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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 0205601N / <i>Harm Improvement</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	882.054	116.881	132.371	146.166	-	146.166	137.899	80.170	44.602	22.756	Continuing	Continuing
1780: <i>HARM Improvement</i>	58.120	6.220	7.105	6.335	-	6.335	7.404	7.384	7.245	7.473	Continuing	Continuing
2185: <i>AARGM</i>	736.608	14.771	11.677	11.191	-	11.191	4.788	4.878	4.971	5.058	0.000	793.942
2189: <i>AARGM ER</i>	87.326	95.890	113.589	128.640	-	128.640	125.707	67.908	32.386	10.225	0.000	661.671

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 607

A. Mission Description and Budget Item Justification

Research, Development, Test and Evaluation funding for the Joint Service Anti-Radiation Missile (ARM) program, which will include near and far term performance improvements, cost reduction, and studies that establish future development requirements. Specific initial efforts include lower cost seeker component development and seeker aided fuzing to enhance warhead performance in low angle impacts and against certain ship targets.

JUSTIFICATION FOR BUDGET ACTIVITY: These projects are funded under Operational Systems Development because they include 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	120.762	138.431	67.887	-	67.887
Current President's Budget	116.881	132.371	146.166	-	146.166
Total Adjustments	-3.881	-6.060	78.279	-	78.279
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-6.060			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.881	0.000			
• Program Adjustments	0.000	0.000	78.483	-	78.483
• Rate/Misc Adjustments	0.000	0.000	-0.204	-	-0.204

Change Summary Explanation

Project Unit 1780: The FY 2021 funding request was reduced by \$0.717M to account for the availability of prior year execution balances.

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Project Unit 2185: FY 2021 funding decrease is due to the phasing of M Code development and Software Development efforts.

Project Unit 2189: FY 2021 funding increase of \$79.2M is due to the ramp up of Engineering and Manufacturing Development and Developmental Test and Evaluation to support aircraft integration testing, rocket motor preliminary flight rating qualification, weapon software development and store separation testing.

Acquisition Milestones: Knowledge Point 5 changed from 2nd QTR 2022 to 1st QTR 2023.
Test and Evaluation: Developmental T&E changed from starting 3rd QTR 2020 to 4th QTR 2019. Operational T&E changed from starting 2nd QTR 2023 to 4th QTR 2022.

FY 2020 Congressional reduction of \$6.060M to the AARGM-ER program due to test schedule discrepancy.

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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 0205601N / <i>Harm Improvement</i>				Project (Number/Name) 1780 / <i>HARM Improvement</i>			
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
1780: <i>HARM Improvement</i>	58.120	6.220	7.105	6.335	-	6.335	7.404	7.384	7.245	7.473	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Anti-Radiation Missile (ARM) Improvement is a combination of the Navy-led High Speed Anti-Radiation Missile (HARM) program, the Advanced Anti-Radiation Guide Missile (AARGM) program and the Advanced Anti Radiation Guided Missile Extended Range (AARGM -ER). The HARM program has undergone several Engineering Change Plans since ceasing production in 1983. Currently, the inventory consists of AGM-88B/C missiles with Block 5/A software which provides increased capability tracking emitters, improved targeting against a larger set of air defense related systems and an improved seeker. HARM is a Navy led joint service program with the United States Air Force. AARGM is a program derived from a Small Business Innovative Research (SBIR) program that developed a dual mode guidance section, incorporating a Millimeter Wave (MMW) radar with an advanced anti-radiation homing seeker. This provides the capability to counter shutdown of emitters. Additional capability for AARGM consists of Global Positioning System (GPS) capability, MMW terminal guidance, Weapon Impact Assessment (WIA), GPS point-to-point weapon engagement and impact avoidance zone/missile impact zones. AARGM -ER is a derivative of the AARGM program that utilizes the seeker electronics and repackages them into a new missile shape with a new rocket motor to achieve greater speed and range.

ARM Improvement efforts require periodic updates to the user database based on changing threat parameters, enhanced air defense engagement tactics and modern complex emerging systems. These funds provide the opportunity to conduct ground and flight testing against foreign systems, to build MMW radar shapes and modern complex emitters and systems, called Foreign Material Assessment (FMA). The result of FMA is an analytical report on findings, updates to fleet tactics manuals, curriculum changes to the Suppression of Enemy Air Defenses / Destruction of Enemy Air Defenses lead Air Combat Training Curriculum course work and weapon school tactics/training and procedure briefs. FMA is focused on air defense weapon system and non-traditional target set exploitation, analysis and subsequent integration and response to ensure that the AGM-88 ARM weapon systems family remains relevant in the planned operational environment.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: ARM Foreign Material Assessment (FMA)	6.220	7.105	6.335	0.000	6.335
Articles:	-	-	-	-	-
FY 2020 Plans:					
The FMA team will continue to conduct FMA testing (both ground-based and captive flight testing), data analysis, and systems engineering to maximize ARM Family of weapons effectiveness against threat air defense systems in FY 2020. The expanded capabilities of the AARGM and AARGM -ER from the legacy HARM will take advantage of the additional lab capabilities to compliment already existing HARM lab capabilities. This will enable digital Anti-Radiation Homing (ARH) seeker and Millimeter Wave (MMW) terminal seeker assessment, which are unique capabilities to AARGM and AARGM-ER. FMA assessments will remain focused on new modern complex threat systems as they become available for evaluation as well as theater/country-specific					

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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 1780 / <i>HARM Improvement</i>
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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
<p>systems of interest. Priorities are coordinated through the Fleet ARM Steering Committee. Expect continued testing and evaluation on advanced Surface-to-Air weapons and related IADS, jammers, ARM countermeasures, and non-traditional ARM targets. Fleet engagement will continue as a key element of testing, engineering, and analytical efforts, which includes funding for threat assessment, operational updates, and integration efforts. Additional test priorities include characterizing new modern complex systems in the field, so that FMA assessments can directly populate missile threat data libraries with updated attributes to enhance track quality for the ARM family of weapons along with continued assessment of special projects developmental improvements against foreign material.</p> <p><i>FY 2021 Base Plans:</i> The FMA team will continue to conduct FMA testing (both ground-based and captive flight testing), data analysis, and systems engineering to maximize ARM family of weapons effectiveness against threat air defense systems in FY 2021. The expanded capabilities of the AARGM and AARGM -ER from the legacy HARM will take advantage of the additional lab capabilities to compliment already existing HARM lab capabilities. This will enable digital Anti-Radiation Homing (ARH) seeker and Millimeter Wave (MMW) terminal seeker assessment which are unique capabilities to AARGM and AARGM-ER. FMA assessments will remain focused on new modern complex threat systems as they become available for evaluation as well as theater/country-specific systems of interest. Priorities are coordinated through the Fleet ARM Steering Committee. Expect continued testing and evaluation on advanced Surface-to-Air weapons and related IADS, jammers, ARM countermeasures, and non-traditional ARM targets. Fleet engagement will continue as a key element of testing, engineering, and analytical efforts, which includes funding for threat assessment, operational updates, and integration efforts. Additional test priorities include characterizing new modern complex systems in the field, so that FMA assessments can directly populate missile threat data libraries with updated attributes to enhance track quality for ARM family of weapons along with continued assessment of special projects developmental improvements against foreign material.</p> <p><i>FY 2021 OCO Plans:</i> N/A</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Project Code 1780: Reduced to account for under execution mark.</p>					
Accomplishments/Planned Programs Subtotals	6.220	7.105	6.335	0.000	6.335

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

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

Remarks

D. Acquisition Strategy

ARM system updates are provided through the System Support Activity (SSA) at Naval Air Warfare Center - Weapons Division (NAWCWD), China Lake, CA. ARM fleet priorities are set by the Fleet ARM Steering Committee.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Systems Engineering	WR	NAWCWD : China Lake, CA	8.628	1.668	Nov 2018	1.679	Nov 2019	1.789	Nov 2020	-		1.789	Continuing	Continuing	Continuing
Systems Engineering	Various	Various : Various	0.300	0.300	Jul 2019	0.306	Jul 2020	0.312	Nov 2020	-		0.312	Continuing	Continuing	Continuing
Prior Year Prod Dev no longer funded in FYDP	Various	Various : Various	24.732	0.000		0.000		0.000		-		0.000	0.000	24.732	-
Subtotal			33.660	1.968		1.985		2.101		-		2.101	Continuing	Continuing	N/A

Remarks
FY 2021 funding supports manpower required for data collection and analysis resulting from field testing.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Developmental Test & Eval	WR	NAWCWD : China Lake, CA	5.153	4.057	Nov 2018	4.921	Nov 2019	4.031	Nov 2020	-		4.031	Continuing	Continuing	Continuing
Prior Year Dev T&E no longer funded in FYDP	Various	Various : Various	18.701	0.000		0.000		0.000		-		0.000	0.000	18.701	-
Subtotal			23.854	4.057		4.921		4.031		-		4.031	Continuing	Continuing	N/A

Remarks
FY 2021 funding supports field testing and increased laboratory testing enabled by previous investments in AARGM laboratory capabilities.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Program Management Support	WR	NAWCAD : Patuxent River, MD	0.185	0.185	Nov 2018	0.189	Nov 2019	0.193	Nov 2020	-		0.193	Continuing	Continuing	Continuing
Travel	WR	Various : Various	0.421	0.010	Oct 2018	0.010	Oct 2019	0.010	Oct 2020	-		0.010	Continuing	Continuing	Continuing
Subtotal			0.606	0.195		0.199		0.203		-		0.203	Continuing	Continuing	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 0205601N / Harm Improvement	Project (Number/Name) 1780 / HARM Improvement
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PU-1780 Funding	FY19				FY20				FY21				FY22				FY23				FY24				FY25																																						
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Systems Development	Air Defense Unit System Report																																																														
	Lab Development																																																														
Test & Evaluation	ARM Flight Testing																																																														
	ARM Ground Testing																																																														
Deliveries																																																															
	<p>Tactics Manual Updates</p>																																																														
	<p>User Data File Update</p>																																																														

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 1780 / <i>HARM Improvement</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>HARM IMPROVEMENT</i>				
Systems Development: Air Defense Unit System Report: Air Defense Unit System Report	1	2019	4	2025
Systems Development: Lab Development: Lab Development	1	2019	4	2025
Test & Evaluation: ARM Flight Testing: Flight Testing FY 2019	1	2019	4	2025
Test & Evaluation: ARM Ground Testing: Ground Testing FY 2019	1	2019	4	2025
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2019	4	2019	4	2019
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2020	4	2020	4	2020
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2021	4	2021	4	2021
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2022	4	2022	4	2022
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2023	4	2023	4	2023
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2024	4	2024	4	2024
Deliveries: Tactics Manual Update: Tactics Manual Update FY 2025	4	2025	4	2025
Deliveries: User Data File Update: User Data File Update FY 2019	4	2019	4	2019
Deliveries: User Data File Update: User Data File Update FY 2020	4	2020	4	2020
Deliveries: User Data File Update: User Data File Update FY 2021	4	2021	4	2021
Deliveries: User Data File Update: User Data File Update FY 2022	4	2022	4	2022
Deliveries: User Data File Update: User Data File Update FY 2023	4	2023	4	2023
Deliveries: User Data File Update: User Data File Update FY 2024	4	2024	4	2024
Deliveries: User Data File Update: User Data File Update FY 2025	4	2025	4	2025

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Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0205601N / <i>Harm Improvement</i>				Project (Number/Name) 2185 / <i>AARGM</i>			
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
2185: <i>AARGM</i>	736.608	14.771	11.677	11.191	-	11.191	4.788	4.878	4.971	5.058	0.000	793.942
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Anti-Radiation Guided Missile (AARGM) transitioned a Phase III Small Business Innovation Research (SBIR) program to develop and demonstrate a multi-mode guidance section on a High Speed Anti-Radiation Missile (HARM) airframe to System Development and Demonstration (SD&D) in FY 2003. The AARGM SD&D program was designed to integrate multi-mode guidance (passive Anti-Radiation Homing (ARH)/active Millimeter Wave (MMW) Radar/Global Positioning System (GPS)/Inertial Navigation System) on the HARM Air-to-Ground Missile (AGM)-88. Planned AARGM weapon system capabilities include: active MMW terminal guidance to counter shutdown, expanded threat coverage, enhanced ARH, Weapon Impact Assessment (WIA) transmitted prior to detonation, GPS/point-to-point weapon navigation, enhanced navigational performance in denied environments and weapon employment with impact avoidance zone/missile impact zones.

The AARGM program includes 40 SD&D test articles with follow on production modification kits. Milestone C was achieved 4Q FY 2008, followed by a combined FY 2008/FY 2009 Low Rate Initial Production (LRIP) contract award in 1Q FY 2009. Developmental testing was completed in 2009. Initial Operational Test and Evaluation (IOT&E) was completed in 3Q FY 2012. Full-Rate Production (FRP) decision was received 4 September 2012 with FRP contract award on 10 September 2012, and deliveries began in January 2014.

The AARGM Block 1 Upgrade program began in FY 2012 and consists of a software only upgrade to implement deferred Key Performance Parameter 3 and to correct IOT&E deficiencies in the AGM-88E All-Up-Round as well as the Common Munitions Built-in Test (BIT) Reprogramming Equipment (CMBRE).

Follow-on Operational Test and Evaluation/Integrated Test (FOT&E/IT) of the Block 1 Upgrade completed with Fleet Release approval in July 2017 and fielding complete in January 2018.

In FY 2021 - FY 2025, the AARGM program plans to continue to develop and demonstrate the capability to engage and destroy non-traditional and Overseas Contingency Operations targets. These developments continue Future Naval Capability Science and Technology investments by the Office of Naval Research initiated in FY 2006. Over this same timeframe, the AARGM program will develop or enhance navigational capability in denied environments.

FY 2021 funding continues to support AARGM's advanced development and system capability upgrades. Additional funding will support the implementation of GPS M Code, AARGM Derivative Program and upgrades to the radio frequency data processing to meet emerging requirements

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Threat Data Library / System Updates	1.200	1.224	1.246	0.000	1.246
Articles:	-	-	-	-	-

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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
<p><i>FY 2020 Plans:</i> AGM-88E continues effort to upgrade and prioritize Electronic Intelligence files. Continue test and assessment of threat systems that impact already fielded weapons and to develop threat data for new target sets. Plans also include continued development or enhancement of navigational capability, and human system interface improvements to mission planning.</p> <p><i>FY 2021 Base Plans:</i> AGM-88E will continue efforts to upgrade and prioritize Electronic Intelligence files. Continue test and assessment of threat systems that impact already fielded weapons and to develop threat data for new target sets. Plans also include continued development or enhancement of navigational capability, integration of modernized Anti-Radiation Homing processor, expect continued testing and evaluation on advanced Surface-to-Air weapons and related IADS, jammers, and ARM countermeasures, and non-traditional ARM targets and human system interface improvements to mission planning.</p> <p><i>FY 2021 OCO Plans:</i> N/A</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Project Unit 2185: FY2020 to FY2021 increase due to continuation of Threat Data Library/System Updates.</p>					
<p><i>Title:</i> Follow-on Test and Evaluation and Correction of Deficiencies</p> <p align="right"><i>Articles:</i></p> <p><i>FY 2020 Plans:</i> Continue to upgrade the system with test results to include developmental activity assessing software and hardware anomalies. Testing for those efforts in System Updates includes navigational T&E, processor performance evaluations, and includes verification and validation for E2 hardware changes and Block 1A testing.</p> <p><i>FY 2021 Base Plans:</i> Continue to upgrade the system with test results to include developmental activity assessing software and hardware anomalies. Testing for those efforts in System Updates includes navigational T&E, processor performance evaluations, and includes verification and validation of E2 Hardware and Block 1A testing.</p> <p><i>FY 2021 OCO Plans:</i> N/A</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></p>	0.484 -	0.494 -	0.504 -	0.000 -	0.504 -

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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
Project Unit 2185: FY2020 to FY2021 increase due to continued execution of AARGM Follow-on Test & Evaluation and Correction of Deficiencies efforts.					

Title: Advanced Development	13.087	9.959	9.441	0.000	9.441
Articles:	-	-	-	-	-

FY 2020 Plans:
Enhance navigational capability to comply with requirement to implement GPS M-Code to comply with U.S. Statute. Continue M Code Integration & Testing and continued upgrade of the radio frequency data processing to meet emerging requirements by updating the Block 1A missile software to add Complex Emitters, AARGM Derivative Program (ADP), GPS M-Code, and Reprogramming Capability. Funding supports the continued transition of receiver technology upgrades in coordination with the Office of Naval Research (ONR) project ALPO. Efforts specifically include testing, configuration control board reviews, test plan reviews, requirements analysis and weapons integration analysis. This project supports an upgraded AGM-88E capability against non-traditional and OCO targets. Effort in support of this requirement includes weapon system developmental activities, range and laboratory support and analysis. In FY 2020, the AARGM program plans to continue to develop and demonstrate the capability to engage and destroy non-traditional and Overseas Contingency Operations targets.

FY 2021 Base Plans:
Enhance navigational capability to comply with requirement to implement GPS M-Code to comply with U.S. Statute. Conclude M Code Integration & Testing and continued upgrade of the radio frequency data processing to meet emerging requirements by updating the Block 1A missile software to add Complex Emitters, AARGM Derivative Program (ADP), M-Code, and Reprogramming Capability. Funding supports the continued transition of receiver technology upgrades in coordination with the Office of Naval Research (ONR) project ALPO. Efforts specifically include testing, configuration control board reviews, test plan reviews, requirements analysis and weapons integration analysis. This project supports an upgraded AGM-88E capability against non-traditional and OCO targets. Effort in support of this requirement includes weapon system developmental activities, range and laboratory support and analysis. In FY 2021, the AARGM program plans to continue to develop and demonstrate the capability to engage and destroy non-traditional and Overseas Contingency Operations targets.

FY 2021 OCO Plans:
N/A

FY 2020 to FY 2021 Increase/Decrease Statement:

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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
Project Unit 2185: Decrease of funding from FY2020 to FY2021 is due to the phasing of M Code development and software development efforts.					
Accomplishments/Planned Programs Subtotals	14.771	11.677	11.191	0.000	11.191

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• WPN/2327: <i>HARM Mods</i>	179.885	183.740	86.052	-	86.052	51.553	52.590	53.636	54.706	0.000	1,684.700

Remarks

D. Acquisition Strategy

The AARGM program started as a Phase I Small Business Innovative Research (SBIR), Advanced Technology Program, evolved into a Phase III SBIR program, and transitioned into a System Development and Demonstration (SD&D) Acquisition Category 1C program in June 2003. The AARGM SD&D met most U.S. Navy operational requirements. AARGM Advanced Technology Development and Quick Bolt Advanced Concept Technology Demonstration demonstrated possible future system enhancements. AARGM Block 1 fulfills the rest of the operational requirements. Block 1 Fleet Release was approved in 4Q FY 2017. ONR Future Naval Capability AARGM Derivative Program (ADP) Program to transition in FY 2020-FY2021. Expand target set capability and add GPS M-code in FY 2018 - FY 2024.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Primary Hardware Development	SS/CPFF	Northrop Grumman Innovation Systems : Northridge, CA	9.049	0.000		0.000		0.000		-		0.000	0.000	9.049	9.049
Systems Engineering	WR	NAWCWD : China Lake, CA	85.527	1.016	Nov 2018	1.036	Nov 2019	1.028	Nov 2020	-		1.028	4.208	92.815	-
M Code	SS/IDIQ	Northrop Grumman Innovation Systems : Northridge, CA	1.000	0.900	Aug 2019	0.000		0.000		-		0.000	0.000	1.900	1.900
Software Development (Block 1A)	SS/IDIQ	Northrop Grumman Innovation Systems : Northridge, CA	1.026	7.800	Dec 2018	5.357	Dec 2019	4.903	Dec 2020	-		4.903	1.037	20.123	20.123
Software Development (Block 1A)	WR	NAWCWD : China Lake, CA	0.000	1.178	Apr 2019	1.423	Nov 2019	1.980	Nov 2020	-		1.980	2.056	6.637	-
Mission Planning	WR	Various : Various	0.933	0.100	Mar 2019	0.100	Mar 2020	0.100	Mar 2021	-		0.100	0.400	1.633	-
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	544.279	0.000		0.000		0.000		-		0.000	0.000	544.279	-
Subtotal			641.814	10.994		7.916		8.011		-		8.011	7.701	676.436	N/A

Remarks
 FY 2021 Product Development funding planned to continue to support Radio Frequency (RF) Processor firmware, RF Processor software, A2 Card firmware, the transition of the ONR Future Naval Capability Project ALPO into the program of record AARGM Derivative Program (ADP) and Missile Software (Block 1A) development efforts.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Prior year Support no longer funded in the FYDP	Various	Various : Various	7.147	0.000		0.000		0.000		-		0.000	0.000	7.147	-
Subtotal			7.147	0.000		0.000		0.000		-		0.000	0.000	7.147	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / Harm Improvement	Project (Number/Name) 2185 / AARGM
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Development Test & Evaluation	WR	NAWCWD : China Lake, CA	26.961	0.429	Nov 2018	0.437	Nov 2019	1.994	Dec 2020	-		1.994	7.088	36.909	-
Operational and Integrated Test & Evaluation (IT&OT)	WR	NAWCWD : China Lake, CA	12.772	2.300	Jun 2019	0.100	Nov 2019	0.100	Nov 2020	-		0.100	1.290	16.562	-
Operational and Integrated Test & Evaluation (IT&OT)	SS/IDIQ	Northrop Grumman Innovation Systems : Northridge, CA	1.342	0.000		2.158	Dec 2019	0.000		-		0.000	0.000	3.500	3.500
Prior year T&E no longer funded in the FYDP	Various	Various : Various	24.929	0.000		0.000		0.000		-		0.000	0.000	24.929	-
Subtotal			66.004	2.729		2.695		2.094		-		2.094	8.378	81.900	N/A

Remarks

FY 2021 funding is for continued IT&OT to support testing required for M Code integration and Block 1A.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Program Management Support	Various	Various : Various	5.386	0.250	Feb 2019	0.255	Feb 2020	0.260	Feb 2021	-		0.260	1.040	7.191	-
Travel	WR	NAVAIR HQ : Patuxent River, MD	1.793	0.015	Oct 2018	0.015	Oct 2019	0.015	Oct 2020	-		0.015	0.060	1.898	-
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	3.214	0.583	Nov 2018	0.596	Nov 2019	0.607	Nov 2020	-		0.607	1.700	6.700	-
Program Management Support	Various	NRO : Washington, D.C.	1.000	0.200	Nov 2018	0.200	Nov 2019	0.204	Nov 2020	-		0.204	0.816	2.420	-
Prior year Mgmt no longer funded in the FYDP	Various	Various : Various	10.250	0.000		0.000		0.000		-		0.000	0.000	10.250	-
Subtotal			21.643	1.048		1.066		1.086		-		1.086	3.616	28.459	N/A

Remarks

Contract Type for Travel is TO.

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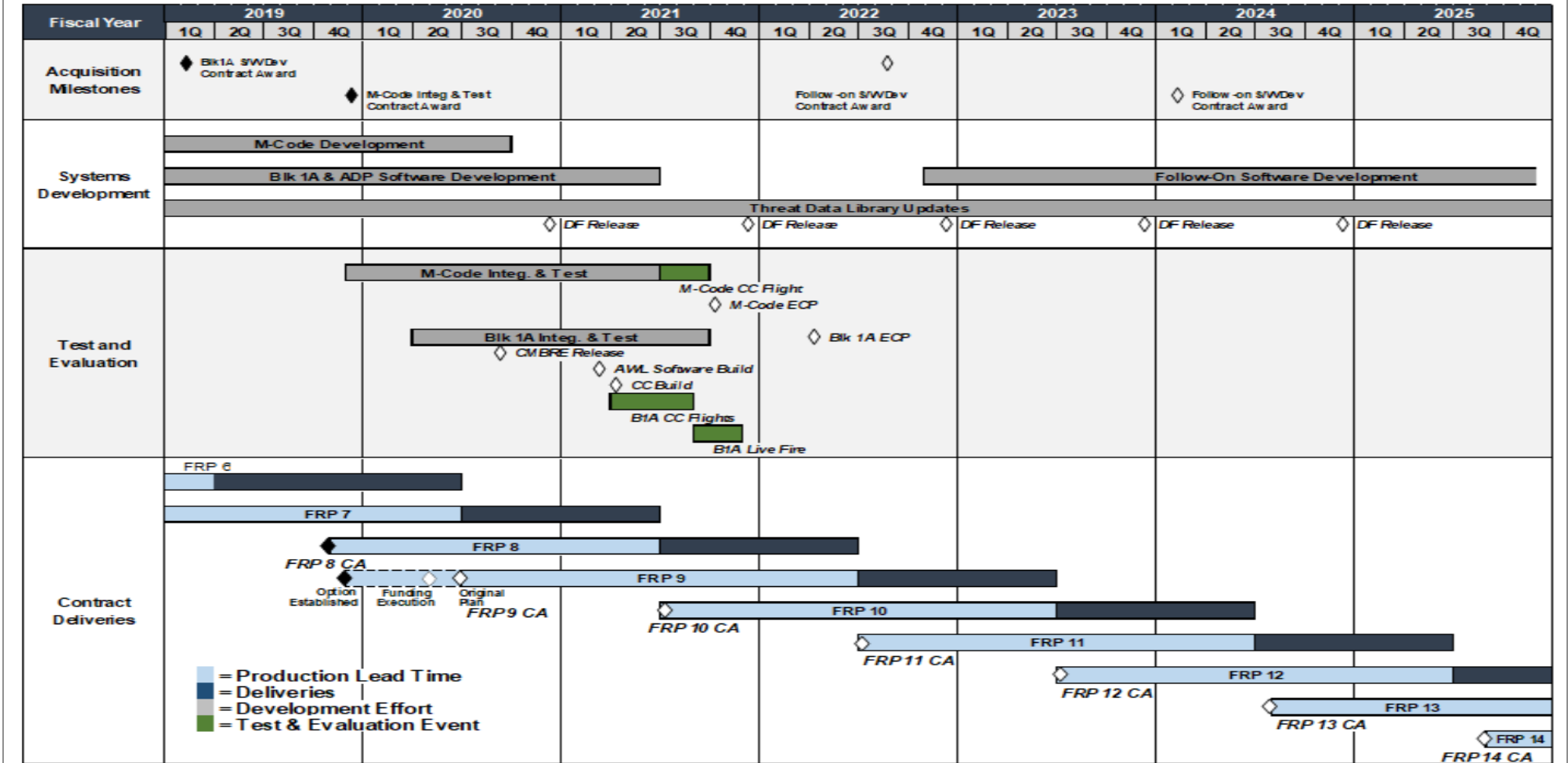
Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy

Date: February 2020

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0205601N / Harm Improvement

Project (Number/Name)
2185 / AARGM



■ = Production Lead Time
■ = Deliveries
■ = Development Effort
■ = Test & Evaluation Event

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2185 / <i>AARGM</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AARGM				
M-Code: M-Code Integration & Test	4	2019	2	2021
M-Code: M-Code Captive Carry Flight	3	2021	3	2021
M-Code: M-Code ECP	3	2021	3	2021
Software Development: Block 1A Software Development Award	1	2019	1	2019
Software Development: Block 1A & ADP Software Development	1	2019	2	2021
Software Development: Block 1A Captive Carry Flights	2	2021	3	2021
Software Development: Block 1A ECP	2	2022	2	2022
Software Development: Block 1A Live Fire Test	3	2021	4	2021
Software Development: Follow-On Software Development and Test Contract Award FY22	3	2022	3	2022
Software Development: Follow-On Software Development and Test Contract Award FY24	1	2024	1	2024
Software Development: Follow-On Software Development	4	2022	4	2025
Threat Data Library Updates: Threat Data Library Updates	1	2019	4	2025
Threat Data Library Updates: Threat Data File Release FY20	4	2020	4	2020
Threat Data Library Updates: Threat Data File Release FY21	4	2021	4	2021
Threat Data Library Updates: Threat Data File Release FY22	4	2022	4	2022
Threat Data Library Updates: Threat Data File Release FY23	4	2023	4	2023
Threat Data Library Updates: Threat Data File Release FY24	4	2024	4	2024
Production Milestones: Contract Award: Full-Rate Production Lot 8	4	2019	4	2019
Production Milestones: Contract Award: Full-Rate Production Lot 9	2	2020	2	2020
Production Milestones: Contract Award: Full-Rate Production Lot 10	3	2021	3	2021

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2185 / <i>AARGM</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Production Milestones: Contract Award: Full-Rate Production Lot 11	3	2022	3	2022
Production Milestones: Contract Award: Full-Rate Production Lot 12	3	2023	3	2023
Production Milestones: Contract Award: Full-Rate Production Lot 13	3	2024	3	2024
Production Milestones: Contract Award: Full-Rate Production Lot 14	3	2025	3	2025
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 6 (WPN)	1	2019	2	2019
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 7 (WPN)	3	2019	2	2020
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 8 (WPN)	3	2020	2	2021
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 9 (WPN)	3	2021	2	2022
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 10 (WPN)	3	2022	2	2023
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 11 (WPN)	3	2023	2	2024
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 12 (WPN)	3	2024	2	2025
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 13 (WPN)	3	2025	4	2025

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</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
2189: <i>AARGM ER</i>	87.326	95.890	113.589	128.640	-	128.640	125.707	67.908	32.386	10.225	0.000	661.671
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 607

A. Mission Description and Budget Item Justification

The Air-to-Ground (AGM)-88 Extended Range (ER) Upgrade was a new start in FY 2016. The purpose of this effort is to develop hardware and software modifications to improve the Advanced Anti-Radiation Guided Missile (AARGM)'s operational capabilities, including extended range, survivability and effectiveness against complex, new, and emerging threats. This budget line item funds a new rocket motor design, system development and integration, test asset procurement, testing, and associated software updates for the AARGM-ER to ensure these capabilities perform in accordance with established requirements. FY 2021 activities include continuation of the Engineering & Manufacturing Development (EMD) phase, continuation of Developmental Test & Evaluation, and the continuation of test articles delivery. AARGM-ER retains the same guidance, sensor, and warhead capabilities of the AARGM.

The AARGM-ER program is part of the Navy's Integrated Fire Control (IFC) approach to address advanced threat capabilities in the Anti-Access/Area-Denial (A2/AD) environment. IFC solutions enable individual system capabilities to be leveraged across an effects chain, placing the full spectrum of tactical capability in the hands of the warfighter. IFC solutions that push engagement distances beyond the launch platform's radar horizon and allows the U.S. Navy to operate in, and control, contested battle space in littoral waters and A2/AD environments are increasingly critical as more scenarios require compressed and coordinated fire control timelines.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: AARGM ER Development	95.890	113.589	128.640	0.000	128.640
Articles:	15	2	-	-	-
<i>FY 2020 Plans:</i> FY 2020 activities include continuation of the Engineering and Manufacturing Development contract and commencement of aircraft integration. Execute Knowledge Point 3 and complete a Critical Design Review. Test & evaluation of software for the guidance section will continue in support of functional ground and flight testing. Preliminary Flight Rating Test events will assess rocket motor performance in advance of first free flight events in FY21. Jettison and safe separation flights will assess the weapons autopilot in various environments where the missile is separating from the host aircraft. Begin rocket motor qualification. Flight test planning for captive carriage of training missiles begins. Continuation of build of test articles for analysis and qualification.					
<i>FY 2021 Base Plans:</i> FY 2021 activities include continuation of the Engineering and Manufacturing Development contract, and system-level developmental testing of production-representative missiles. Manufacturing of missile components and missiles will continue in support of contractor and government test plans. Testing conducted by the					

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</i>
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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
contractor and the government will assess component-level and system-level performance, and substantiate readiness for low rate production. Knowledge Point 4 in FY 2021 will be informed by results from an Operational Assessment, free flight developmental testing of a missile and a Production Readiness Review. <i>FY 2021 OCO Plans:</i> N/A <i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Increase of funding from FY2020 to FY2021 is due to continuation of Engineering and Manufacturing Development, Developmental Test and Evaluation and aircraft integration.					
Accomplishments/Planned Programs Subtotals	95.890	113.589	128.640	0.000	128.640

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• WPN/2327: <i>HARM Mods</i>	0.000	0.000	61.520	-	61.520	76.665	140.325	183.767	216.009	Continuing	Continuing

Remarks

D. Acquisition Strategy
The AARGM Extended Range Program will provide hardware and software modifications to improve AARGM's operational capabilities, including extended range, survivability, and effectiveness against complex, new, and emerging threats. The program's objective requirement for Initial Operational Capability is FY 2023.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Rocket Motor Risk Initiative	WR	NAWCWD : China Lake, CA	0.947	0.000		0.000		0.000		-		0.000	0.000	0.947	-
Rocket Motor Risk Initiative	WR	NSWC : Indian Head, MD	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
Front End Design Analysis	SS/CPFF	Northrop Grumman Corporation Innovation Systems : Northridge, CA	15.221	0.000		0.000		0.000		-		0.000	0.000	15.221	15.221
Missile Section Integration	SS/CPFF	Northrop Grumman Corporation Innovation Systems : Northridge, CA	41.043	16.632	Oct 2018	0.000		0.000		-		0.000	0.000	57.675	57.152
Engineering & Manufacturing Development	SS/CPFF	Northrop Grumman Corporation Innovation Systems : Northridge, CA	0.000	29.588	Mar 2019	72.980	Dec 2019	87.215	Oct 2020	-		87.215	118.064	307.847	322.500
Aircraft Integration	WR	NAWCWD : China Lake, CA	0.907	5.917	Jan 2019	8.050	Nov 2019	9.124	Nov 2020	-		9.124	15.803	39.801	-
Aircraft Integration	TBD	Boeing : St. Louis, MO	0.000	0.483	Apr 2019	6.200	Dec 2019	1.737	Oct 2020	-		1.737	12.091	20.511	-
Systems Engineering	WR	NAWCWD : China Lake, CA	13.433	8.275	Nov 2018	6.119	Nov 2019	6.165	Nov 2020	-		6.165	14.028	48.020	-
Systems Engineering	WR	NAWCAD : Patuxent River, MD	3.366	3.409	Nov 2018	3.447	Nov 2019	3.314	Nov 2020	-		3.314	6.800	20.336	-
Telemetry Section	WR	NAWCWD : China Lake, CA	0.404	2.184	Nov 2018	2.184	Nov 2019	2.800	Nov 2020	-		2.800	5.012	12.584	-
AUR Containers	WR	NSWC : Indian Head, MD	0.000	0.355	Dec 2018	0.000		0.362	Nov 2020	-		0.362	1.587	2.304	-
Subtotal			76.321	66.843		98.980		110.717		-		110.717	173.385	526.246	N/A

Remarks
 Engineering and Manufacturing Development increases in FY 2021 are to support aircraft integration testing, rocket motor preliminary flight rating qualification and weapon software development.

 Aircraft Integration (NAWCWD) will continue to support the F/A-18 H-18 software build.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			

Aircraft Integration (Boeing) will continue with aircraft interface software development and testing.

Increase in Telemetry Sections in FY 2021 is to support planned testing events.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Studies & Analysis	Various	Various : Various	5.822	0.500	Mar 2019	0.150	Dec 2019	0.000		-		0.000	0.000	6.472	-
Subtotal			5.822	0.500		0.150		0.000		-		0.000	0.000	6.472	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Developmental Test & Evaluation	WR	NAWCAD : Patuxent River, MD	0.000	1.550	Nov 2018	4.625	Nov 2019	8.715	Nov 2020	-		8.715	32.283	47.173	-
Developmental Test & Evaluation	WR	NAWCWD : China Lake, CA	0.000	0.000		2.925	Nov 2019	5.263	Nov 2020	-		5.263	9.852	18.040	-
Developmental Test & Evaluation	WR	Various : Various	0.000	0.000		0.897	Dec 2019	0.910	Nov 2020	-		0.910	0.000	1.807	-
ER Test Assets	TBD	Northrop Grumman Corporation Innovation Systems : Northridge, CA	0.000	25.500	Mar 2019	3.468	Nov 2019	0.000		-		0.000	0.000	28.968	28.968
T&E Support	WR	COTF : Norfolk, VA	0.050	0.093	Nov 2018	0.204	Nov 2019	0.255	Nov 2020	-		0.255	1.011	1.613	-
Operational and Integrated T&E	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	2.386	2.386	-
Subtotal			0.050	27.143		12.119		15.143		-		15.143	45.532	99.987	N/A

Remarks
Increase in FY 2021 for Developmental Test and Evaluation (NAWCAD) is to perform store separation testing and jettison loads and noise and vibration flight tests.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy **Date:** February 2020

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			

Developmental Test and Evaluation (NAWCWD) will increase due to aircraft interface flight-testing and first free flight test event.

Fifteen (15) Test articles were procured in FY 2019 and two (2) test articles were procured in FY2020. All Up Round test assets support testing on the F/A-18 E/F and EA-18G including captive carry, ship suitability, missile free flight test events and support. Testing is required to address environmental and aeromechanical design considerations for the missile and aircraft integration. Testing is also required to evaluate missile guidance and control characteristics, as well as validate free flight performance and developmental test objectives.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Program Management Support	Various	Various : Various	2.802	0.829	Nov 2018	1.184	Nov 2019	1.290	Nov 2020	-		1.290	9.387	15.492	-
Program Management Support	WR	NAWCAD : Patuxent River, MD	2.197	0.469	Nov 2018	1.046	Nov 2019	1.345	Nov 2020	-		1.345	1.721	6.778	-
Government Engineering & Information Technology Support	WR	NSWC : Dahlgren, VA	0.067	0.043	Nov 2018	0.040	Oct 2019	0.045	Oct 2020	-		0.045	5.318	5.513	-
Travel	WR	NAVAIR HQ : Patuxent River, MD	0.067	0.063	Nov 2018	0.070	Nov 2019	0.100	Nov 2020	-		0.100	0.883	1.183	-
Subtotal			5.133	1.404		2.340		2.780		-		2.780	17.309	28.966	N/A

Remarks

Increase in FY 2021 for Management Services is to support Knowledge Point 4.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	87.326	95.890	113.589	128.640	-	128.640	236.226	661.671	N/A

Remarks

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AARGM ER				
Acquisition Milestones: Milestones: Knowledge Point 2	2	2019	2	2019
Acquisition Milestones: Milestones: Knowledge Point 3	2	2020	2	2020
Acquisition Milestones: Milestones: Knowledge Point 4	2	2021	2	2021
Acquisition Milestones: Milestones: Knowledge Point 5	1	2023	1	2023
Acquisition Milestones: Milestones: IOC	4	2023	4	2023
Systems Development: Preliminary Design Review (PDR)	1	2019	1	2019
Systems Development: Critical Design Review (CDR)	2	2020	2	2020
Systems Development: Missile Section Integration: Missile Section Integration	1	2019	1	2020
Systems Development: Engineering & Manufacturing Development: Engineering & Manufacturing Development	2	2019	4	2023
Test & Evaluation: Aircraft Integration: Aircraft Integration	1	2019	4	2023
Test & Evaluation: Technical Evaluation: Developmental Test & Evaluation (DT&E)	4	2019	1	2023
Test & Evaluation: Operational Assessment: Operational Assessment	2	2021	2	2021
Test & Evaluation: Operational Evaluation: Operational Test & Evaluation (OT&E)	4	2022	4	2023
Test & Evaluation: Follow on Test & Evaluation: Follow on Test & Evaluation (FOT&E)	1	2024	4	2025
Research & Development Milestones: Contract Awards: Engineering & Manufacturing Development (DT Test Articles)	2	2019	2	2019
Production Milestones: Production Readiness Reviews: Production Readiness Review (PRR) 1	2	2021	2	2021
Production Milestones: Contract Awards: LRIP 1 WPN	3	2021	3	2021
Production Milestones: Contract Awards: LRIP 2 WPN	3	2022	3	2022
Production Milestones: Contract Awards: LRIP 3 WPN	3	2023	3	2023
Production Milestones: Contract Awards: FRP 1 WPN	3	2024	3	2024

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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 0205601N / <i>Harm Improvement</i>	Project (Number/Name) 2189 / <i>AARGM ER</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Production Milestones: Contract Awards: FRP 2 WPN	3	2025	3	2025
Deliveries: DT Test Articles	1	2020	1	2023
Deliveries: LRIP 1 WPN	2	2023	4	2023
Deliveries: LRIP 2 WPN	4	2023	4	2024
Deliveries: LRIP 3 WPN	4	2024	4	2025
Deliveries: FRP 1 WPN	4	2025	4	2025