Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	750.899	28.063	48.635	87.989	-	87.989	115.055	117.180	78.571	62.396	Continuing	Continuing
1780: *HARM Improvement*	48.994	1.383	1.347	6.408	-	6.408	6.409	7.406	7.434	7.463	Continuing	Continuing
2185: *AARGM*	701.905	17.468	4.237	15.249	-	15.249	7.927	9.034	7.528	5.029	Continuing	Continuing
2189: *AARGM ER*	0.000	9.212	43.051	66.332	-	66.332	100.719	100.740	63.609	49.904	Continuing	Continuing
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 368												

Note

Project unit 2189 is established for the Anti-Radiation Guided Missile (AARGM) Extended Range (ER) developmental effort and was a new start in FY 2016.

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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	23.708	48.635	83.573	-	83.573
Current President's Budget	28.063	48.635	87.989	-	87.989
Total Adjustments	4.355	0.000	4.416	-	4.416
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	4.600	0.000			
• SBIR/STTR Transfer	-0.246	0.000			
• Program Adjustments	0.000	0.000	5.276	-	5.276
• Rate/Misc Adjustments	0.001	0.000	-0.860	-	-0.860

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0205601N *I Harm Improvement*

Change Summary Explanation

FY 2018 funding increase to Proj. 1780 HARM Improvement to support HARM/AARGM Foreign Material Assessment (FMA) to maximize HARM/AARGM effectiveness against threat air defense systems.

FY 2018 funding increase to Proj. 2185 AARGM to support the implementation of M Code and upgrades to the radio frequency data processing to meet emerging requirements.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*	Project (Number/Name) 1780 / *HARM Improvement*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
1780: *HARM Improvement*	48.994	1.383	1.347	6.408	-	6.408	6.409	7.406	7.434	7.463	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 and the Advanced Anti-Radiation Guide Missile (AARGM) program. 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 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 advance anti-radiation homing seeker. This provides the capability to counter shutdown of emitters. Additional capability for AARGM consists of Global Positioning System capability, MMW terminal guidance, netted targeting real time feed via Integrated Broadcast System (IBS), Weapon Impact Assessment (WIA), GPS point-to-point weapon engagement and impact avoidance zone/missile impact zones.

ARM Improvement efforts require periodic updates to the user data base based on changing threat parameters, enhanced air defense engagement tactics and emerging systems. These funds provide the opportunity to conduct ground and flight testing against foreign 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 exploitation, analysis and subsequent integration and response to ensure the AGM-88 ARM weapon systems remains relevant in the planned operational environment.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: ARM Foreign Material Assessment (FMA)	1.383	1.347	6.408	0.000	6.408
Articles:	-	-	-	-	-
FY 2016 Accomplishments: The FMA team conducted FMA analysis and engineering against threat weapon systems in FY 2016. Focus was on new threat systems as they become available as well as theater/country-specific systems of interest, with priorities coordinated through the Fleet Anti-Radiation Missile (ARM) Steering Committee. Testing and evaluation continued on advanced Surface-to-Air weapons and related Integrated Air Defense System, jammers and ARM countermeasures, and non-traditional ARM targets. Team continued to support Fleet engagement as a key element of engineering and analytical efforts, which included funding for threat assessment, operational updates and integration efforts. Additional test priorities included characterizing complex systems in the field, so that the 5A attenuation and Lower Threshold Adjust fields can be populated with the data that gives the best					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 1780 / *HARM Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
track quality to the High-speed Anti-Radiation Missile (HARM) missile. The FMA team conducted developmental tests of in-country foreign threat systems via ground and flight test to maximize HARM system performance. Focus was on any system not previously tested by the FMA team. Non-traditional targeting methods were explored as well. ***FY 2017 Plans:*** The FMA team will continue to conduct FMA analysis and engineering against threat weapon systems in FY 2017. Focus will be on new threat systems as they become available as well as theater/country-specific systems of interest, with priorities coordinated through the Fleet ARM Steering Committee. Expect continued testing on advanced Surface-to-Air weapons and related Integrated Air Defense System (IADS), jammers and ARM countermeasures, and non-traditional ARM targets. Team will continue to support Fleet engagement as a key element of engineering and analytical efforts, which includes funding for threat assessment, operational updates and integration efforts. Additional test priorities include characterizing complex systems in the field, so that the 5A attenuation and Lower Threat Adjust fields can be populated with the data that gives the best track quality to the HARM)missile. The FMA team will continue to conduct developmental test of in-country foreign threat systems via ground and flight test in FY 2017 to maximize HARM system performance. Non-traditional targeting methods will be explored as well. ***FY 2018 Base Plans:*** FMA activities will expand to include the AGM-88E Advanced Anti-Radiation Guided Missile (AARGM) in addition to the AGM-88B/C High-speed Anti-Radiation Missile (HARM). Increased funding will allow for FMA lab, ground, and flight test and evaluation activities to expand across the entire AGM-88 family of missiles to evaluate new and modern threat systems in order to update HARM and AARGM with capability to counter these threats. The funding also supports enhancement/upgrade to existing lab facilities to support the analysis of FMA results. The FMA team will continue to conduct FMA testing (both ground-based and captive flight testing), data analysis, and systems engineering to maximize AARGM and HARM effectiveness against threat air defense systems in FY 2018. The expanded capabilities of the AARGM 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. FMA assessments will remain focused on new threat systems as they become available for evaluation as well as theater/country-specific systems of interest. Priorities coordinated through the Fleet ARM Steering Committee. Expect continued testing and evaluation on advanced Surface-to-Air weapons and related IADS, jammers, and 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 complex systems in the field, so					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 1780 / *HARM Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
that FMA assessments can directly populate missile threat data libraries with updated attributes to enhance track quality for HARM and AARGM. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	1.383	1.347	6.408	0.000	6.408

C. Other Program Funding Summary ($ in Millions)

N/A

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.

E. Performance Metrics

Continue FMA testing and engineering analysis against new and evolving foreign threats.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*				Project (Number/Name) 2185 / *AARGM*			
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
2185: *AARGM*	701.905	17.468	4.237	15.249	-	15.249	7.927	9.034	7.528	5.029	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 368

A. Mission Description and Budget Item Justification

Advanced Anti-Radiation Guided Missile (AARGM) transitioned a Phase III Small Business Innovative 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, counter shutdown, expanded threat coverage, enhanced ARH, netted targeting real-time feed via Integrated Broadcast System (IBS) prior to missile launch, 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 the follow on of 2,435 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 program remains in production through FY 2023.

The AARGM Block 1 Upgrade program began in FY 2012 and consists of a software only upgrade to 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). In parallel with the Block 1 Upgrade, Integrated Broadcast Service (IBS)-R developmental efforts are ongoing.

Follow-on Operational Test and Evaluation/Integrated Test (FOT&E/IT) is ongoing in conjunction with Block 1 Upgrade and is scheduled to complete in FY 2017.

In FY 2016 - FY 2022, the AARGM program plans 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 2018 funding increased as a result of efforts supporting AARGM's advanced development and system capability upgrades. Additional funding will support the implementation of M Code and upgrades to the radio frequency data processing to meet emerging requirements.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2185 / *AARGM*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Threat Data Library / System Updates	1.788	2.210	2.230	0.000	2.230
Articles:	-	-	-	-	-
FY 2016 Accomplishments: AGM-88E Block 1 Upgrade continued effort to update Electronic Intelligence files and Millimeter Wave (MMW) signatures to identify track and engage new and/or improved threat radars. Continued test and assessment of threat systems to include characterization of AARGM Millimeter Wave and Anti-Radiation Homing (ARH) subsystems. Developed threat data for new target sets.					
FY 2017 Plans: AGM-88E Block 1 Upgrade continues effort to update Electronic Intelligence files and Millimeter Wave signatures to identify track and engage new and/or improved threat radars. Continue test and assessment of threat systems. Develop threat data for new target sets.					
FY 2018 Base Plans: AGM-88E Block 1 Upgrade continues effort to upgrade systems such as the Electronic Intelligence files and Millimeter Wave signatures to identify, track and engage new and/or improved threat radars. Continue test and assessment of threat systems that impact already fielded weapons and to develop threat data for new target sets. Plans also include development or enhancement of navigational capability, integration of modernized Anti-Radiation Homing processor, and human system interface improvements to mission planning.					
FY 2018 OCO Plans: N/A					
Title: Follow-on Operational Test and Evaluation (FOT&E) and Correction of Deficiencies	13.990	1.077	0.475	0.000	0.475
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Continued FOT&E, including Integrated Test (IT) and Operational Test (OT) for Advanced Anti-Radiation Guided Missile (AARGM) Block 1 utilizing Commander Operational Test & Evaluation Force (COMOPTEVFOR) requirements for suitable and effective for desired flights, targets and locations. Design improvements for the telemetry sections support data collection efforts on test events and for non-combat expenditure events.					
FY 2017 Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2185 / *AARGM*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Complete FOT&E, including IT and OT for AARGM Block 1 utilizing COMOPTEVFOR requirements for suitable and effective for desired flights, targets, and locations. Continue to upgrade the system with test results to include developmental activity assessing software and hardware anomalies. ***FY 2018 Base Plans:*** 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 correction of deficiencies from Block 0 and Block 1 testing. ***FY 2018 OCO Plans:*** N/A					
Title: Advanced Development	1.690	0.950	12.544	0.000	12.544
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Continued support for advanced development, analysis activities of testing, configuration control board review, test plan reviews, requirements analysis and weapons integration analysis. ***FY 2017 Plans:*** Continue support for advanced development, systems capability upgrades, analysis activities and testing such as the Integrated Broadcast Service - Receiver. Funding supports testing, configuration control board review, test plan reviews, requirements analysis and weapons integration analysis. Funding also supports the Anti-Radiation Missile (AARGM) Derivative Program to include upgrading the AGM-88E capability against non-traditional and Overseas Contingency Operations (OCO) targets, weapon system developmental activities, range and laboratory support and analysis. ***FY 2018 Base Plans:*** Enhance navigational capability to comply with requirement to implement M Code to comply with U.S. Statute. Funding added in PB18 specifically addresses the effort to upgrade radio frequency data processing to meet emerging requirements. Funding also supports the transition of receiver technology upgrades in coordination with the Office of Naval Research (ONR). This project was initiated in FY 2016 which upgrades the AARGM capability for detection of high priority, non-traditional targets. The Technology Transition Agreement (TTA) requires the program to fund the integration of the design which consists of software development and hardware integration. Funding also provides continued support for advanced development, upgrades systems capability, analysis activities and testing such as the Integrated Broadcast Service - Receiver. Funding supports testing,					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2185 / *AARGM*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
configuration control board review, test plan reviews, requirements analysis and weapons integration analysis. Funding also supports upgrading AGM-88E capability against non-traditional and OCO targets. This includes weapon system developmental activities, range and laboratory support and analysis. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	17.468	4.237	15.249	0.000	15.249

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• WPN 2327: *HARM Mods*	120.798	178.213	183.368	-	183.368	190.029	185.905	190.051	177.449	188.285	1,945.791

Remarks

FY 2021 and FY 2022 Total Cost funding listed does not include the Advanced Anti-Radiation Guided Missile Extended Range funding.

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 fulfills U.S. Navy operational requirements and incorporates AARGM Advanced Technology Development and Quick Bolt Advanced Concept Technology Demonstration - demonstrated system requirements. Block 1 Fleet Release anticipated for 3Q FY 2017. Expand target set capability in FY 2017 - FY2022.

E. Performance Metrics

Block 1 Fleet Release scheduled for 3Q FY 2017.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*	Project (Number/Name) 2185 / *AARGM*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPFF	Orbital ATK : Northridge, CA	0.000	0.000		0.000		9.500	Nov 2017	-		9.500	0.000	9.500	-
Systems Engineering	WR	NAWCWD : China Lake, CA	75.355	6.965	Nov 2015	2.012	Nov 2016	2.055	Nov 2017	-		2.055	Continuing	Continuing	Continuing
M Code	SS/IDIQ	Orbital ATK : Northridge, CA	0.000	0.000		0.000		1.000	Jan 2018	-		1.000	0.000	1.000	-
Software Development	WR	SPAWAR : San Diego, CA	0.569	0.324	Mar 2016	0.050	Mar 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Software Development	SS/IDIQ	Orbital ATK : Northridge, CA	0.000	0.000		0.000		1.026	Mar 2018	-		1.026	0.000	1.026	-
Mission Planning	WR	Various : Various	0.633	0.100	Mar 2016	0.100	Mar 2017	0.100	Mar 2018	-		0.100	Continuing	Continuing	Continuing
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	543.386	0.000		0.000		0.000		-		0.000	0.000	543.386	-
		Subtotal	619.943	7.389		2.162		13.681		-		13.681	-	-	-

Remarks

FY 2018 Primary Hardware Development funding planned for the Radio Frequency data processing upgrade. FY 2018 M Code funding required to support implementation of M Code. FY 2018 Software Development funding planned to support the transition of ONR upgrades.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	WR	NAWCWD : China Lake, CA	26.433	0.000		0.000		0.528	Nov 2017	-		0.528	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*	Project (Number/Name) 2185 / *AARGM*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	SS/IDIQ	Orbital ATK : Northridge, CA	5.441	0.298	May 2016	0.000		0.000		-		0.000	0.000	5.739	5.739
Development Test & Evaluation	WR	JITC : Fort Huachuca, AZ	0.000	0.000		0.006	Feb 2017	0.000		-		0.000	0.000	0.006	-
Operational and Integrated Test & Evaluation (IT&OT))	WR	NAWCWD : China Lake, CA	5.997	6.717	Nov 2015	0.648	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Operational and Integrated Test & Evaluation (IT&OT))	WR	COMOPTEVFOR : Norfolk, VA	11.235	0.435	Nov 2015	0.190	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Operational and Integrated Test & Evaluation (IT&OT))	SS/IDIQ	Orbital ATK : Northridge, CA	0.000	1.342	Jun 2016	0.291	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Prior year T&E no longer funded in the FYDP	Various	Various : Various	7.469	0.000		0.000		0.000		-		0.000	0.000	7.469	-
		Subtotal	56.575	8.792		1.135		0.528		-		0.528	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	4.556	0.284	Feb 2016	0.175	Feb 2017	0.250	Feb 2018	-		0.250	Continuing	Continuing	Continuing
Travel	WR	NAVAIR HQ : Patuxent River, MD	1.714	0.024	Feb 2016	0.025	Feb 2017	0.015	Feb 2018	-		0.015	Continuing	Continuing	Continuing
Government Engineering Support	WR	NAWC AD : Patuxent River, MD	1.520	0.679	Nov 2015	0.440	Nov 2016	0.575	Nov 2017	-		0.575	Continuing	Continuing	Continuing
Program Management Support	Various	NRO : Washington, D.C.	0.200	0.300	Nov 2015	0.300	Nov 2016	0.200	Nov 2017	-		0.200	Continuing	Continuing	Continuing
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	18.240	1.287		0.940		1.040		-		1.040	-	-	-

Remarks

Contract Type for Travel is TO

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*	Project (Number/Name) 2185 / *AARGM*	

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	701.905	17.468		4.237		15.249		-		15.249	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2185 / *AARGM*

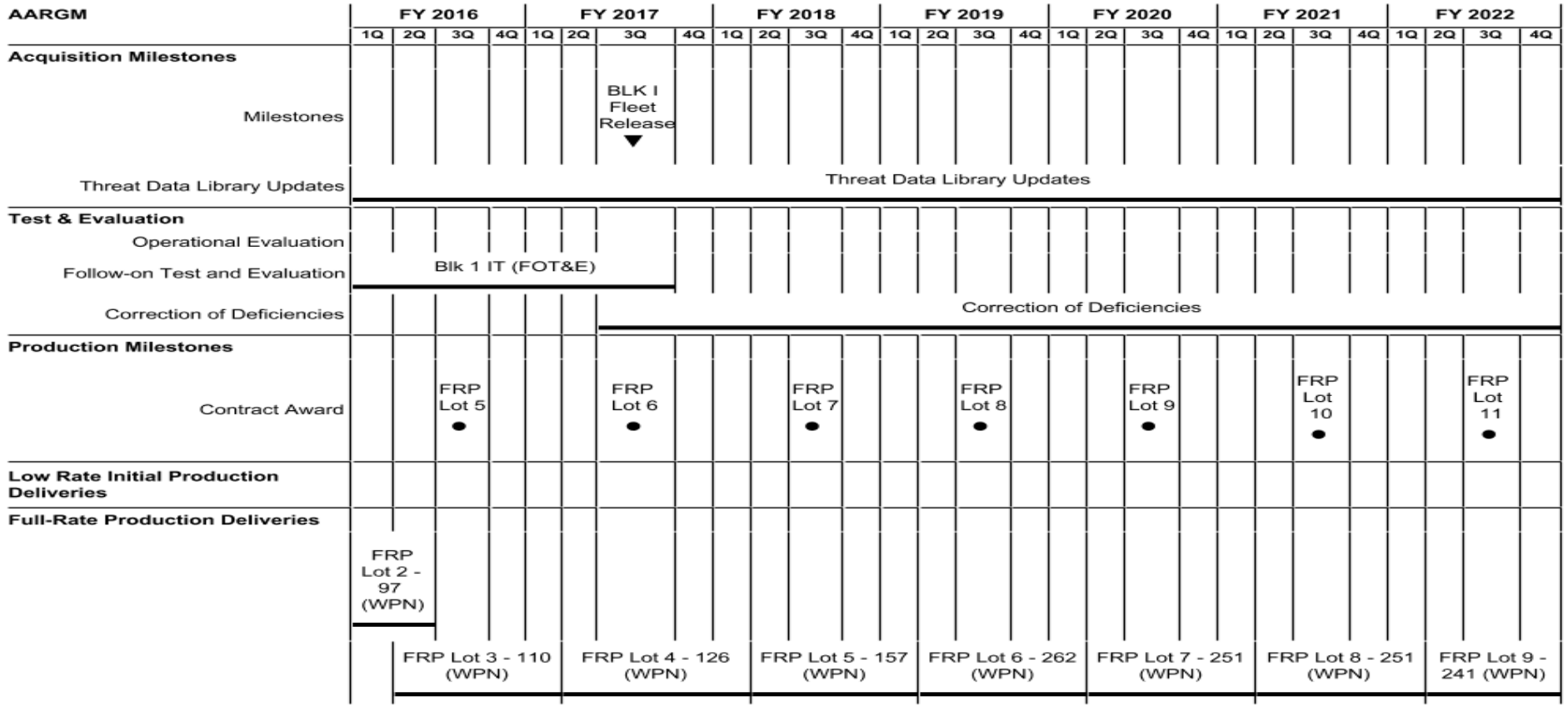

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2185 / *AARGM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AARGM				
Acquisition Milestones: Milestones: BLOCK 1 Fleet Release	3	2017	3	2017
Acquisition Milestones: Threat Data Library Updates: Threat Data Library Updates	1	2016	4	2022
Test & Evaluation: Follow-on Test and Evaluation: Block 1 IT (FOT&E)	1	2016	3	2017
Test & Evaluation: Correction of Deficiencies: Correction of Deficiencies	3	2017	4	2022
Production Milestones: Contract Award: Full-Rate Production Lot 5	3	2016	3	2016
Production Milestones: Contract Award: Full-Rate Production Lot 6	3	2017	3	2017
Production Milestones: Contract Award: Full-Rate Production Lot 7	3	2018	3	2018
Production Milestones: Contract Award: Full-Rate Production Lot 8	3	2019	3	2019
Production Milestones: Contract Award: Full-Rate Production Lot 9	3	2020	3	2020
Production Milestones: Contract Award: Full-Rate Production Lot 10	3	2021	3	2021
Production Milestones: Contract Award: Full-Rate Production Lot 11	3	2022	3	2022
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 2 (WPN)	1	2016	2	2016
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 3 (WPN)	2	2016	1	2017
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 4 (WPN)	2	2017	1	2018
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 5 (WPN)	2	2018	1	2019
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 6 (WPN)	2	2019	1	2020
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 7 (WPN)	2	2020	1	2021
Full-Rate Production Deliveries: Full-Rate Production Deliveries - Lot 8 (WPN)	2	2021	1	2022
Full-Rate Production Deliveries: Full-Rate Production Delieveries - Lot 9 (WPN)	2	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*	Project (Number/Name) 2189 / *AARGM ER*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
2189: *AARGM ER*	0.000	9.212	43.051	66.332	-	66.332	100.719	100.740	63.609	49.904	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Air-to-Ground (AGM)-88E 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 2018 activities include entry into the Engineering Manufacturing and Design (EMD) phase. Procurement of test articles will begin in FY 2019. AARGM-ER retains the same guidance, sensor, and warhead capabilities of the Block 1 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 (A2AD) 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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: AARGM ER Development	9.212	43.051	66.332	0.000	66.332
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Began the developmental effort for the AARGM-ER upgrade to include award of the AARGM pre-Front End Design Analysis (pre-FEDA) contract, development of technical requirements specifications, and documentation to satisfy mandatory DoD 5000.2 entry criteria. Executed analyses for F/A-18 and F-35 aircraft integration. Initiated analysis for telemetry section Flight Termination System development. Developed data analyses to support lead system integration trade decisions.					
FY 2017 Plans: Continue the AARGM-ER developmental efforts to include award of the Front End Design Analysis (FEDA) contract, award of the Missile Section Integration contract, and initiation of a Rocket Motor Risk Initiative. Continue analyses for F/A-18 and F-35C aircraft integration. Continue range safety analysis for telemetry section Flight Termination System development.					
FY 2018 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2189 / *AARGM ER*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Completion of the Front End Design Analysis and Missile Section Integration contracts. Completion of the Rocket Motor Risk Initiative. Execution of Milestone B and contract award for the Engineering & Manufacturing Development phase. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	9.212	43.051	66.332	0.000	66.332

C. Other Program Funding Summary ($ in Millions)

N/A

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, emerging threats. The program's threshold requirement for Initial Operational Capability is FY 2023.

E. Performance Metrics

AARGM-ER activities to support a Milestone B in FY 2018.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2189 / *AARGM ER*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Rocket Motor Risk Initiative	WR	NAWCWD : China Lake, CA	0.000	0.000		3.608	Jan 2017	3.680	Nov 2017	-		3.680	Continuing	Continuing	Continuing
Rocket Motor Risk Initiative	WR	NSWC : Indian Head, MD	0.000	0.000		0.100	Dec 2016	0.100	Dec 2017	-		0.100	0.000	0.200	-
Front End Design Analysis	SS/CPFF	Orbital ATK : Northridge, CA	0.000	3.234	Nov 2016	7.523	Feb 2017	8.300	Nov 2017	-		8.300	Continuing	Continuing	Continuing
Missile Section Integration	SS/CPFF	Orbital ATK : Northridge, CA	0.000	0.000		18.600	Jul 2017	29.400	Nov 2017	-		29.400	0.000	48.000	-
Engineering & Manufacturing Development	TBD	TBD : TBD	0.000	0.000		0.000		11.020	Apr 2018	-		11.020	Continuing	Continuing	Continuing
Aircraft Integration	Various	Various : Various	0.000	0.680	Mar 2016	0.204	Mar 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCWD : China Lake, CA	0.000	2.390	Feb 2016	3.923	Nov 2016	5.006	Nov 2017	-		5.006	Continuing	Continuing	Continuing
Telemetry Section	WR	NAWCWD : China Lake, CA	0.000	0.100	Feb 2016	0.204	Dec 2016	0.204	Nov 2017	-		0.204	Continuing	Continuing	Continuing
		Subtotal	0.000	6.404		34.162		57.710		-		57.710	-	-	-

Remarks

Advanced Anti-Radiation Guided Missile Extended Range was a new start program in FY 2016. FY 2018 activities include completion of the Front End Design Analysis and Missile Section Integration contracts. Completion of the Rocket Motor Risk Initiative. Execution of Milestone B and contract award for the Engineering & Manufacturing Development phase.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Studies & Analysis	Various	Various : Various	0.000	0.870	Apr 2016	3.197	Apr 2017	2.100	Nov 2017	-		2.100	Continuing	Continuing	Continuing
		Subtotal	0.000	0.870		3.197		2.100		-		2.100	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205601N / *Harm Improvement*	Project (Number/Name) 2189 / *AARGM ER*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
ER Test Assets	TBD	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Operational and Integrated T&E	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		0.000		-		0.000	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	0.000	0.638	Feb 2016	2.790	Nov 2016	3.199	Nov 2017	-		3.199	Continuing	Continuing	Continuing
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	0.000	1.280	Feb 2016	2.804	Nov 2016	3.213	Nov 2017	-		3.213	Continuing	Continuing	Continuing
Travel	WR	NAVAIR HQ : Patuxent River, MD	0.000	0.020	Feb 2016	0.098	Nov 2016	0.110	Nov 2017	-		0.110	Continuing	Continuing	Continuing
		Subtotal	0.000	1.938		5.692		6.522		-		6.522	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	9.212		43.051		66.332		-		66.332	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2189 / *AARGM ER*

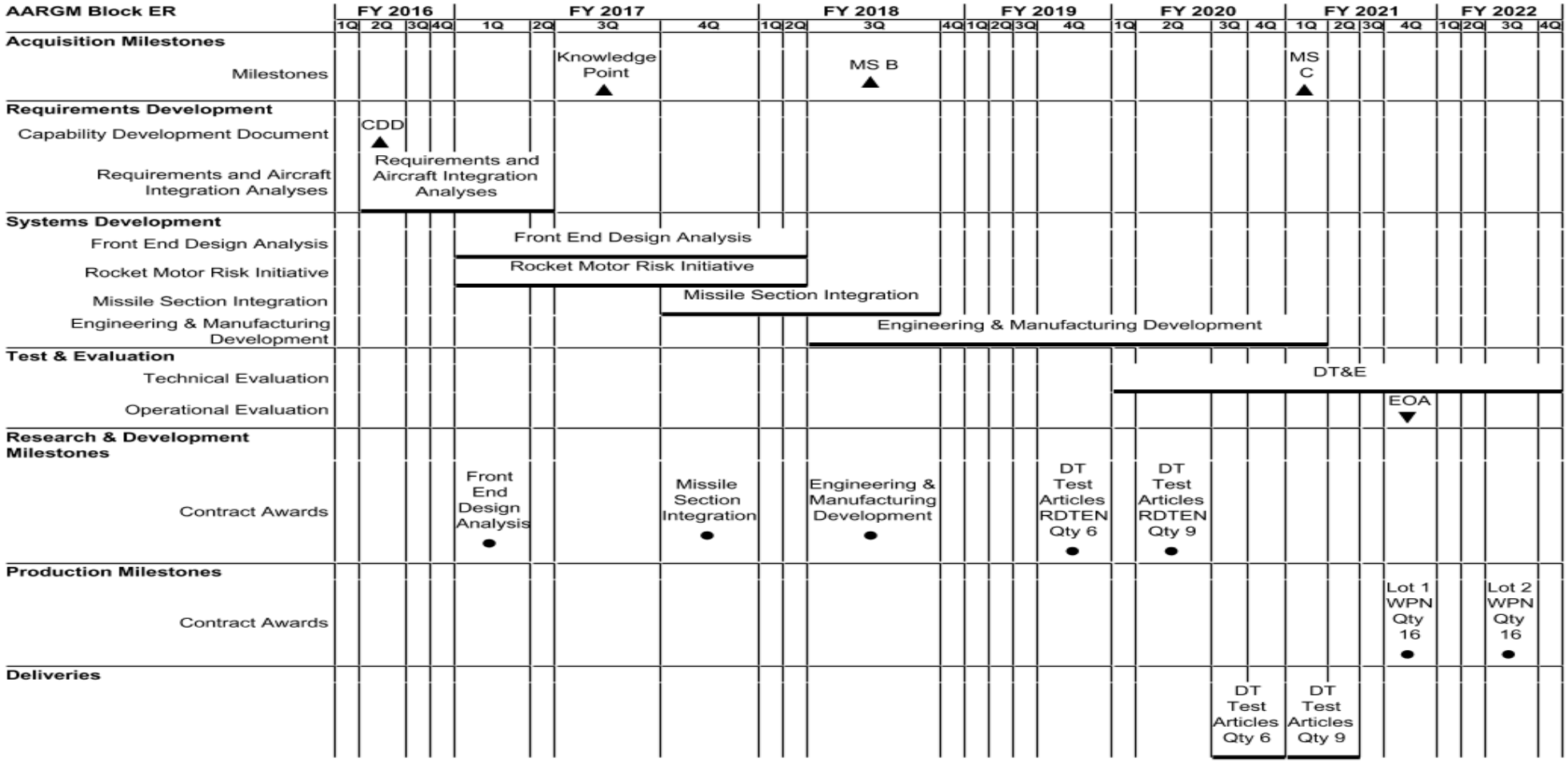

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2189 / *AARGM ER*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AARGM Block ER				
Acquisition Milestones: Milestones: Knowledge Point	3	2017	3	2017
Acquisition Milestones: Milestones: MS B	3	2018	3	2018
Acquisition Milestones: Milestones: MS C	1	2021	1	2021
Requirements Development: Capability Development Document: Capability Development Document	2	2016	2	2016
Requirements Development: Requirements and Aircraft Integration Analyses: Requirements and Aircraft Integration Analyses	2	2016	2	2017
Systems Development: Front End Design Analysis: Front End Design Analysis	1	2017	2	2018
Systems Development: Rocket Motor Risk Initiative: Rocket Motor Risk Initiative	1	2017	2	2018
Systems Development: Missile Section Integration: Missile Section Integration	4	2017	3	2018
Systems Development: Engineering & Manufacturing Development: Engineering & Manufacturing Development	3	2018	1	2021
Test & Evaluation: Technical Evaluation: Developmental Test & Evaluation	1	2020	4	2022
Test & Evaluation: Operational Evaluation: Early Operational Assessment	4	2021	4	2021
Research & Development Milestones: Contract Awards: Front End Design Analysis	1	2017	1	2017
Research & Development Milestones: Contract Awards: Missile Section Integration	4	2017	4	2017
Research & Development Milestones: Contract Awards: Engineering & Manufacturing Development	3	2018	3	2018
Research & Development Milestones: Contract Awards: DT Test Articles RDTEN Qty 6	4	2019	4	2019
Research & Development Milestones: Contract Awards: DT Test Articles RDTEN Qty 9	2	2020	2	2020
Production Milestones: Contract Awards: Lot 1 WPN Qty 16	4	2021	4	2021
Production Milestones: Contract Awards: Lot 2 WPN Qty 16	3	2022	3	2022
Deliveries: DT Test Articles Qty 6	3	2020	4	2020

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205601N / *Harm Improvement*	**Project (Number/Name)** 2189 / *AARGM ER*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Deliveries: DT Test Articles Qty 9	1	2021	2	2021