contract award coupled with Raytheon Missile Systems (RMS) personnel resource constraints, RMS has been unable to provide the required Cost and Pricing data to perform the Lot 34 Proposal Technical Evaluation. This submission delay has caused the anticipated Contract award to slip from 2QFY20 to 1QFY21.		

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy **Date:** February 2020

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0207163N / AMRAAM	Project (Number/Name) 0981 / AMRAAM
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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
0981: AMRAAM	222.750	27.698	34.191	44.323	-	44.323	33.258	25.599	26.121	26.151	80.542	520.633
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 185

A. Mission Description and Budget Item Justification

This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the Advanced Medium Range Air-to-Air Missile (AMRAAM) into Navy aircraft with analysis of Navy unique applications, aircraft missile integration tasks, product improvement efforts including missile software upgrade development and procurement of hardware to support Navy test and evaluation tasks. Funding in FY 2020 through FY 2025 supports Navy unique Test & Evaluation for Navy fielding of improved capability via SIP.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: Test and Evaluation</p> <p align="right">Articles:</p> <p>Description: Test and Evaluation (T&E) and associated governmental support required to ensure AIM-120 missile integration with US Navy aircraft platforms (F/A-18 C/D/E/F/G, AV-8B and F-35). Increased funding in FY21 is required due to additional flight test requirements and Hardware-in-the Loop Facility efforts to support 5th generation aerial target emulation.</p> <p>FY 2020 Plans: Field SIP-2 in 1QFY20. Execute SIP-3 IT and provide necessary documentation and test results for DT/OT transition report. Support SIP 3F development activities. Support SIP-4 Risk Reduction activities. Continue to provide test support to complete AIM-120D SIP DT and OT events. Continue to evaluate and address 5th generation aerial target emulation.</p> <p>FY 2021 Base Plans: Continue to develop and procure test resources required to meet test requirements and provide support personnel to complete AIM-120 DT and OT events. Increase evaluation efforts to address 5th generation aerial target emulation.</p> <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>	8.653	14.212	16.623	0.000	16.623
	-	-	-	-	-

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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0207163N / AMRAAM	Project (Number/Name) 0981 / AMRAAM
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Increase in FY21 is to support 5th generation aerial target emulation efforts.					
<p>Title: System Improvement Program (SIP) Efforts</p> <p align="right">Articles:</p> <p>Description: 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 Profile updates on a recurring basis. Electronic Protection Improvement Program (EPIP) Advanced Tape 1 and Tape 2 capability improvements on the C7 missile variant will be incorporated into AIM-120D SIP-2 and 3 software updates. AIM-120D SIP-3 software will be re-hosted in AIM-120D3 hardware as part of SIP-3F. SIP-4 will exploit new Form, Fit, Function (F3R) hardware to maximize missile performance. AIM-120C3-C7 software will address an emerging threat.</p> <p>FY 2020 Plans: Complete SIP-3 development efforts to include SIP-3 Integrated Test (IT). Complete SIP-3 Functional Configuration Audit (FCA) and support dedicated OT. Continue SIP-4 TMRR and AIM-120D SIP candidate selection process to analyze solutions for warfighter's deficiencies and enhancements. Begin SIP3F development to host SIP-3 software on AIM-120D3 hardware. Continue AIM-120C3-C7 software development to address emerging threat.</p> <p>FY 2021 Base Plans: Complete SIP-3 OT and deliver the tactical AIM-120D software to the field. Continue SIP-3F software builds and complete SIP-4 RR to mature software for the AIM-120D3 (F3R) configuration. Continue the AIM-120 Candidate Selection Process (CSP) to analyze warfighter's priority deficiencies and enhancements. Continue AIM-120C3-C7 software development to address emerging threat.</p> <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase in FY21 is to address missile to aircraft interface improvements and development of software solutions to improve missile performance against a rapidly advancing threat.</p>	19.045	19.979	27.700	0.000	27.700
	-	-	-	-	-
Accomplishments/Planned Programs Subtotals	27.698	34.191	44.323	0.000	44.323

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• WPN/ 2206: AMRAAM	188.441	211.827	326.952	-	326.952	344.998	363.244	227.255	240.051	0.000	4,629.278
• MPAF/3479: AMRAAM	307.486	332.250	453.672	-	453.672	407.370	444.931	455.315	598.000	305.747	12,949.153
• RDTE,AF/673777: AMRAAM	50.728	55.384	51.799	-	51.799	54.993	50.485	32.037	68.185	88.086	1,058.954

Remarks

D. Acquisition Strategy

AMRAAM production procurements will continue across the FYDP with periodic pre-planned technical design refreshes and value engineering change proposals.

AMRAAM's Acquisition Program Baseline (APB) was updated on 28 Oct 2015.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 7				PE 0207163N / AMRAAM				0981 / 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
Primary Hdw Development (EGLIN)	SS/CPAF	RAYTHEON COMPANY : Tucson AZ	94.038	15.538	Jan 2019	16.317	Jan 2020	22.883	Jan 2021	-		22.883	121.584	270.360	275.180
Award Fees (EGLIN)	SS/CPAF	RAYTHEON COMPANY : Tucson AZ	15.099	2.742	Jan 2019	2.880	Jan 2020	4.038	Jan 2021	-		4.038	21.458	46.217	47.065
Primary Hdw Development (NAWCAD)	WR	NAWCAD : Patuxent River MD	4.310	0.272	Nov 2018	0.277	Nov 2019	0.314	Nov 2020	-		0.314	2.367	7.540	-
Prior Years Dev Cost no longer funded in the FYDP	Various	Various : Various	32.477	0.000		0.000		0.000		-		0.000	0.000	32.477	-
Subtotal			145.924	18.552		19.474		27.235		-		27.235	145.409	356.594	N/A
Support (\$ 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
Prior Years Support costs no longer funded in the FYDP	Various	Various : Various	23.795	0.000		0.000		0.000		-		0.000	0.000	23.795	-
Subtotal			23.795	0.000		0.000		0.000		-		0.000	0.000	23.795	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
Dev Test & Eval (NAWCWD)	WR	NAWCWD : China Lake CA	43.531	7.440	Nov 2018	13.199	Nov 2019	15.591	Nov 2020	-		15.591	36.757	116.518	-
Oper Test & Eval	WR	COMOPTEVFOR : Norfolk, VA	1.606	1.213	Mar 2019	1.013	Mar 2020	1.032	Mar 2021	-		1.032	7.796	12.660	-
Subtotal			45.137	8.653		14.212		16.623		-		16.623	44.553	129.178	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy

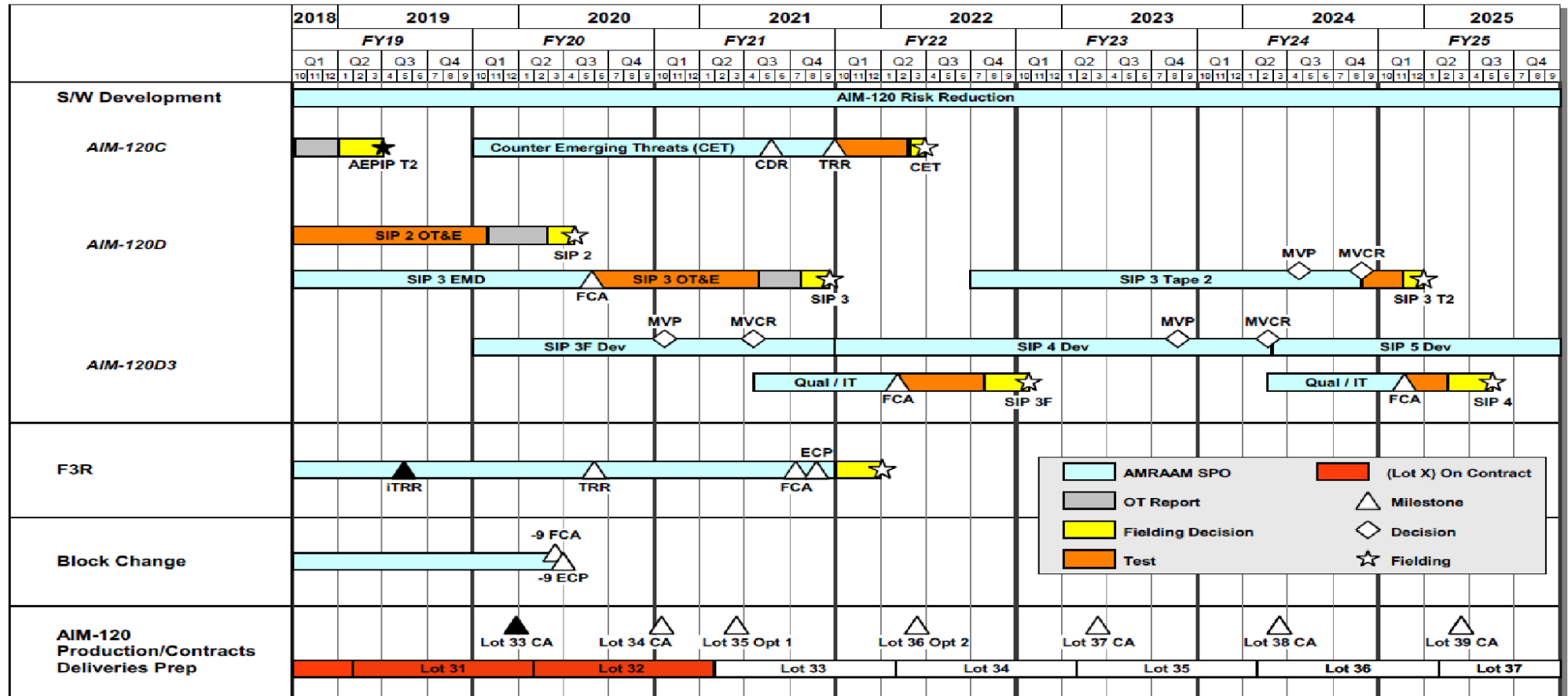
Date: February 2020

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0207163N / AMRAAM

Project (Number/Name)
0981 / AMRAAM

AMRAAM Program Schedule



Agile Terminology IAW DODI 5000.02: MVP = Minimum Viable Product
MVCR = Minimum Viable Capability Release

Baseline: 1 Oct 2019
Approved: 1 Jan 2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0207163N / AMRAAM	Project (Number/Name) 0981 / AMRAAM

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AMRAAM				
Acquisition Milestones: Milestones: SIP 2 AIM-120D IOC	3	2020	3	2020
Acquisition Milestones: Milestones: SIP 3 AIM-120D IOC	4	2021	4	2021
Acquisition Milestones: Milestones: SIP3F AIM-120D3 IOC	1	2023	1	2023
Acquisition Milestones: Milestones: EPIP Advanced AIM-120C7 IOC Tape 2	3	2019	3	2019
Systems Development: Software Development: SIP-2 Development	1	2019	3	2020
Systems Development: Software Development: SIP-3 Development	1	2019	4	2021
Systems Development: Software Development: SIP-3F Development	1	2020	1	2021
Systems Development: Software Development: SIP-4 Development	1	2022	2	2024
Systems Development: Software Development: SIP-5 Development	2	2024	4	2025
Systems Development: Software Development: Electronic Protection Improvement Program AIM-120C	1	2019	3	2019
Test and Evaluation: SIP 2	1	2019	3	2020
Test and Evaluation: SIP 3	1	2019	4	2021
Test and Evaluation: SIP 3F	3	2021	1	2023
Test and Evaluation: SIP-4	2	2024	3	2025
Test and Evaluation: 5th Generation Target Emulation	1	2019	2	2022
Production Contract Awards: Production Lot 33 Contract Award	1	2020	1	2020
Production Contract Awards: Production Lot 34 Contract Award	1	2021	1	2021
Production Contract Awards: Production Lot 35 Contract Award	2	2021	2	2021
Production Contract Awards: Production Lot 36 Contract Award	2	2022	2	2022
Production Contract Awards: Production Lot 37 Contract Award	2	2023	2	2023
Production Contract Awards: Production Lot 38 Contract Award	2	2024	2	2024

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy **Date:** February 2020

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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Production Contract Awards: Production Lot 39 Contract Award	2	2025	2	2025
Production Deliveries: Production Lot 31 AUR	2	2019	2	2020
Production Deliveries: Production Lot 32 AUR	2	2020	2	2021
Production Deliveries: Production Lot 33 AUR	2	2021	2	2022
Production Deliveries: Production Lot 34 AUR	2	2022	2	2023
Production Deliveries: Production Lot 35 AUR	2	2023	2	2024
Production Deliveries: Production Lot 36 AUR	2	2024	2	2025
Production Deliveries: Production Lot 37 AUR	2	2025	4	2025