Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0604227N *I Harpoon Modifications*							
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	0.000	0.000	5.426	-	5.426	4.557	2.710	0.000	0.000	0.000	12.693
1843: *Harpoon Block II+*	0.000	0.000	0.000	5.426	-	5.426	4.557	2.710	0.000	0.000	0.000	12.693

Note

This is a new start in FY 2019

A. Mission Description and Budget Item Justification

The Harpoon Block II+ missile provides the Department of Navy (DON) with an expanded capability. Harpoon Block II+ missile kits are a Net Enabled, Air-Launched, Anti-ship Cruise weapon with the ability to receive in-flight updates that improve the targeting and engagement of moving maritime targets. This system utilizes global positioning to provide in-flight updates coupled with an active radar seeker to provide accurate targeting.

The Harpoon seeker upgrade effort will modernize current seeker configurations to increase the precision of targeting. Currently, Harpoon missiles contain 3700-3. The 3700-series seekers operate by sequentially searching a pre-defined Area of Uncertainty (AOU). The seeker was designed to detect, acquire and track any surface target that happens to be in that zone. A newer seeker provides value to the warfighter through significant improvements in the sequential search radar seekers' probability of acquiring the intended target. Improvements in 3700-4+ Electronic Protection capability significantly increases the probability of engaging a valid surface target in a complex environment.

The Harpoon seeker upgrade will develop a new seeker to convert old analog 3700-3 seekers to new digital seekers. The new seekers, "3700-4+" will implement the -4 functionality using newer, smaller and more reliable parts. The 3700-4+ seekers will replace the legacy Mode Control Board (MCB) with a Mode Control Expanded Interface (MCEI) board. The five circuit boards from the 3700-3 seeker will be replaced with four new boards. In order to allow better seeker functionality and enhanced target selection algorithms, and the Guidance Control Unit (GCU).

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*			R-1 Program Element (Number/Name) PE 0604227N *I Harpoon Modifications*		
B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	5.426	-	5.426
Total Adjustments	0.000	0.000	5.426	-	5.426
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	5.501	-	5.501
• Rate/Misc Adjustments	0.000	0.000	-0.075	-	-0.075

Change Summary Explanation

This program is a new start in FY 2019 and provide funding for manufacturing, prototype and testing. FY 2019 funding supports the development of a new manufacturing process to upgrade legacy 3700-3 seekers. This effort includes factory acceptance tests, design verification tests, environmental tests and operational flight testing.

The FY 2019 funding request was reduced by $0.031 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0604227N / *Harpoon Modifications*	Project (Number/Name) 1843 / *Harpoon Block II+*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1843: *Harpoon Block II+*	0.000	0.000	0.000	5.426	-	5.426	4.557	2.710	0.000	0.000	0.000	12.693
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Operational System Development	0.000	0.000	5.426	0.000	5.426
Articles:	-	-	-	-	-
FY 2018 Plans: N/A					
FY 2019 Base Plans: New Start will begin in FY 2019 and provide funding for manufacturing, prototype and testing. FY 2019 plan is to develop a new manufacturing process to upgrade legacy 3700-3 seekers. This effort includes factory acceptance tests, design verification tests, environmental tests and operational flight testing. The endstate is a production-ready seeker design.					
FY 2019 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0604227N / *Harpoon Modifications*	**Project (Number/Name)** 1843 / *Harpoon Block II+*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** As this is a New Start program, there is an increase of 5$.426 million from FY 2018 to FY 2019. FY 2019 provides funding for a new manufacturing process to upgrade legacy 3700-3 seekers.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.426	0.000	5.426

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 1507N/2326: *Harpoon Mods*	0.000	17.300	14.840	-	14.840	10.006	9.959	3.941	3.943	0.000	59.989

Remarks

D. Acquisition Strategy

The new seekers' improved digital technology, including more functionality in a reduced footprint and inclusion of a new seeker interface, will permit seamless addition and integration of future capability improvements in the Harpoon Block II+.

U.S. Navy will upgrade legacy Harpoon 3700-3 seekers using a unique process developed by L-3/Mustang to a Harpoon 3700-4+ seeker. The current Harpoon 3700-3 seekers are designed with antiquated analog technology, are out of production, incorporate obsolete sub-components, involve reliability concerns and represent significantly less seeker capability. The proposed solution will use the knowledge and technology demonstrated via SBIR N102-131 (Phases I and II) to develop a new seeker manufacturing process to convert old analog 3700-3 seekers to new digital seekers.
The Program Office plans on acquiring the developmental engineering and production assets as a sole source cost-plus incentive fee (CPIF) contract. Non-recurring engineering and production options will be priced separately.

E. Performance Metrics

Earned Value will be used for the contracted efforts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0604227N / *Harpoon Modifications*	Project (Number/Name) 1843 / *Harpoon Block II+*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPIF	Mustang/L3 : Plano, TX	0.000	0.000		0.000		4.968	Feb 2019	-		4.968	6.610	11.578	11.578
		Subtotal	0.000	0.000		0.000		4.968		-		4.968	6.610	11.578	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Support	WR	NAWC AD : Patuxent River, MD	0.000	0.000		0.000		0.229	Nov 2018	-		0.229	0.328	0.557	-
		Subtotal	0.000	0.000		0.000		0.229		-		0.229	0.328	0.557	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.229	Nov 2018	-		0.229	0.329	0.558	-
		Subtotal	0.000	0.000		0.000		0.229		-		0.229	0.329	0.558	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		5.426		-		5.426	7.267	12.693	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0604227N / *Harpoon Modifications*	**Project (Number/Name)** 1843 / *Harpoon Block II+*

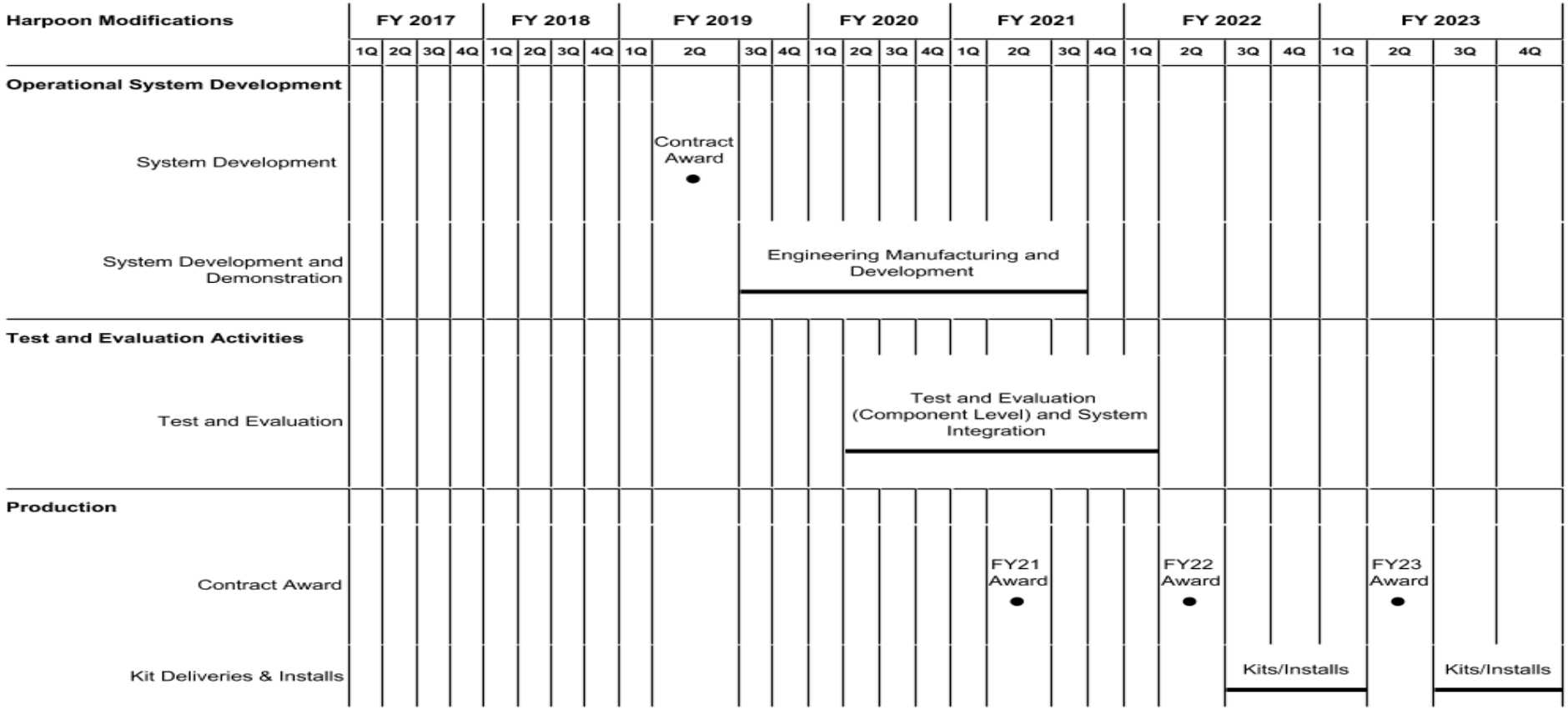

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0604227N / *Harpoon Modifications*	**Project (Number/Name)** 1843 / *Harpoon Block II+*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Harpoon Modifications				
Operational System Development: System Development: Contract Award	2	2019	2	2019
Operational System Development: System Development and Demonstration: Engineering Manufacturing and Development	3	2019	3	2021
Test and Evaluation Activities: Test and Evaluation: Test and Evaluation (Component Level) and System Integration	2	2020	1	2022
Production: Contract Award: FY21 Award	2	2021	2	2021
Production: Contract Award: FY22 Award	2	2022	2	2022
Production: Contract Award: FY23 Award	2	2023	2	2023
Production: Kit Deliveries & Installs: Kits/Installs 1	3	2022	1	2023
Production: Kit Deliveries & Installs: Kits/Installs 2	3	2023	4	2023