Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604270N *I Electronic Warfare (EW) Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,012.976	50.613	83.624	116.811	-	116.811	190.776	129.585	111.598	113.817	Continuing	Continuing
0556: *EW Counter Response*	488.927	16.174	17.040	44.307	-	44.307	99.451	39.562	32.581	33.232	Continuing	Continuing
1742: *EW Technical Development and T&E*	4.047	1.064	1.833	1.764	-	1.764	1.614	1.650	1.684	1.718	Continuing	Continuing
2175: *Tactical Air Electronic Warfare*	498.786	2.091	45.074	48.624	-	48.624	71.093	71.179	52.270	53.311	0.000	842.428
3308: *Technology Development*	0.000	2.276	6.108	6.238	-	6.238	8.444	8.614	8.776	8.950	Continuing	Continuing
3309: *Assault Survivability Optimization*	3.484	0.848	0.836	6.910	-	6.910	0.842	0.861	0.878	0.895	Continuing	Continuing
3327: *MAGTF EW Aviation Development*	16.115	23.551	12.362	7.677	-	7.677	8.136	6.717	14.382	14.664	Continuing	Continuing
3371: *MAGTF EW Interoperability Development*	1.617	1.609	0.371	1.291	-	1.291	1.196	1.002	1.027	1.047	Continuing	Continuing
9999: *Congressional Adds*	0.000	3.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.000
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 418												

A. Mission Description and Budget Item Justification

This program element includes development of Electronic Warfare (EW) systems for the United States Navy (USN), United States Marine Corps (USMC), and United States Army tactical aircraft, USMC helicopters, surface combatants, data link vulnerability assessments, precision targeting, USN and USMC radio frequency jammers, and development and testing of electronic warfare devices for emerging threats and emergency contingencies. This element also includes development of hardware/ software solutions that link on-board integrated Aircraft Survivability Equipment (iASE) that are compatible with mission planning information and systems as well as studies and evaluations of current and future aircraft threats, modeling and simulation for improved countermeasure capabilities, and development and testing to address new and emerging threats. The projects in this element improve the ability of the Joint Force to strike diverse targets inside adversary air and missile defense networks to destroy mobile power-projection platforms and enhance close combat lethality in complex terrain.
This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

Project Unit 2175 Tactical Air Electronic Warfare Cost to Complete should read $4.331 Million. Total Cost should read $846.760 Million.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604270N *I Electronic Warfare (EW) Dev*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	54.055	89.824	127.108	-	127.108
Current President's Budget	50.613	83.624	116.811	-	116.811
Total Adjustments	-3.442	-6.200	-10.297	-	-10.297
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-6.200			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.929	0.000			
• SBIR/STTR Transfer	-0.511	0.000			
• Program Adjustments	0.000	0.000	4.500	-	4.500
• Rate/Misc Adjustments	-0.002	0.000	-14.797	-	-14.797
• Congressional Add Adjustments	3.000	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *Intrepid Tiger II (V)3 UH-1Y Jettison Capability*	3.000	0.000
Congressional Add Subtotals for Project: 9999	3.000	0.000
Congressional Add Totals for all Projects	3.000	0.000

Change Summary Explanation

Project Unit 3327: The FY 2020 funding request was reduced by $5.600 million to account for the availability of prior year execution balances.

Cost:

Project Unit 3309 / Assault Survivability Optimization: Increase from FY 2019 to FY 2020 is $6.1M to address existing, known survivability shortfalls in USMC platforms to defeat current and emerging advanced missile threats that if not addressed will result in loss of aircrew and aircraft.

Technical:

Project Unit 3309 / Assault Survivability Optimization: FY 2020 added effort to address shortfalls in test equipment to evaluate countermeasure effectiveness against advanced threats in multiple spectrums, including UV (ultra-violet), VIS (visible), and IR (infra-red).

Schedule:

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604270N *I Electronic Warfare (EW) Dev*

Project Unit 0556 / EW COUNTER RESPONSE: N/A

Project Unit 1742 / EW Technical Development and T&E: N/A

Project Unit 2175 / Tactical Air Electronic Warfare: ALQ-214 SW Improvement Fleet Release was changed to a Fielding Decision 3rd Qtr. FY 2019 due to test range availability and software progression, this extend development and integrated testing. Additional Integrated Testing on the F/A-18 C/Daircraft will begin in 1st Qtr. FY 2020 extending into 2nd Qtr. FY 2020. ALQ-214 ARC strategy was further defined to include two phases and accelerate fielding a capability. Phase 1 ARC development addresses the requirements to mitigate potential risks associated with the software development program. The Phase 2 ARC contract award will follow the Requirements Definition phase and satisfy the ARC Development and Aircraft Integration requirement. Dual Band Decoy (DBD) Acquisition Strategy was approved to provide for Early Operational Capability to address emerging threats. DBD prototyping replaced DBD development, with DBD EMD contract and production contract to follow the prototyping phase. DBD Production Milestones added for Low Rate Initial Production (LRIP) and Full Rate Production (FRP) 1 in 2nd Qtr. FY 2022 and 2nd Qtr. FY 2023 respectively, supporting a DBD Initial Operational Capability in 4th Qtr. FY 2023.

Project Unit 3308 / Technology Development: Milestones: Contract Awards: ARC Risk Reduction Contract award added to 3rd Qtr. FY 2018. FY 2018 Operational Flight Program delayed one year. FY 2019 Operational Flight Program changed from 2nd Qtr. FY 2019 to 4th Qtr. FY 2019. FY 2019 and FY 2020 Target Generator delayed one year. All Contract Awards delayed due to Reprioritization of fiscal and manpower resources to meet emergent fleet needs.
Test and Evaluation: Suite Level ECM Testing added to 4th Qtr. FY 2018 through 1st Qtr. FY 2019 and 2nd Qtr. FY 2020 through 1st Qtr. FY 2021. Threat Simulation and Test Assets: Digital Radio Frequency Memory (DRFM) Target Generator Development, DRFM Target Generator Integration and Testing, IDECM Model Development, FY 2022 IDECM Model Lab Integration and FY 2023 IDECM Model Lab Integration delayed one year due to reprioritization of fiscal and manpower resources to meet emergent fleet needs.

Project Unit 3309 / Assault Survivability Optimization: FY 2018 flight test changed from 2nd/3rd Qtr to 4th Qtr due to test range availability. FY18 Test Mission Data File (MDF) changed from 2nd Qtr to 3rd Qtr to align with flight test. Added Radio Frequency Countermeasure (Chaff) fight test for MH-60 2nd Qtr 2018. Initiated modeling and simulation and engineering and evaluation to determine applicability of 1x1x8 countermeasures on Navy aircraft platforms. Updated FY 2019 schedule to reflect ground to air flight test for F/A-18E/F using advanced 1X1X8 countermeasures. FY 2019 to FY 2020 increase of $6.1M prioritized by USMC to fill existing, known capability shortfalls to address critical gaps in survivability against current and emerging threat systems thereby endangering USMC platforms. FY 2020 includes advanced countermeasure dispense techniques optimization modeling and simulation, test MDF development, countermeasure dispense techniques optimization flight test and optimized operational MDF release for AH-1Z/UH-1Y and MV-22 to address survivability shortfalls against advanced missile threats. FY 2020 modeling and simulation funding supports the development of advanced countermeasure techniques prior to air to air flight test for F/A-18 and ground to air flight test for AH-1Z/UH-1Y and MV-22. Schedule includes efforts to improve test and measurement equipment and to develop advanced countermeasures to defeat infrared and radio frequency threats.

Project Unit 3327 / MAGTF EW Aviation Development: AN/ALQ-231(V)1 BLK X TD Flight Release moved from 2nd Qtr FY 2020 to 1st Qtr FY 2021; AN/ALQ-231(V)1 BLK X Software Development completion moved from 2nd Qtr FY 2019 to 2nd Qtr FY 2020; Advanced Technology Software Development

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604270N *I Electronic Warfare (EW) Dev*

moved from 3rd Qtr FY 2020 to 2nd Qtr FY 2021; AN/ALQ-231(V)1 BLK X Developmental test completion moved from 1st Qtr FY 2019 to 1st Qtr FY 2021; AN/ALQ-231(V)1 BLK X OT&E completion moved from 4th Qtr FY 2019 to 2nd Qtr FY 2021. AN/ALQ-231(V)1 BLK X production awards all slid 1 year.

Project Unit C327 / Intrepid Tiger II (V)3 UH-1Y Jettison Capability: Congressional Add in FY 2018.

Project Unit 3371 / Spiral 2 request for proposal added from 1QTR FY20 to 2QTR FY20 to support transition of Spiral 2 to Program of Record

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 0556 / *EW Counter Response*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
0556: *EW Counter Response*	488.927	16.174	17.040	44.307	-	44.307	99.451	39.562	32.581	33.232	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Jammer Techniques Optimization (JATO) organization produces the jamming techniques and Electronic Attack (EA) optimization algorithms that are critical for current and future Airborne Electronic Attack (AEA) systems of the United States Navy (USN) and United States Marine Corps (USMC) to execute the evolving AEA mission. Through Modeling & Simulation (M&S), laboratory testing, and field testing, JATO optimizes parameters for existing EA systems (such as AN/ALQ-99 Tactical Jamming System (TJS) and the AN/ALQ-231(V) Intrepid Tiger II Family of Systems) to best counter existing threats, and applies that knowledge to define the requirements for follow-on AEA systems such as the Next Generation Jammer Mid-Band (NGJ-MB) and Next Generation Jammer Low Band (NGJ-LB) programs. As commercial and military Radio Frequency (RF) threats evolve and proliferate, the JATO organization provides updated tactics, techniques, and procedures to maximize the potency of USN and USMC AEA in meeting the Combatant Command (COCOM) Commanders' EW priorities, to include highly contested environments, Force Protection, Information Operations, and enhanced communications jamming. (Classified discussion available upon request).

JATO's Advanced Techniques Group (ATG) focuses specifically on electronic countermeasures to advanced threat weapon systems and Command, Control, and Communications (C3) networks that are challenging existing EA approaches, and how to best apply advances in geolocation and unknown threat characterization to EA responses. Additional efforts include risk reduction activities to evaluate and minimize EA interference with US weapons systems, and research/technology studies in support of upgrades to existing AEA systems such as the AN/ALQ-99 TJS.

The Electronic Warfare (EW) Advanced Capability Development project focuses on increasing the Department of the Navy's understanding and utilization of rapidly-evolving technologies that operate in the Electromagnetic spectrum. As commercial and military Radio Frequency (RF) threats evolve and proliferate, this project tracks the relevant technology, intelligence, and tactics to maximize the potency of USN and USMC AEA through the rapid insertion of emergent technologies into existing AEA weapon systems and aircraft platforms.

The Special Capability Pods (SCPs) project heavily leverages existing Air Force Research Laboratory (AFRL) projects and focuses on continued development, test, and evaluation of SCPs for utilization on USN aircraft platforms. Initial efforts to develop Navy pod variants were funded by the Air Force in FY18 as an OSD initiative. The SCPs will be specifically designed to address identified electromagnetic capability gaps and counter emerging electronic threats. As an iterative program, the highly modular interior design of the SCPs allows the pod to be integrated with current technology and upgraded electronics to provide the USN the rapidly adaptable solution to bridge capability gaps against rapidly and continuously evolving threats. Efforts in FY 2020 will result in the fielding of two initial technology demonstration prototypes. (Classified discussion available upon request).

AN/ALQ-99 TJS Band 9/10 Transmitters will remain in service after fielding of NGJ-MB and NGJ-LB and need to maintain effectiveness against present and future threats. The Band 9/10 extension is a modification to the ALQ-99 Band 9/10 transmitter to extend the frequency range and provide a contingency capability to address

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

emerging threats. (Classified discussion available upon request). Batwing Reflector Air to Ground variant is an organically produced alternate reflector for the AN/ ALQ-99 Band 9/10 Transmitter, increasing the radiating power for improved capability and effectiveness.

The Electromagnetic Maneuver Warfare (EMW) Resource Allocation Management (RAM) project develops a software application to interface with the display in the cockpit of the EA-18G. The software application will provide the aircrew with smart decision aids in flight to enhance EW capability and survivability, optimized flight profiles, and jamming effectiveness in highly contested environments. EMW RAM efforts are being conducted as a collaborative project with Australia under the Airborne Multi-Platform Electronic Warfare Project Arrangement.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Jammer Techniques Optimization (JATO)	16.174	16.505	18.139	0.000	18.139
Articles:	-	-	-	-	-
FY 2019 Plans: The JATO organization will continue engineering development and test support of existing and emerging systems such as the EA-18G, and AN/ALQ-249 (NGJ-MB) to address potential RF and Cyber/EW effects on current and evolving radar/communications threats. JATO will continue to generate tactics, techniques, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, USQ-113, ALQ-218, ALQ-227, AN/ALQ-231(V), and Unmanned Aerial Systems (UAS) payloads. JATO continues to meet COCOM Commanders' EW priorities including support for Overseas Contingency Operations and Force Protection. (Classified discussion available upon request).					
FY 2020 Base Plans: The JATO organization will continue engineering development and test support of existing and emerging systems such as the EA-18G, and AN/ALQ-249 (NGJ-MB) to address potential RF and Cyber/EW effects on current and evolving radar/communications threats. JATO will continue to generate tactics, techniques, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, ALQ-218, ALQ-227, AN/ALQ-231(V), and Unmanned Aerial Systems (UAS) payloads. JATO continues to meet COCOM Commanders' EW priorities including support for Overseas Contingency Operations and Force Protection. (Classified discussion available upon request).					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: Increase in funding from FY 2019 to FY 2020 is required to support additional testing requirements for developmental EW systems, and to provide increased flight and ground testing against adversary systems.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Additionally, funds will provide for increased efforts of the Advanced Techniques Group (ATG) to address Cyber/ EW threats.					
Title: Electronic Warfare (EW) Advanced Development	0.000	0.535	9.443	0.000	9.443
Articles:	-	-	-	-	-
FY 2019 Plans: This project focuses on increasing the Department of the Navy's understanding and utilization of rapidly-evolving technologies to control the Electromagnetic spectrum. Efforts in FY 2019 include the investigation of rapid technology insertions into systems including, but not limited to, the AN/ALQ-99, AN/ALQ-231(V), AN/ALQ-249 (NGJ-MB), and Unmanned Aerial Systems (UAS) payloads to address existing capability gaps on COCOM Commanders' Integrated Priority Lists. Technology integration analysis to mitigate interoperability issues and ensure maximum lethality is also addressed. (Classified discussion available upon request).					
FY 2020 Base Plans: Efforts in FY20 include initial hardware and software prototyping, engineering, and multi-system effects characterization for capabilities into systems including, but not limited to, the AN/ALQ-99, AN/ALQ-231, AN/ ALQ-249, NGJ-LB, Special Capability Pod (SCP), and other manned and unmanned aircraft payloads to address existing capability gaps on COCOM Integrated Priority Lists. (Classified discussion available upon request).					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: This project was previously funded under the JAMMER TECHNIQUES OPTIMIZATION (JATO) project and is now being separated to provide increased clarity. Increase from FY2019 to FY2020 is required to perform hardware and software prototyping, engineering and integration of advanced hardware and software into candidate systems along with initial characterization of cross system electronic effects.					
Title: Special Capability Pod (SCP)	0.000	0.000	16.600	0.000	16.600
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The Special Capability Pods (SCPs) project leverages other ongoing Navy and Joint Service investments and focuses on continued development, test and evaluation of rapidly repurposable pods for highly flexible Airborne Electronic Attack capability, with Navy pod variants initially funded by Joint Service partners in FY18. As an iterative program, the highly modular interior design of the SCPs allows the pod to be integrated with updated technology and capability to provide the USN a rapidly adaptable solution to address capability gaps against targets such as, but not limited to, highly specialized and/or rapidly evolving threats. Efforts in FY20 will result in the delivery of initial technology demonstration prototypes. (Classified discussion available upon request). ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The SCP project, leveraging previous and ongoing Navy and Joint Service investment, was previously included in the Electronic Warfare (EW) Advanced Development project. This tasking is now being separated in order to provide increased clarity. Increase from FY19 to FY20 is required to begin procuring hardware, software, and related aircraft integration and engineering efforts to support delivery of initial technology demonstration prototypes.					
Title: Electromagnetic Manuever Warfare (EMW) Resource Allocation Manager (RAM) ***Articles:*** ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** The Department of Navy is developing dynamic Electromagnetic Maneuver Warfare (EMW) Resource Allocation Management (RAM) applications to increase operators effectiveness in the Electromagnetic Spectrum (ES). FY 2020 efforts includes development of defined Electronic Warfare (EW) architecture framework. (Classified discussion available upon request). ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***	0.000 -	0.000 -	0.125 -	0.000 -	0.125 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The EMW RAM project was previously included in the EW Advanced Development project. This tasking is now being separated in order to provide increased clarity and transparency.					
Accomplishments/Planned Programs Subtotals	16.174	17.040	44.307	0.000	44.307

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• APN/0513: *AEA Systems*	49.729	40.277	44.470	-	44.470	56.307	58.592	57.933	59.417	47.775	745.030

Remarks

D. Acquisition Strategy

The JATO organization, comprised of a partnership between the Government and several University Aligned Research Centers, continues to research EW tactics and techniques. The JATO prime delivery order, a cost plus fixed fee contract that covers the period of FY 2017 through FY 2021, was awarded to Johns Hopkins University in 4th Qtr. FY 2017.

The Electronic Warfare (EW) Advanced Capability Development project will investigate developmental and existing technologies from commercial and governmental sources for integration into current and emerging USN and USMC EW weapon systems and aircraft. These technologies, once demonstrated to have sufficient maturity, will transition into the applicable acquisition programs. Additionally, the project will pursue technology development and demonstration through rapid acquisition or Speed to Fleet initiatives to the greatest extent possible.

The Special Capability Pods (SCPs) project heavily leverages existing Air Force Research Laboratory (AFRL) projects and focuses on continued development, test, and evaluation of SCPs for utilization on USN aircraft platforms. Initial efforts to develop Navy pod variants were funded by the Air Force in FY18 as an OSD initiative. The SCPs will be specifically designed to address identified electromagnetic capability gaps and counter emerging electronic threats. As an iterative program, the highly modular interior design of the SCPs allows the pod to be integrated with current technology and upgraded electronics to provide the USN the rapidly adaptable solution to bridge capability gaps against rapidly and continuously evolving threats. Efforts in FY 2020 will result in the fielding of two initial technology demonstration prototypes. (Classified discussion available upon request).

The Batwing Reflector Air to Air variant for the AN/ALQ-99 Band 9/10 Transmitter began procurement in FY 2017 as part of a Speed to Fleet initiative. Development of the Batwing Reflector Air to Ground variant for the AN/ALQ-99 Band 9/10 Transmitter flown on the EA-18G platform will commence in 2Qtr. FY 2020 and will capitalize on investments already made on the Batwing Air to Air variant.

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E. Performance Metrics

JATO development counters enemy radar systems and communication systems to provide techniques to protect allied forces. Development of the SCP and EMW RAM commence in FY 2020. AN/ALQ-99 TJS Band 9/10 Transmitter extension and Batwing Reflector Air to Ground variant are planned to start in FY 2021.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary HDW Development - SCP	Various	Various : Various	0.000	0.000		0.000		10.343	Nov 2019	-		10.343	Continuing	Continuing	Continuing
Systems Engineering	WR	Naval Research Lab : Maryland	13.925	1.885	Nov 2017	1.893	Nov 2018	2.085	Nov 2019	-		2.085	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : Patuxent River, MD	24.741	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCWD : Point Mugu, CA	90.109	2.952	Nov 2017	3.394	Nov 2018	7.022	Nov 2019	-		7.022	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		2.400	Nov 2019	-		2.400	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC Det : Crane, IN	11.276	0.325	Nov 2017	0.452	Nov 2018	1.433	Nov 2019	-		1.433	Continuing	Continuing	Continuing
Systems Engineering	Various	Various : Various	14.893	0.000		0.000		1.832	Nov 2019	-		1.832	Continuing	Continuing	Continuing
Prior Year Development cost no longer Funded in the FYDP	Various	Various : Various	263.147	0.000		0.000		0.000		-		0.000	0.000	263.147	-
		Subtotal	418.091	5.162		5.739		25.115		-		25.115	Continuing	Continuing	N/A

Remarks

Funding increases from FY 2019 to FY 2020 due to the development of Special Capability Pods (SCP) beginning in FY 2020.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support - Jammer Techniques Optimization (JATO)	SS/CPFF	Johns Hopkins Unv : Maryland	44.829	4.749	Nov 2017	4.760	Dec 2018	5.055	Dec 2019	-		5.055	Continuing	Continuing	Continuing
Development Support - EW Advanced Development	SS/CPFF	Johns Hopkins Unv : Maryland	0.000	0.000		0.235	Dec 2018	3.001	Dec 2019	-		3.001	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support - Jammer Techniques Optimization (JATO)	SS/CPFF	GTRI : Atlanta, GA	0.000	0.987	Jul 2018	0.992	Dec 2018	1.012	Dec 2019	-		1.012	Continuing	Continuing	Continuing
Development Support - EW Advanced Development	SS/CPFF	GTRI : Atlanta, GA	0.000	0.000		0.000		2.500	Dec 2019	-		2.500	Continuing	Continuing	Continuing
Eng & Tech Srvc (Non FFRDC)	Various	Various : Various	18.852	1.433	Nov 2017	1.446	Dec 2018	1.975	Dec 2019	-		1.975	Continuing	Continuing	Continuing
Prior year Support costs no longer funded in the FYDP	Various	Various : Various	2.256	0.000		0.000		0.000		-		0.000	0.000	2.256	-
		Subtotal	65.937	7.169		7.433		13.543		-		13.543	Continuing	Continuing	N/A

Remarks

Funding increases from FY 2019 to FY 2020 due to development support associated with the Special Capability Pods (SCP)effort beginning in FY 2020, and increased EW Advanced Development support.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
JATO Flight Test	WR	NAWCWD : Point Mugu, CA	0.961	1.681	Nov 2017	1.695	Nov 2018	2.229	Nov 2019	-		2.229	Continuing	Continuing	Continuing
JATO Ground/Lab Test	WR	NAWCWD : Point Mugu, CA	2.380	1.678	Nov 2017	1.682	Nov 2018	1.715	Nov 2019	-		1.715	Continuing	Continuing	Continuing
JATO Flight Test	WR	Various : Various	0.000	0.354	Nov 2017	0.361	Nov 2018	0.368	Nov 2019	-		0.368	Continuing	Continuing	Continuing
SCP Test	WR	Various : Various	0.000	0.000		0.000		1.157	Nov 2019	-		1.157	Continuing	Continuing	Continuing
		Subtotal	3.341	3.713		3.738		5.469		-		5.469	Continuing	Continuing	N/A

Remarks

Funding increases from FY 2019 to FY 2020 due to testing requirements associated with SCP efforts beginning in FY 2020.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	Various : Various	1.318	0.030	Oct 2017	0.030	Oct 2018	0.030	Oct 2019	-		0.030	Continuing	Continuing	Continuing
Travel	WR	Various : Various	0.240	0.100	Oct 2017	0.100	Oct 2018	0.150	Oct 2019	-		0.150	Continuing	Continuing	Continuing
		Subtotal	1.558	0.130		0.130		0.180		-		0.180	Continuing	Continuing	N/A

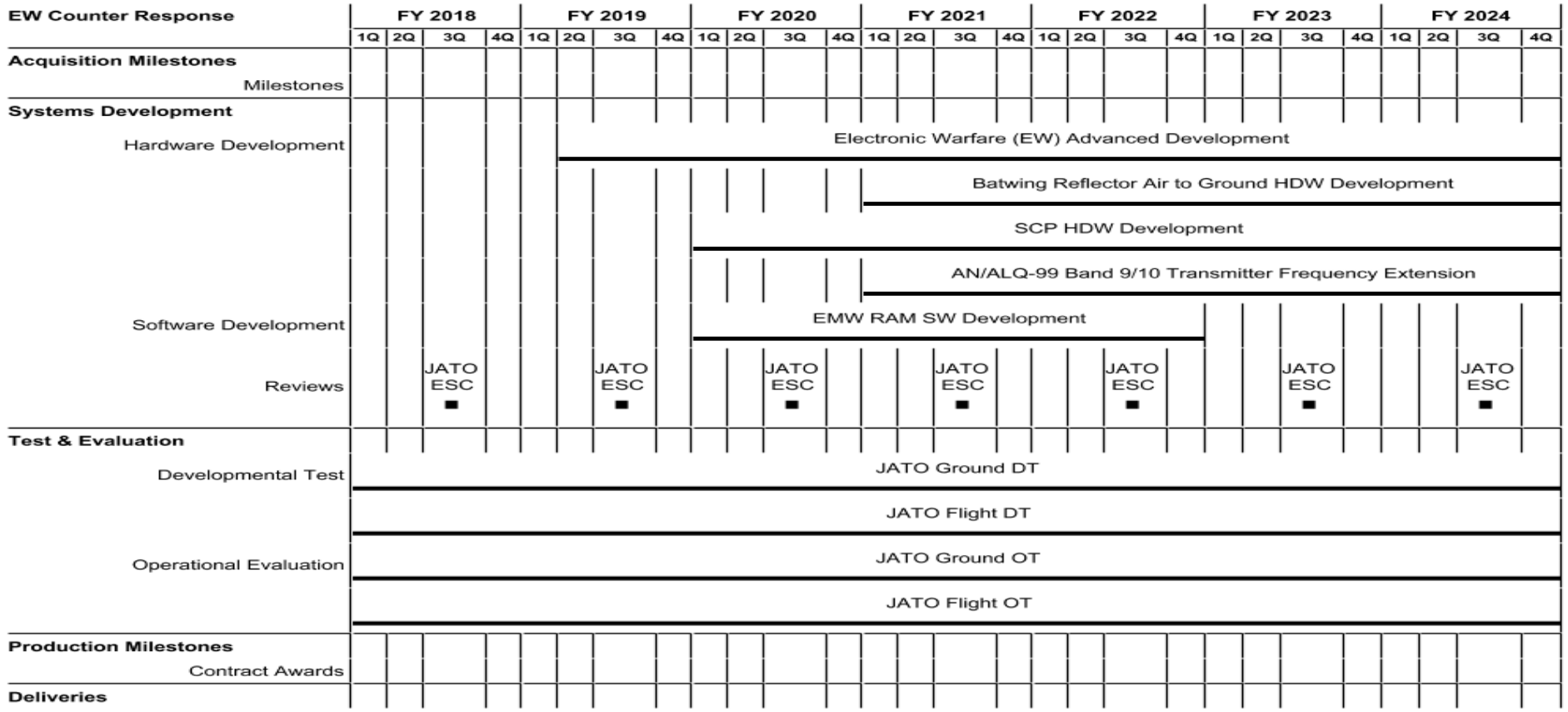
Remarks

Funding increases from FY 2019 to FY 2020 for additional headquarters travel funding required to support the SCP effort.

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	488.927	16.174		17.040		44.307		-		44.307	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*



2020PB - 0604270N - 0556

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 0556 / *EW Counter Response*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EW Counter Response				
Systems Development: Hardware Development: Electronic Warfare (EW) Advanced Development	2	2019	4	2024
Systems Development: Hardware Development: Batwing Reflector Air to Ground Hardware Development	1	2021	4	2024
Systems Development: Hardware Development: Special Capability Pod (SCP) Hardware Development	1	2020	4	2024
Systems Development: Hardware Development: AN/ALQ-99 Band 9/10 Transmitter Frequency Extension	1	2021	4	2024
Systems Development: Software Development: Electromagnetic Manuever Warfare (EMW) Resource Allocation Manager (RAM) Development	1	2020	4	2022
Systems Development: Reviews: JATO Executive Steering Committee 2018	3	2018	3	2018
Systems Development: Reviews: JATO Executive Steering Committee 2019	3	2019	3	2019
Systems Development: Reviews: JATO Executive Steering Committee 2020	3	2020	3	2020
Systems Development: Reviews: JATO Executive Steering Committee 2021	3	2021	3	2021
Systems Development: Reviews: JATO Executive Steering Committee 2022	3	2022	3	2022
Systems Development: Reviews: JATO Executive Steering Committee 2023	3	2023	3	2023
Systems Development: Reviews: JATO Executive Steering Committee 2024	3	2024	3	2024
Test & Evaluation: Developmental Test: JATO Ground Developmental Test	1	2018	4	2024
Test & Evaluation: Developmental Test: JATO Flight Developmental Test	1	2018	4	2024
Test & Evaluation: Operational Evaluation: JATO Ground Operational Test	1	2018	4	2024
Test & Evaluation: Operational Evaluation: JATO Flight Operational Test	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 1742 / *EW Technical Development and T&E*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
1742: *EW Technical Development and T&E*	4.047	1.064	1.833	1.764	-	1.764	1.614	1.650	1.684	1.718	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Electronic Warfare systems for the United States Navy (USN), United States Marine Corps (USMC), and United States Army tactical aircraft, USMC helicopters, surface combatants, data link vulnerability assessments, precision targeting, USN and USMC radio frequency jammers, and development and testing of electronic warfare devices for emerging threats and emergency contingencies. This element also includes development of Aircraft Survivability Equipment (ASE) and Electronic Warfare (EW) countermeasures solutions for the USN, USMC, and Coalition Aircraft to include studies and evaluations of current and future aircraft threats, modeling and simulation for improved countermeasure capabilities, and development and testing to address new and emerging threats. This program is funded under System Development and Demonstration because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision. (More details available at a higher classification upon request).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Electronic Warfare Technical Development and Test & Evaluation	1.064	1.833	1.764	0.000	1.764
Articles:	-	-	-	-	-
Description: Quick reaction prototyping of tactical information and electronic warfare systems. Addresses various Fleet requirements across multiple platforms (airborne, surface and subsurface), airborne and surface cryptologic operational requirements documents and the joint oversight council missions needs statement to research, assess, and develop information warfare and electronic warfare systems and capabilities. These systems/capabilities provide information dominance to friendly forces during conflict, which is necessary for successful mission accomplishment.					
FY 2019 Plans: Perform engineering development and test support of existing and emerging systems such as the EA-6B, EA-18G, and Next Generation Jammer to address potential Radio Frequency (RF) and Cyber/Electronic Warfare (EW) effects on current and evolving radar/communications threats. Generate techniques, tactics, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, USQ-113, ALQ-218, ALQ-227, AN/ALQ-231, ALE-43; and assist in requirements definitions of emerging Airborne					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 1742 / *EW Technical Development and T&E*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Electronic Attack (AEA) systems. Continue to lead efforts in support of Overseas Operations and Force Protection issues. (Classified discussion available upon request). ***FY 2020 Base Plans:*** Continue Engineering development and test support efforts of existing and emerging systems such as the EA-6B, EA-18G, and Next Generation Jammer to address potential Radio Frequency (RF) and Cyber/EW effects on current and evolving radar/communications threats. Generate techniques, tactics, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, USQ-113, ALQ-218, ALQ-227, AN/ALQ-231, ALE-43; and assist in requirements definitions of emerging AEA systems. Continue to lead efforts in support of Overseas Operations and Force Protection issues. (Classified discussion available upon request). ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY19 to FY20 decrease due to procurement and process improvement efficiencies.					
Accomplishments/Planned Programs Subtotals	1.064	1.833	1.764	0.000	1.764

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Development of classified prototypes and special capabilities. The Navy is granted streamlined acquisition authority for the development of classified prototypes and special capabilities under the Deputy Assistant Secretary of the Navy (DASN) (C4I).

E. Performance Metrics

Measures include quality and impact of new ideas and approaches; the success of the technology application in satisfying Combatant Commanders and Fleet requirements; and successful cost effective transition of capabilities to operational systems. The goal of these investments is to provide non-kinetic options to Commanders to influence adversaries and prevent escalation of crises. Qualitative measures are used initially then through development of modeling and simulation scenarios and capabilities, transition to quantitative metrics. Success heavily depends upon insight and feedback obtained through various intelligence community efforts and results.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 1742 / *EW Technical Development and T&E*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development	C/FP	Classified : classified	3.338	0.816	Oct 2017	1.524	Oct 2018	1.032	Oct 2019	-		1.032	Continuing	Continuing	Continuing
		Subtotal	3.338	0.816		1.524		1.032		-		1.032	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mod & Sim	C/CPFF	Classified : Classified	0.709	0.248	Oct 2017	0.309	Oct 2018	0.732	Oct 2019	-		0.732	Continuing	Continuing	Continuing
		Subtotal	0.709	0.248		0.309		0.732		-		0.732	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.047	1.064		1.833		1.764		-		1.764	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 1742 / *EW Technical Development and T&E*

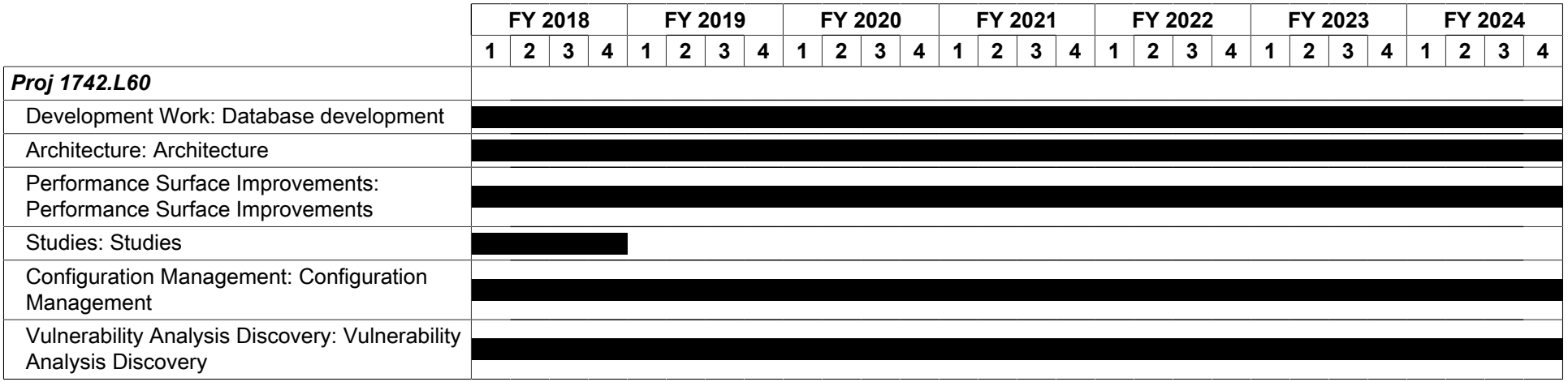


Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 1742 / *EW Technical Development and T&E*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1742.L60				
Development Work: Database development	1	2018	4	2024
Architecture: Architecture	1	2018	4	2024
Performance Surface Improvements: Performance Surface Improvements	1	2018	4	2024
Studies: Studies	1	2018	4	2018
Configuration Management: Configuration Management	1	2018	4	2024
Vulnerability Analysis Discovery: Vulnerability Analysis Discovery	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 2175 / *Tactical Air Electronic Warfare*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2175: *Tactical Air Electronic Warfare*	498.786	2.091	45.074	48.624	-	48.624	71.093	71.179	52.270	53.311	0.000	842.428
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 418

A. Mission Description and Budget Item Justification

Integrated Defensive Electronic Countermeasures (IDECM) Block 3 (IB-3/ALE-55) introduced the new Fiber Optic Towed Decoy (FOTD), ALE-55, capability to the IDECM Block 2 Electronic Warfare (EW) suite as a replacement for the ALE-50 Advanced Airborne Electronic Decoy (AAED). The FOTD, when integrated with the rest of the F/A-18E/F EW suite (i.e., ALQ-214, ALR-67(V)3, ALE-47 and ALE-50), the associated cockpit controls, displays and other avionics significantly improves the survivability of the host aircraft in a radio frequency threat environment. IB-3 MS III (Full-Rate Production Decision) was approved in the 4th Qtr. FY 2011. IB-3 Initial Operational Capability (IOC) was achieved 4th Qtr. FY 2011.

IDECM Block 4 (IB-4) is an Engineering Change Proposal (ECP) to the ALQ-214 to render it suitable for operation on F/A-18C/D aircraft (replacing the ALQ-126B and significantly improving F/A-18C/D survivability) while retaining all IDECM suite functionality when installed on F/A-18E/F aircraft. The IB-4 acquisition and contract strategy includes development of the Common On-Board Jammer for the F/A-18 C/D/E/F aircraft through sole source contract awards for modifications to the ALQ-214. IB-4, ALQ-214 ECP efforts include hardware and software design, development and test, delivery of 17 engineering development models, integration and testing on the host aircraft. The F/A-18 EW suite includes the ALR-67 Radar Warning Receiver (RWR), the ALE-47 Countermeasures Dispensing Set (CMDS), the mission computer and other avionics. In addition to performing the RWR function, the ALR-67 is the EW bus controller. The EW bus is the primary interface between the EW systems (Jammer, RWR, and CMDS). The mission computer is the avionics bus controller, the interface between the EW suite and other avionics. IB-4 production Cut-In occurred 2nd Qtr FY 2012, Initial Operational Capability (IOC) achieved May 2015.

ALQ-214 software improvement will provide the ALQ-214 with digital radio frequency memory deny-delay, technique capability significantly improving F/A-18C/D/E/F survivability. Acquisition and contract strategy includes development, integration and test of the ALQ-214 software improvements through sole-source contract award. Modifications to other F/A-18E/F Block II and Block III aircraft avionics may be required in order to develop and integrate this capability. These other avionics may include, but are not limited to, the ALR-67(V)2, ALR-67(V)3, ALE-47, ALE-50 AAED, ALE-55 FOTD, mission computer and fire control radar.

F/A-18 E/F ALQ-214 Adaptive Radar Countermeasures (ARC) will provide the ALQ-214 with improved RF threat detection algorithms and jamming against modern threat radars. Modifications to other F/A-18E/F Block II and Block III aircraft avionics may be required in order to develop and integrate this capability. These other avionics may include, but are not limited to, the ALR-67(V)2, ALR-67(V)3, ALE-47, ALE-50 AAED, ALE-55 FOTD, mission computer and fire control radar.

The Dual Band Decoy (DBD) will provide expanded Radio Frequency (RF) capability against current and emerging modern RF threat radars, significantly improving the survivability of the F/A-18 E/F. DBD will replace the current ALE-55 FOTD beginning with fielding of an Early Operational Capability in FY 2023. Modifications to other F/

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

A-18E/F Block II and Block III aircraft avionics may be required in order to develop and integrate this capability. These other avionics may include, but are not limited to, the ALR-67(V)2, ALR-67(V)3, ALE-47, ALE-50 AAED, ALE-55 FOTD, mission computer and fire control radar.

This Project also includes/enables integrated Aircraft Survivability Equipment (iASE) which improves situational awareness for own-ship, wingman, and distributed command and control.

Project Unit 2175 Tactical Air Electronic Warfare Cost to Complete should read $4.331 Million. Total Cost should read $842,760 Million.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Tactical Air EW	2.091	45.074	48.624	0.000	48.624
Articles:	-	-	-	-	-
FY 2019 Plans: IDECM ARC Requirements Definition will begin in FY 2019. Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.					
FY 2020 Base Plans: IDECM ARC Development, Integration and Test will continue in FY 2020 and continue into FY 2024. Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: Funding increase of $3.550M from FY19 to FY20 is for Flight testing on Legacy Hornet A/C.					
Accomplishments/Planned Programs Subtotals	2.091	45.074	48.624	0.000	48.624

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• APN/0576 004-12: *Common On-Board Jammer*	44.826	66.854	44.672	-	44.672	43.347	49.750	50.568	52.261	28.930	808.547
• PANMC/0182: *Airborne Expendable CM*	23.534	23.712	18.110	-	18.110	18.527	25.847	46.137	47.054	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

Remarks

Airborne Expendable Countermeasures procurement above is for both ALE-55 and the DBD. It is anticipated that a transition from ALE-55 to an EOC variant of DBD will occur in FY 2022.

D. Acquisition Strategy

IB-4 Engineering Change Proposal (ECP) and Software Improvement (SWIP) development contracts were awarded sole-source to Harris in 2009 and 2012 respectively. Harris is the original developer/manufacturer and current sustainer of the ALQ-214. Annual IB-4 production awards are planned through 2025.

ARC development contract is planned as a sole source to Leidos beginning in 2019 continuing through 2023. DBD development is planned as an evolutionary development approach with competitive prototyping phase starting in FY 2019 through FY 2021, followed by a competitive EMD phase starting in FY 2021 continuing into FY 2024.

E. Performance Metrics

IDECM Block 4: ALQ-214 FRP 14-16 contract awarded 4th Qtr. FY 2017. FRP-15 option contract awarded 2nd Qtr. FY 2018. FRP 16 contract award is planned for 2nd Qtr. FY 2019. ALQ-214 FRP 14-16 is a Sole Source Firm Fixed Price (SS/FFP) contract with a base plus 2 options to Harris.
ALQ-214 Software Improvement: Successfully achieve Fleet Release in 4th Qtr. FY 2018.

ARC: Successfully award ARC development contract to Leidos in 1st Qtr. FY 2019. Development contract will continue into FY 2024.

DBD: Successfully award a DBD prototype development contract in FY 2019. Contract will continue through FY 2021. Contractor is TBD.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Eng - IDECM	SS/CPFF	Various : Various	64.169	0.000		0.000		0.000		-		0.000	0.000	64.169	64.169
Adaptive Radar Countermeasures (ARC) Development	SS/CPFF	Leidos : Arlington, VA	0.000	0.000		13.092	Jan 2019	9.402	Dec 2019	-		9.402	76.614	99.108	96.383
Dual Band Decoy Development	TBD	TBD : TBD	0.000	0.000		27.778	May 2019	28.651	May 2020	-		28.651	95.482	151.911	153.528
Prior Year Prod Dev costs no longer funded in FYDP	Various	Various : Various	243.543	0.000		0.000		0.000		-		0.000	0.000	243.543	-
		Subtotal	307.712	0.000		40.870		38.053		-		38.053	172.096	558.731	N/A

Remarks

IDECM ARC Requirements Definition will begin in FY 2019. Development, Integration and Test will begin in FY 2020.
Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Log Supt- ARC	WR	NAWCAD : Pax River, MD	0.000	0.000		0.000		0.057	Nov 2019	-		0.057	0.238	0.295	-
Software Dev-ALQ - 214 SW Dev	SS/CPFF	Harris : Clifton, NJ	27.875	1.781	Nov 2017	0.000		0.000		-		0.000	0.000	29.656	29.656
Engineering Support	WR	Various : Various	2.318	0.095	Nov 2017	0.249	Nov 2018	0.000		-		0.000	0.000	2.662	-
Studies and Analysis SW Dev	SS/CR	Johns Hopkins : Baltimore, MD	1.573	0.000		0.000		0.000		-		0.000	0.000	1.573	1.573
Engineering Support ARC	WR	Various : Various	0.000	0.000		1.416	Nov 2018	1.611	Nov 2019	-		1.611	13.200	16.227	-
Engineering Support Dual Band Decoy	WR	Various : Various	0.000	0.000		1.912	Nov 2018	3.045	Nov 2019	-		3.045	14.150	19.107	-
Prior Year Support costs no longer funded in FYDP	Various	Various : Various	19.531	0.000		0.000		0.000		-		0.000	0.000	19.531	-
Software Dev-ALQ - 214 SW Dev	C/CPFF	GTRI : Atlanta GA	0.000	0.000		0.222	Dec 2018	0.000		-		0.000	0.000	0.222	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	51.297	1.876		3.799		4.713		-		4.713	27.588	89.273	N/A

Remarks

Software Dev - ALQ-214 SW Dev. Software Development challenges required additional funding to complete the effort.
IDECM ARC Requirements Definition will begin in FY 2019. Development, Integration and Test will begin in FY 2020.
Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Dev Test & Eval Supt ALQ-214 SW Imp	WR	Various : Various	0.420	0.000		0.000		0.000		-		0.000	0.000	0.420	-
Integrated Test & Eval ALQ-214 SW Imp	WR	NAWCWD : China Lake, CA	0.952	0.000		0.000		0.000		-		0.000	0.000	0.952	-
Integrated Test & Eval ALQ-214 SW Imp C/D Aircraft	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		4.000	Oct 2019	-		4.000	0.000	4.000	-
Dev Test & Eval Supt ALQ-214 SW Imp	WR	NAWCWD : China Lake, CA	12.535	0.169	Aug 2018	0.000		0.000		-		0.000	0.000	12.704	-
Dev Test & Eval Supt ALQ-214 SW IMP	WR	NAWCWD : Point Mugu, CA	2.210	0.000		0.000		0.000		-		0.000	0.000	2.210	-
Oper Test & Eval IDECM	WR	NAWCWD : China Lake, CA	2.737	0.000		0.000		0.000		-		0.000	0.000	2.737	-
Eng Test & Eval IDECM	WR	Various : Various	2.657	0.000		0.000		0.000		-		0.000	0.000	2.657	-
Eng & Tech Srvcs (Non-FFRDC)	SS/CPFF	Various : Various	2.453	0.000		0.032	Jan 2019	0.000		-		0.000	0.000	2.485	2.453
Dev Test & Eval Supt ARC	WR	Various : Various	0.000	0.000		0.000		1.303	Nov 2019	-		1.303	10.082	11.385	-
Integrated Test & Eval ARC	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	2.459	2.459	-
Oper Test & Eval ARC	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	12.000	12.000	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Oper Test & Eval ARC (VX-9)	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.000		-		0.000	6.900	6.900	-
Dev Test & Eval Supt Dual Band Decoy	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	5.711	5.711	-
Integrated Test & Eval Dual Band Decoy	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	2.115	2.115	-
Oper Test & Eval Dual Band Decoy	WR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	7.050	7.050	-
Eng Test & Eval ARC	WR	Various : Various	0.000	0.000		0.321	Nov 2018	0.502	Nov 2019	-		0.502	2.111	2.934	-
Oper Test & Eval DBD (VX-9)	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.000		-		0.000	3.788	3.788	-
Prior Year T&E costs no longer funded in FYDP	WR	Various : Various	26.007	0.000		0.000		0.000		-		0.000	0.000	26.007	-
		Subtotal	49.971	0.169		0.353		5.805		-		5.805	52.216	108.514	N/A

Remarks

IDECM ARC Requirements Definition will begin in FY 2019. Development, Integration and Test will begin in FY 2020.
Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.
ALQ-214 Integrated Test & Evaluation on the F/A-18 C/D aircraft will occur in FY 2020.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	NAWCAD : Pax River, MD	0.871	0.046	Oct 2017	0.052	Oct 2018	0.053	Oct 2019	-		0.053	0.285	1.307	-
Prior Year Mgmt costs no longer funded in FYDP	Various	Various : Various	88.935	0.000		0.000		0.000		-		0.000	0.000	88.935	-
		Subtotal	89.806	0.046		0.052		0.053		-		0.053	0.285	90.242	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 2175 / *Tactical Air Electronic Warfare*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	498.786	2.091		45.074		48.624		-		48.624	252.185	846.760	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

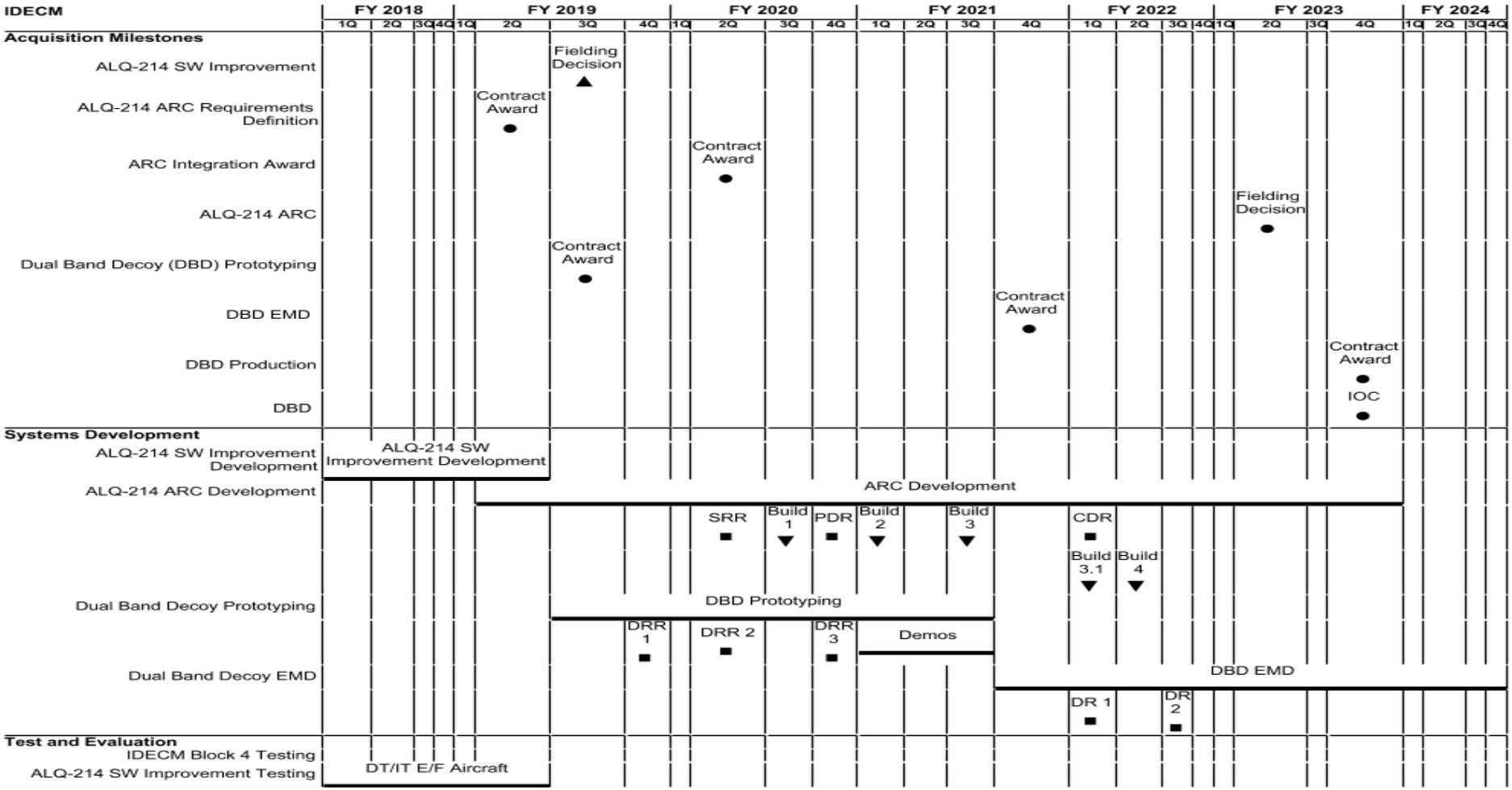
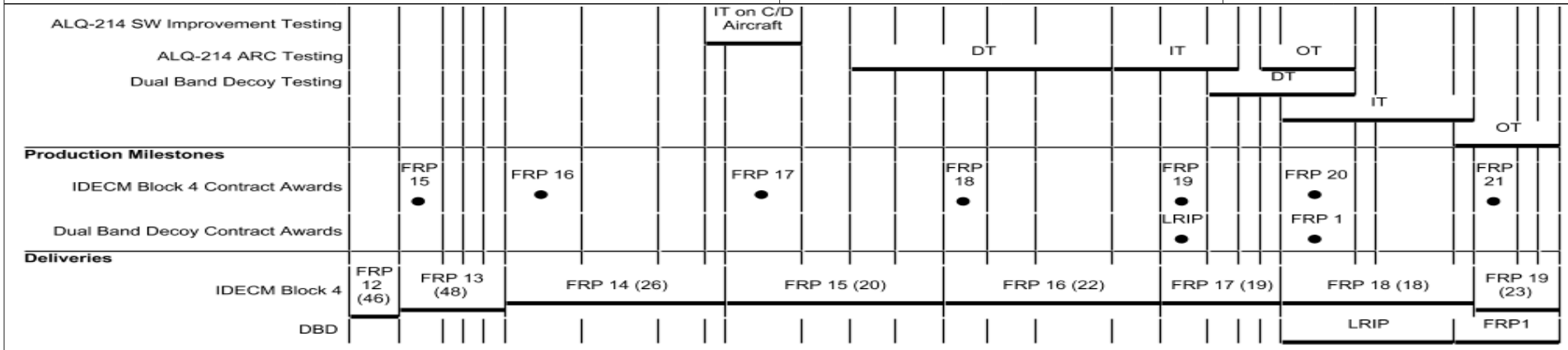


Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*



2020PB - 0604270N - 2175 IDECM Block 4 is an ECP to Block 2

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
IDECM				
Acquisition Milestones: ALQ-214 SW Improvement: ALQ-214 SW Improvement Fielding Decision	3	2019	3	2019
Acquisition Milestones: ALQ-214 ARC Requirements Definition: ALQ-214 ARC Requirements Definition	2	2019	2	2019
Acquisition Milestones: ARC Integration Award: ARC Integration Award	2	2020	2	2020
Acquisition Milestones: ALQ-214 ARC: ALQ-214 ARC	2	2023	2	2023
Acquisition Milestones: Dual Band Decoy (DBD) Prototyping: Contrat Award	3	2019	3	2019
Acquisition Milestones: DBD EMD: Contract Award	4	2021	4	2021
Acquisition Milestones: DBD Production: Contract Award	4	2023	4	2023
Acquisition Milestones: DBD: IOC	4	2023	4	2023
Systems Development: ALQ-214 SW Improvement Development: ALQ-214 SW Improvement Development	1	2018	2	2019
Systems Development: ALQ-214 ARC Development: ARC Development	2	2019	4	2023
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Systems Requirements Review	2	2020	2	2020
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Preliminary Design Review	4	2020	4	2020
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Critical Design Review	1	2022	1	2022
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 1	3	2020	3	2020
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 2	1	2021	1	2021
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 3	3	2021	3	2021
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 3.1	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 4	2	2022	2	2022
Systems Development: Dual Band Decoy Prototyping: DBD Prototyping	3	2019	3	2021
Systems Development: Dual Band Decoy Prototyping: Design Readyness Review 1	4	2019	4	2019
Systems Development: Dual Band Decoy Prototyping: Design Readyness Review 2	2	2020	2	2020
Systems Development: Dual Band Decoy Prototyping: Design Readyness Review 3	4	2020	4	2020
Systems Development: Dual Band Decoy Prototyping: Prototype Demonstrations	1	2021	3	2021
Systems Development: Dual Band Decoy EMD: DBD EMD	4	2021	4	2024
Systems Development: Dual Band Decoy EMD: Design Review 1	1	2022	1	2022
Systems Development: Dual Band Decoy EMD: Design Review 2	3	2022	3	2022
Test and Evaluation: ALQ-214 SW Improvement Testing: ALQ-214 SW Improvement Development Testing (DT)/Integrated Testing (IT) E/F	1	2018	2	2019
Test and Evaluation: ALQ-214 SW Improvement Testing: ALQ-214 SW Improvement Integrated Testing (IT) on C/D Aircraft	1	2020	2	2020
Test and Evaluation: ALQ-214 ARC Testing: ALQ-214 ARC Developmental Testing	4	2020	4	2021
Test and Evaluation: ALQ-214 ARC Testing: ALQ-214 ARC Integrated Testing	1	2022	3	2022
Test and Evaluation: ALQ-214 ARC Testing: ALQ-214 ARC Operational Testing	1	2023	2	2023
Test and Evaluation: Dual Band Decoy Testing: DBD Developmental Testing	3	2022	2	2023
Test and Evaluation: Dual Band Decoy Testing: DBD Integrated Testing	2	2023	1	2024
Test and Evaluation: Dual Band Decoy Testing: DBD Operational Testing	1	2024	4	2024
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 15	2	2018	2	2018
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 16	2	2019	2	2019
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 17	2	2020	2	2020
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 18	2	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 2175 / *Tactical Air Electronic Warfare*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 19	2	2022	2	2022
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 20	2	2023	2	2023
Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 21	2	2024	2	2024
Production Milestones: Dual Band Decoy Contract Awards: DBD Low Rate Initial Production	2	2022	2	2022
Production Milestones: Dual Band Decoy Contract Awards: DBD Full Rate Production	2	2023	2	2023
Deliveries: IDECM Block 4: IDECM Block 4 FRP 12 Deliveries (46)	1	2018	1	2018
Deliveries: IDECM Block 4: IDECM Block 4 FRP 13 Deliveries (48)	2	2018	1	2019
Deliveries: IDECM Block 4: IDECM Block 4 FRP 14 Deliveries (26)	2	2019	1	2020
Deliveries: IDECM Block 4: IDECM Block 4 FRP 15 Deliveries (20)	2	2020	1	2021
Deliveries: IDECM Block 4: IDECM Block 4 FRP 16 Deliveries (22)	2	2021	1	2022
Deliveries: IDECM Block 4: IDECM Block 4 FRP 17 Deliveries (19)	2	2022	1	2023
Deliveries: IDECM Block 4: IDECM Block 4 FRP 18 Deliveries (18)	2	2023	1	2024
Deliveries: IDECM Block 4: IDECM Block 4 FRP 19 Deliveries (23)	2	2024	4	2024
Deliveries: DBD: DBD LRIP Deliveries	2	2023	4	2023
Deliveries: DBD: DBD FRP1 Deliveries	1	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3308 / *Technology Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3308: *Technology Development*	0.000	2.276	6.108	6.238	-	6.238	8.444	8.614	8.776	8.950	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

PE 0604279N consolidated to PE 0604270N beginning in FY 2017.

A. Mission Description and Budget Item Justification

Project Unit 3308 / Technology Development funds efforts that focus on the quick reaction prototyping and fielding of Tactical Electronic Warfare (EW)/countermeasures solutions for increased resilience and survivability by improving the active electronic defense of tactical aircraft. This self-protection provides friendly forces the ability to deploy, survive, operate, maneuver, and regenerate in all domains while under attack as well as strike diverse targets inside adversary air and missile defense networks to destroy mobile power-projection platforms. This Project also includes/enables integrated Aircraft Survivability Equipment (iASE) which improves situational awareness for own-ship, wingman, and distributed command and control. Significant investments have been made in the modular hardware and reprogrammable software resident in ASE capability which is fielded today. Technology Development makes specific investments towards countermeasure/jammer/receiver algorithm development, threat data file and model updates as modern threats continue to evolve. These updated data files and algorithms can be deployed within hours of release by squadron maintenance personnel to aircraft while still on the ramp or flight deck. This program directly addresses the operational requirement of Strike survivability platforms for optimization of EW/countermeasure solutions across the Department of Navy.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Technology Development	2.276	6.108	6.238	0.000	6.238
Articles:	-	-	-	-	-
FY 2019 Plans: Perform EW vulnerability studies/analysis, product development and test conducted for the ALQ-214 system on the F/A-18 C/D and E/F for both USMC and Navy aircraft. Develop, model and test advanced electronic countermeasure algorithms for USMC and Navy aircraft to defend against modern threats both inside and outside the currently protected RF spectrum.					
FY 2020 Base Plans: Perform EW vulnerability studies/analysis, product development and test conducted for the ALQ-214 system on the F/A-18 C/D and E/F for both USMC and Navy aircraft. Develop, model and test advanced electronic countermeasure algorithms for USMC and Navy aircraft to defend against modern threats both inside and outside the currently protected RF spectrum.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $.111M due to emerging threats outside currently protected RF spectrum. This requires additional algorithms development and testing.					
Accomplishments/Planned Programs Subtotals	2.276	6.108	6.238	0.000	6.238

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Electronic Warfare/vulnerability studies/analysis, product development and test conducted for strike aircraft across the Future Years Defense Program (FYDP).

E. Performance Metrics

Electronic Warfare (EW) vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP. Updated Threat Models and Algorithms are released in EW Suite Updates and posted to Naval Data Distribution System (NDDS). Once available on NDDS, Fleet Maintainers download and install the EW Suite to all applicable aircraft.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Dev - ALQ-214 SW Dev	SS/CPFF	Harris : Clifton,NJ	0.000	0.545	Nov 2017	0.900	Jan 2019	1.190	Jan 2020	-		1.190	Continuing	Continuing	Continuing
Software Dev - ALQ-214 SW Dev	WR	NAWCWD : Point Mugu, CA	0.000	0.000		2.233	Dec 2018	2.010	Dec 2019	-		2.010	0.000	4.243	-
Software Dev - ALQ-214 SW Dev	MIPR	Wright Patterson AFB : Dayton, OH	0.000	0.000		2.500	Jan 2019	0.000		-		0.000	0.000	2.500	-
		Subtotal	0.000	0.545		5.633		3.200		-		3.200	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Dev - ALQ-214 SW Dev	WR	NAWCWD : Point Mugu, CA	0.000	0.000		0.000		0.836	Nov 2019	-		0.836	Continuing	Continuing	Continuing
Software Dev - ALQ-214 SW Dev	C/CPFF	Johns Hopkins : Baltimore, MD	0.000	0.000		0.475	Feb 2019	0.260	Nov 2019	-		0.260	Continuing	Continuing	Continuing
Software Dev - ALQ-214 SW Dev	C/BA	Leidos : Arlington, VA	0.000	1.000	Jul 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Software Dev - ALQ-214 SW Dev	WR	NRL : Arlington, VA	0.000	0.075	Aug 2018	0.000		0.000		-		0.000	0.000	0.075	-
		Subtotal	0.000	1.075		0.475		1.096		-		1.096	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

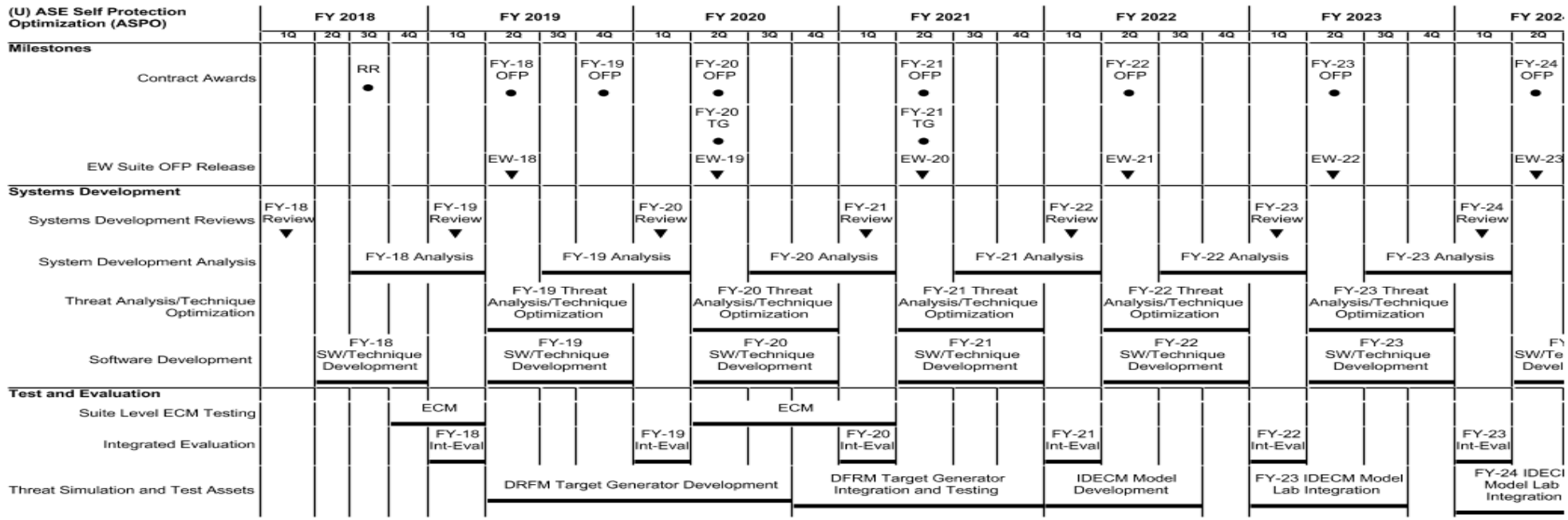
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Evaluation	WR	NAWCWD : Point Mugu, CA	0.000	0.000		0.000		1.502	Nov 2019	-		1.502	Continuing	Continuing	Continuing
Engineering & Evaluation	WR	Various : Various	0.000	0.656	Dec 2017	0.000		0.440	Nov 2019	-		0.440	Continuing	Continuing	Continuing
		Subtotal	0.000	0.656		0.000		1.942		-		1.942	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3308 / *Technology Development*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.276		6.108		6.238		-		6.238	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*



2020PB - 0604270N - 3308

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
(U) ASE Self Protection Optimization (ASPO)				
Milestones: Contract Awards: ARC Risk Reduction	3	2018	3	2018
Milestones: Contract Awards: FY-18 Operational Flight Program	2	2019	2	2019
Milestones: Contract Awards: FY-19 Operational Flight Program	4	2019	4	2019
Milestones: Contract Awards: FY-20 Operational Flight Program	2	2020	2	2020
Milestones: Contract Awards: FY-21 Operational Flight Program	2	2021	2	2021
Milestones: Contract Awards: FY-22 Operational Flight Program	2	2022	2	2022
Milestones: Contract Awards: FY-23 Operational Flight Program	2	2023	2	2023
Milestones: Contract Awards: FY-24 Operational Flight Program	2	2024	2	2024
Milestones: Contract Awards: FY-20 Target Generator	2	2020	2	2020
Milestones: Contract Awards: FY-21 Target Generator	2	2021	2	2021
Milestones: EW Suite OFP Release: Release-18	2	2019	2	2019
Milestones: EW Suite OFP Release: Release-19	2	2020	2	2020
Milestones: EW Suite OFP Release: Release-20	2	2021	2	2021
Milestones: EW Suite OFP Release: Release-21	2	2022	2	2022
Milestones: EW Suite OFP Release: Release-22	2	2023	2	2023
Milestones: EW Suite OFP Release: Release-23	2	2024	2	2024
Systems Development: Systems Development Reviews: FY-18 Review	1	2018	1	2018
Systems Development: Systems Development Reviews: FY-19 Review	1	2019	1	2019
Systems Development: Systems Development Reviews: FY-20 Review	1	2020	1	2020
Systems Development: Systems Development Reviews: FY-21 Review	1	2021	1	2021
Systems Development: Systems Development Reviews: FY-22 Review	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Systems Development: Systems Development Reviews: FY-23 Review	1	2023	1	2023
Systems Development: Systems Development Reviews: FY-24 Review	1	2024	1	2024
Systems Development: System Development Analysis: FY-18 Analysis	3	2018	1	2019
Systems Development: System Development Analysis: FY-19 Analysis	3	2019	1	2020
Systems Development: System Development Analysis: FY-20 Analysis	3	2020	1	2021
Systems Development: System Development Analysis: FY-21 Analysis	3	2021	1	2022
Systems Development: System Development Analysis: FY-22 Analysis	3	2022	1	2023
Systems Development: System Development Analysis: FY-23 Analysis	3	2023	1	2024
Systems Development: System Development Analysis: FY-24 Analysis	3	2024	4	2024
Systems Development: Threat Analysis/Technique Optimization: FY-19 Threat Analysis/Technique Optimization	2	2019	4	2019
Systems Development: Threat Analysis/Technique Optimization: FY-20 Threat Analysis/Technique Optimization	2	2020	4	2020
Systems Development: Threat Analysis/Technique Optimization: FY-21 Threat Analysis/Technique Optimization	2	2021	4	2021
Systems Development: Threat Analysis/Technique Optimization: FY-22 Threat Analysis/Technique Optimization	2	2022	4	2022
Systems Development: Threat Analysis/Technique Optimization: FY-23 Threat Analysis/Technique Optimization	2	2023	4	2023
Systems Development: Threat Analysis/Technique Optimization: FY-24 Threat Analysis/Technique Optimization	2	2024	4	2024
Systems Development: Software Development: FY-18 SW/Technique Development	2	2018	4	2018
Systems Development: Software Development: FY-19 SW/Technique Development	2	2019	4	2019
Systems Development: Software Development: FY-20 SW/Technique Development	2	2020	4	2020
Systems Development: Software Development: FY-21 SW/Technique Development	2	2021	4	2021
Systems Development: Software Development: FY-22 SW/Technique Development	2	2022	4	2022
Systems Development: Software Development: FY-23 SW/Technique Development	2	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3308 / *Technology Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Systems Development: Software Development: FY-24 SW/Technique Development	2	2024	4	2024
Test and Evaluation: Suite Level ECM Testing: FY18 ECM Testing	4	2018	1	2019
Test and Evaluation: Suite Level ECM Testing: FY20 ECM Testing	2	2020	1	2021
Test and Evaluation: Integrated Evaluation: FY-18 Integrated Evaluation	1	2019	1	2019
Test and Evaluation: Integrated Evaluation: FY-19 Integrated Evaluation	1	2020	1	2020
Test and Evaluation: Integrated Evaluation: FY-20 Integrated Evaluation	1	2021	1	2021
Test and Evaluation: Integrated Evaluation: FY-21 Integrated Evaluation	1	2022	1	2022
Test and Evaluation: Integrated Evaluation: FY-22 Integrated Evaluation	1	2023	1	2023
Test and Evaluation: Integrated Evaluation: FY-23 Integrated Evaluation	1	2024	1	2024
Test and Evaluation: Threat Simulation and Test Assets: Digital Radio Frequency Memory (DFRM) Target Generator Development	2	2019	3	2020
Test and Evaluation: Threat Simulation and Test Assets: DFRM Target Generator Integration and Testing	4	2020	4	2021
Test and Evaluation: Threat Simulation and Test Assets: IDECM Model Development	1	2022	3	2022
Test and Evaluation: Threat Simulation and Test Assets: FY-23 IDECM Model Lab Integration	1	2023	3	2023
Test and Evaluation: Threat Simulation and Test Assets: FY-24 IDECM Model Lab Integration	1	2024	3	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3309 / *Assault Survivability Optimization*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3309: *Assault Survivability Optimization*	3.484	0.848	0.836	6.910	-	6.910	0.842	0.861	0.878	0.895	Continuing	Continuing
Quantity of RDT&E Articles	480	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Program was established to fill aircraft survivability gaps against current and future threat systems. This project addresses the Air Expendable Countermeasures (AECM) requirement maintaining a portfolio of countermeasures capable of defeating current and advancing surface-to-air and air-to-air threat missile systems to include the development, testing, and rapid fielding of advanced countermeasures and enhanced employment techniques needed to support fleet combat operations. Countermeasure dispensing techniques are developed using capability advancements tied to integrated Aircraft Survivability Equipment (iASE) investments by leveraging available sensor data in the iASE Suite. Improved countermeasure dispense techniques are rapidly delivered to operational Fleet aircraft thru Mission Data File updates via established software update processes. Also, new expendable countermeasure technology developed in industry, by other DoD Components and through other R&D programs can be transitioned to AECM Program of Record meet the required operational platform survivability without further investment in iASE systems. This Project also includes/enables iASE which improves situational awareness for own-ship, wingman, and distributed command and control. Resources will be applied to the following areas:

1) Studies and evaluations to optimize employment of current countermeasures and iASE capabilities.
2) Development and demonstration of advanced expendable countermeasures and countermeasure techniques.
3) Testing and evaluation of advanced countermeasures.
4) Development of system software enhancements and integration for the testing and deployment of advanced countermeasure techniques.
5) Development of and upgrades to modeling tools and specialized equipment required to conduct evaluation of advanced countermeasures against proliferating threats.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Assault Survivability Optimization	0.848	0.836	6.910	0.000	6.910
Articles:	-	-	-	-	-
FY 2019 Plans: Continue development and testing of advanced countermeasure techniques and upgrade specialized evaluation equipment for advancing threat systems. Perform modeling and simulation and effectiveness ground to air flight testing of 1X1X8 advanced countermeasure flares for F/A-18E/F.					
FY 2020 Base Plans: Continue development and testing of advanced countermeasure techniques and upgrade specialized evaluation equipment for advancing threat systems. Perform modeling and simulation to support effectiveness flight testing of 1X1X8 advanced countermeasure flares for F/A-18E/F against air-to-air threat systems. Perform					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3309 / *Assault Survivability Optimization*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
modeling and simulation to support effectiveness flight testing of advanced countermeasure flares for AH-1Z/ UH-1Y and MV-22 against current emerging threat systems. Perform capability upgrades to test equipment to evaluated countermeasure effectiveness. Perform modeling, simulation and testing of advanced radio frequency countermeasure. Develop advance countermeasures to defeat merging threats. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 to FY 2020 increase of $6.1M prioritized by USMC to fill existing, known capability shortfalls to address critical gaps in survivability against current and emerging threat systems thereby endangering USMC platforms.					
Accomplishments/Planned Programs Subtotals	0.848	0.836	6.910	0.000	6.910

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Acquisition strategy is to leverage improvements in air expendable countermeasures technology and integration of existing iASE sensor data to enhance platform survivability on USN and USMC platforms through more effective dispense techniques, investing in enhancements in modeling and simulation tools to better evaluate countermeasure effectiveness, upgrading test and evaluation equipment to incorporate current and future threats for effectiveness tests, and developing and demonstrating advanced concept countermeasures for future threats. New advanced countermeasures are then transitioned to the Procurement of Ammunition Navy and Marine Corps appropriation for procurement and fielding. New optimized and advanced countermeasure techniques are delivered via operational Mission Data Files (MDF) to increase aircraft/aircrew survivability.

E. Performance Metrics

Maintain capability requirements established in AECM ORD: #512-88-89 dated 28 May 1999 to provide operationally effective mixture of countermeasures that can be employed to degrade and/or neutralize the effectiveness of current and projected Electro Optic (EO), Infrared (IR), Radio Frequency (RF) and Ultra-violet (UV) threat missile systems. Continued development of optimized countermeasure techniques and advance countermeasures by on-going analysis and test flight efforts related to aircraft platform survivability based on global threat development and proliferation. Testing of countermeasure techniques developed for improved survivability is supported by Statement of Functionality for Aircraft Survivability Equipment Smart Dispense, dated 19 January 2012. Project Unit 3309 efforts will continue due to advanced threat proliferation, on-going technology advances in countermeasures and fielding of iASE capability advancements within the EO, IR, RF and UV spectrums. Project will include efforts to satisfy USN and USMC aircraft self-protection against advanced Man-Portable Air Defense Systems (MANPADs).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3309 / *Assault Survivability Optimization*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Expendable Countermeasure Technique Modeling and Simulation	WR	NSWC Crane : Crane, IN	0.773	0.469	Oct 2017	0.423	Oct 2018	0.406	Oct 2019	-		0.406	Continuing	Continuing	Continuing
Archive Radio Frequency Countermeasures Modeling and Simulation efforts no funding through FYDP	WR	NSWC Crane : Crane, IN	0.715	0.000		0.000		0.000		-		0.000	0.000	0.715	0.715
RFCM Modeling and Simulation	C/CPFF	GTRI : Altanta, GA	0.000	0.050	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
1x1x8 Expendable Countermeasure Technique Modeling and Simulation	WR	NSWC Crane : Crane, IN	0.070	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
AH-1Z/UH-1Y and MV-22 Expendable Countermeasure Technique Modeling and Simulation	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.778	Oct 2019	-		0.778	Continuing	Continuing	Continuing
AH-1Z/UH-1Y and MV-22 RFCM Modeling and Simulation	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.275	Oct 2019	-		0.275	Continuing	Continuing	Continuing
		Subtotal	1.558	0.519		0.423		1.459		-		1.459	Continuing	Continuing	N/A

Remarks

Infrared (IR) Decoys: FY 2020 modeling and simulation funding supports the development of advanced countermeasure techniques prior to air to air flight test for F/A-18 and ground to air flight test for AH-1Z/UH-1Y and MV-22. Initiated modeling and simulation and engineering and evaluation in FY 2017 to determine applicability of 1x1x8 countermeasures on Navy aircraft. The program anticipates funding 1X1X8 modeling and simulation in FY 2021.

Radio Frequency (RF) Decoys: FY 2020 modeling and simulation funding supports modeling and simulation of advanced RF decoys on USMC platforms. FY 2018 Radio Frequency Countermeasure (RFCM) Joint Aircraft Survivability Program (JASP) award to perform modeling and simulation for future active RF decoy.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3309 / *Assault Survivability Optimization*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Mission Data File Software Development	WR	FRCSE : Jacksonville, FL	0.240	0.070	Jan 2018	0.071	Dec 2018	0.072	Dec 2019	-		0.072	Continuing	Continuing	Continuing
AH-1Z/UH-1Y and MV-22 Test Mission Data File Software Development	WR	FRCSE : Jacksonville, FL	0.000	0.000		0.000		0.201	Dec 2019	-		0.201	Continuing	Continuing	Continuing
AH-1Z/UH-1Y and MV-22 Operational Mission Data File Software Development and Release	WR	FRCSE : Jacksonville, FL	0.000	0.000		0.000		0.465	Mar 2020	-		0.465	Continuing	Continuing	Continuing
		Subtotal	0.240	0.070		0.071		0.738		-		0.738	Continuing	Continuing	N/A

Remarks

FY 2020 Software development funding supports the creation of test Mission Data Files (MDF) and enhanced operational flight program algorithms for flight effectiveness testing for F/A-18E/F, AH-1Z/UH-1Y and MV-22.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental T&E Flight Tests	WR	Various : Various	0.544	0.031	Jun 2018	0.342	Mar 2019	0.276	Mar 2020	-		0.276	Continuing	Continuing	Continuing
Archive Test and Evaluation Efforts no funding through FYDP	Various	Various : Various	0.698	0.000		0.000		0.000		-		0.000	0.000	0.698	0.698
Archive 1x1x8 Engineering and Evaluation no funding through FYDP	Various	Various : Various	0.277	0.000		0.000		0.000		-		0.000	0.000	0.277	0.277
1x1x8 Engineering and Evaluaion	MIPR	Apexx Enterprises : Montgomery, IN	0.065	0.128	Jul 2018	0.000		0.000		-		0.000	0.000	0.193	0.193
AH-1Z/UH-1Y and MV-22 Developmental T&E Flight Tests	WR	Various : Various	0.000	0.000		0.000		0.749	Mar 2020	-		0.749	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3309 / *Assault Survivability Optimization*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RFCM Millimeter Wave Testing	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.180	Mar 2020	-		0.180	Continuing	Continuing	Continuing
Advanced Countermeasures Development and MJU-67 Re-design	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.625	Oct 2019	-		0.625	Continuing	Continuing	Continuing
Advance Threat Simulator Hardware in the Loop Simulator	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.288	Jan 2020	-		0.288	Continuing	Continuing	Continuing
Threat Analysis and Characterization and Signature Measurement Capability for Seeker Test Van Capability Upgrades	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		1.019	Oct 2019	-		1.019	Continuing	Continuing	Continuing
Engineering and Evaluation for Advance Countermeasure Composition	MIPR	Orbital ATK : Arlington, VA	0.000	0.000		0.000		0.278	Mar 2020	-		0.278	0.000	0.278	0.278
Capability Upgrades for Tiger Pod Infrared Measurement and AICES Pod	WR	NAWCWD : Pt Mugu, CA	0.000	0.000		0.000		0.575	Dec 2019	-		0.575	Continuing	Continuing	Continuing
Capability Upgrades for Mongoose Pod	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.128	Dec 2019	-		0.128	Continuing	Continuing	Continuing
		Subtotal	1.584	0.159		0.342		4.118		-		4.118	Continuing	Continuing	N/A

Remarks

FY 2019 Developmental T&E flight test following modeling and simulation evaluation will optimize expendable countermeasure effectiveness and determine applicability of 1x1x8 countermeasures for F/A-18E/F against ground to air threats. FY 2020 Developmental T&E flight test following modeling and simulation evaluation will optimize expendable countermeasure effectiveness and determine applicability of 1x1x8 countermeasures for F/A-18E/F against air to air threats. Developmental T&E flight test following modeling and simulation evaluation will optimize expendable countermeasure effectiveness for AH-1Z/UH-1Y and MV-22. FY 2020 advanced countermeasure development and engineering will determine solutions to defeat advanced threats in multiple spectrums. FY 2020 test equipment capability upgrades will improve countermeasure test equipment to evaluate effectiveness against advanced threats.

FY 2018 flight test cost updated for actuals. Increase from FY 2018 to FY 2019 above inflation due to higher flight test cost for F/A-18E/F aircraft platform. Initiated engineering and evaluation to determine applicability of 1x1x8 countermeasures on Navy aircraft platforms.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3309 / *Assault Survivability Optimization*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management	WR	FRCSE : Jacksonville, FL	0.102	0.100	Oct 2017	0.000		0.056	Oct 2019	-		0.056	Continuing	Continuing	Continuing
AH-1Z/UH-1Y and MV-22 Advanced Countermeasure Dispense Technique Development Project Management	WR	FRCSE : Jacksonville, FL	0.000	0.000		0.000		0.302	Oct 2019	-		0.302	Continuing	Continuing	Continuing
USMC Common Carriage Survey and Evaluation Study	WR	Various : Various	0.000	0.000		0.000		0.237	Jan 2020	-		0.237	0.000	0.237	0.237
		Subtotal	0.102	0.100		0.000		0.595		-		0.595	Continuing	Continuing	N/A

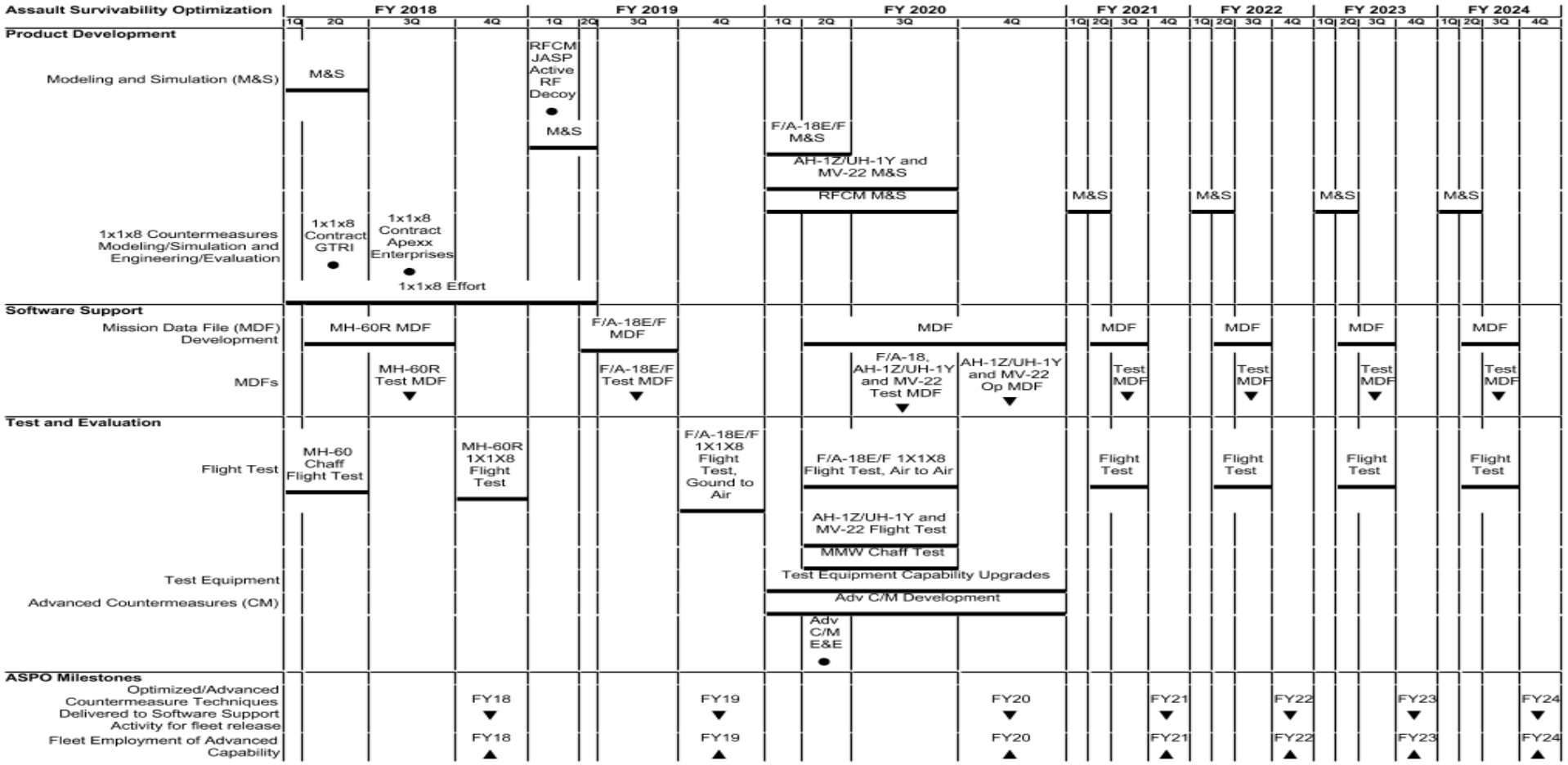
Remarks

Project management required to coordinate increased development activities for Navy and USMC platforms. USMC Common Carriage Survey funding will determine applicability of converting USCM aircraft platforms from round to square countermeasures.

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.484	0.848		0.836		6.910		-		6.910	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3309 / *Assault Survivability Optimization*



2020PB - 0604270N - 3309 Project 3309 moved from PE 0604279N to PE 0604270N in FY 2017

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3309 / *Assault Survivability Optimization*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Assault Survivability Optimization				
Product Development: Modeling and Simulation (M&S): FY18 Modeling and Simulation	1	2018	2	2018
Product Development: Modeling and Simulation (M&S): RFCM Modeling and Simulation for active radio frequency decoy	1	2019	1	2019
Product Development: Modeling and Simulation (M&S): FY19 Modeling and Simulation	1	2019	2	2019
Product Development: Modeling and Simulation (M&S): FY20 Modeling and Simulation	1	2020	2	2020
Product Development: Modeling and Simulation (M&S): AH-1Z/UH-1Y and MV-22 FY20 Modeling and Simulation	1	2020	3	2020
Product Development: Modeling and Simulation (M&S): FY20 RFCM Modeling and Simulation	1	2020	3	2020
Product Development: Modeling and Simulation (M&S): FY21 Modeling and Simulation	1	2021	2	2021
Product Development: Modeling and Simulation (M&S): FY22 Modeling and Simulation	1	2022	2	2022
Product Development: Modeling and Simulation (M&S): FY23 Modeling and Simulation	1	2023	2	2023
Product Development: Modeling and Simulation (M&S): FY24 Modeling and Simulation	1	2024	2	2024
Product Development: 1x1x8 Countermeasures Modeling/Simulation and Engineering/ Evaluation: 1x1x8 Countermeasures Modeling/Simulation and Engineering/Evaluation Contract Award - GTRI	2	2018	2	2018
Product Development: 1x1x8 Countermeasures Modeling/Simulation and Engineering/ Evaluation: 1x1x8 Countermeasures Modeling/Simulation and Engineering/Evaluation Contract Award - Apexx	3	2018	3	2018
Product Development: 1x1x8 Countermeasures Modeling/Simulation and Engineering/ Evaluation: 1x1x8 Countermeasures Modeling/Simulation and Engineering/Evaluation	1	2018	2	2019
Software Support: Mission Data File (MDF) Development: FY18 Mission Data Files Development	2	2018	3	2018

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Software Support: Mission Data File (MDF) Development: FY19 Mission Data Files Development	2	2019	3	2019
Software Support: Mission Data File (MDF) Development: FY20 Mission Data Files Development	2	2020	4	2020
Software Support: Mission Data File (MDF) Development: FY21 Mission Data Files Development	2	2021	3	2021
Software Support: Mission Data File (MDF) Development: FY22 Mission Data Files Development	2	2022	3	2022
Software Support: Mission Data File (MDF) Development: FY23 Mission Data Files Development	2	2023	3	2023
Software Support: Mission Data File (MDF) Development: FY24 Mission Data Files Development	2	2024	3	2024
Software Support: MDFs: FY18 Test Mission Data Files	3	2018	3	2018
Software Support: MDFs: FY19 Test Mission Data Files	3	2019	3	2019
Software Support: MDFs: FY20 Test Mission Data Files	3	2020	3	2020
Software Support: MDFs: FY20 Operational Mission Data Files	4	2020	4	2020
Software Support: MDFs: FY21 Test Mission Data Files	3	2021	3	2021
Software Support: MDFs: FY22 Test Mission Data Files	3	2022	3	2022
Software Support: MDFs: FY23 Test Mission Data Files	3	2023	3	2023
Software Support: MDFs: FY24 Test Mission Data Files	3	2024	3	2024
Test and Evaluation: Flight Test: FY18 Flight Test	4	2018	4	2018
Test and Evaluation: Flight Test: Advanced Chaff Flight Test	1	2018	2	2018
Test and Evaluation: Flight Test: FY19 Flight Test	4	2019	4	2019
Test and Evaluation: Flight Test: FY20 F/A-18 Flight Test	2	2020	3	2020
Test and Evaluation: Flight Test: FY21 Flight Test	2	2021	3	2021
Test and Evaluation: Flight Test: FY22 Flight Test	2	2022	3	2022
Test and Evaluation: Flight Test: FY23 Flight Test	2	2023	3	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3309 / *Assault Survivability Optimization*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Test and Evaluation: Flight Test: FY24 Flight Test	2	2024	3	2024
Test and Evaluation: Flight Test: FY20 AH-1Z/UH-1Y and MV-22 Flight Test	2	2020	3	2020
Test and Evaluation: Flight Test: FY20 MMW Chaff Test	2	2020	3	2020
Test and Evaluation: Test Equipment: Test Equipment Capability Upgrades	1	2020	4	2020
Test and Evaluation: Advanced Countermeasures (CM): Advance Countermeasure Development	1	2020	4	2020
Test and Evaluation: Advanced Countermeasures (CM): Advance Countermeasure Engineering and Evaluation Contract	2	2020	2	2020
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY18 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2018	4	2018
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY19 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2019	4	2019
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 20 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2020	4	2020
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 21 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2021	4	2021
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 22 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2022	4	2022
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 23 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2023	4	2023
ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 24 Optimized/Advanced CM Techniques Delivered to SSA for fleet release	4	2024	4	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ASPO Milestones: Fleet Employment of Advanced Capability: FY18 Fleet Employment of Advanced Capability	4	2018	4	2018
ASPO Milestones: Fleet Employment of Advanced Capability: FY19 Fleet Employment of Advanced Capability	4	2019	4	2019
ASPO Milestones: Fleet Employment of Advanced Capability: FY20 Fleet Employment of Advanced Capability	4	2020	4	2020
ASPO Milestones: Fleet Employment of Advanced Capability: FY21 Fleet Employment of Advanced Capability	4	2021	4	2021
ASPO Milestones: Fleet Employment of Advanced Capability: FY22 Fleet Employment of Advanced Capability	4	2022	4	2022
ASPO Milestones: Fleet Employment of Advanced Capability: FY23 Fleet Employment of Advanced Capability	4	2023	4	2023
ASPO Milestones: Fleet Employment of Advanced Capability: FY24 Fleet Employment of Advanced Capability	4	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3327 / *MAGTF EW Aviation Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3327: *MAGTF EW Aviation Development*	16.115	23.551	12.362	7.677	-	7.677	8.136	6.717	14.382	14.664	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project unit supports the United States Marine Corps (USMC) development of Marine Air Ground Task Force (MAGTF) Electronic Warfare (EW) and the various elements of its distributed System of Systems (SoS). The SoS addresses MAGTF EW sufficiency gaps in the areas of Electronic Attack (EA), EW Support (ES), and Electronic Protection with a multitude of payloads designed for carriage on a variety of organic MAGTF air assets. Payload development plans follow an adaptable, modular and open architecture philosophy to combat the increasing capability gap and enable future growth at a reduced operational and sustainment cost. A key element to this capability is the AN/ALQ-231(V) Intrepid Tiger II program.

The AN/ALQ-231(V)1 pod is the variant of the Intrepid Tiger II pod flown on the AV-8B and F/A-18A-D platforms, with plans for future integration of AN/ALQ-231(V)1 Block X on MV-22, C-130, and CH-53K platforms. The AN/ALQ-231(V)3 is the variant of the Intrepid Tiger II pod flown on the UH-1Y platform, with plans for future integration on AH-1 platforms. All payload variants are capable of conducting, supporting, and coordinating Electro-Magnetic Spectrum (EMS) operations in the form of EA and ES against Irregular Warfare threats. Additionally, all payloads are scalable and adaptable for emerging threats and are interoperable with the USMC's Electronic Warfare Services Architecture (EWSA). The Intrepid Tiger II capability is design to be integrated for MAGTF tactical coordination of cyberspace and EW operations via the Cyber Electronic Warfare Coordination Cell (CEWCC).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Intrepid Tiger II (AN/ALQ-231)	21.051	9.811	5.075	0.000	5.075
Articles:	-	-	-	-	-
FY 2019 Plans: The program will continue efforts to develop, mature, and test Intrepid Tiger II based solutions to radar threats in support of the penetrating jammer mission with plans to release variants of the AN/ALQ-231(V)1 BLK X Radar Jammer for use on the MV-22, AV-8B, and F/A-18C/D platforms, as well as for future use on the C-130 and CH-53K. FY 2019 efforts will include the continued maturation of BLK X EDM design for both a modular pod shell and a cabin rack-mounted solution and the correction of developmental test deficiencies. In addition, integrated Developmental Testing (DT) of the rack-mounted solution for the MV-22 will commence. The program will also continue BLK X software development efforts to support DT. Additionally, development of the EWSA in support of evolving Intrepid Tiger II target sets and missions shall continue in FY 2019.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The program will continue efforts to develop, mature, and test Intrepid Tiger II based solutions to radar threats in support of the penetrating jammer mission with plans to release variants of the AN/ALQ-231(V)1 BLK X Radar Jammer for use on the MV-22, AV-8B, and F/A-18C/D platforms, as well as for future use on the C-130 and CH-53K. FY 2020 efforts will include the finalization of BLK X EDM rack-mounted design and its initial integration on the MV-22 platform. Additionally, integrated Developmental Test (DT) and evaluation of both BLK X software and hardware will be completed on MV-22. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding decreases from FY 2019 to FY 2020 due to funding request reduction by $5.600 million to account for the availability of prior year execution balances.					
Title: MAGTF EW Jammer Techniques Development	2.500	2.551	2.602	0.000	2.602
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 will continue efforts to significantly increase the Marine Corps' cyberspace and Electronic Warfare expertise via the development of new and updated jammer techniques. These techniques will be designed to exploit the interrelated cyberspace domain and the electromagnetic spectrum (EMS) through the development, validation, and delivery of MAGTF EW-specific Tactics, Techniques, and Procedures (TTPs) and testing of MAGTF EW systems against existing and emerging threats. Additional efforts include the acquisition of simulators to better emulate threshold and objective threats for MAGTF EW systems. ***FY 2020 Base Plans:*** FY 2020 will continue efforts to advance the development of new and updated EW jammer techniques. These techniques will be designed to exploit the interrelated cyberspace domain and the electromagnetic spectrum (EMS) through the development, validation, and delivery of MAGTF EW-specific Tactics, Techniques, and Procedures (TTPs) and the testing of MAGTF EW systems against existing and emerging threats. FY 2020 efforts will include the test and evaluation of counter-radar technique performance and effectiveness of BLK X on MV-22 during Developmental Testing. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Funding increases from FY 2019 to FY 2020 due to BLK X jammer technique testing in FY 2020.					
Accomplishments/Planned Programs Subtotals	23.551	12.362	7.677	0.000	7.677

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• APN/0587: *MAGTF EW For Aviation*	10.111	11.590	26.536	-	26.536	30.922	33.629	24.380	24.865	97.777	380.263

Remarks

D. Acquisition Strategy

This project unit is part of USMC led efforts to ensure Marine Corps requirements are included in the budget process for the Future Year Defense Program and beyond. These efforts include AN/ALQ-231(V) Intrepid Tiger II Family of Systems, Collaborative Electronic Warfare (EW)/EW Battle Management, and EW Service Architecture (EWSA). These programs are the Marine Corps' initial steps to create systems to distribute EW capability across the battlespace.

E. Performance Metrics

Continuation of research into Engineering Change Proposals (ECPs) for capability upgrades for AN/ALQ-231(V) Intrepid Tiger II pods to keep pace with the migrating and expanding EW target sets in theatre.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intrepid Tiger BLK X Hardware Development	WR	NAWCWD : Point Mugu, CA	4.683	10.947	Dec 2017	2.579	Nov 2018	0.483	Nov 2019	-		0.483	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : Patuxent River, MD	0.539	0.838	Dec 2017	0.476	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCWD : Point Mugu, CA	8.588	9.716	Dec 2017	6.488	Nov 2018	4.299	Nov 2019	-		4.299	Continuing	Continuing	Continuing
		Subtotal	13.810	21.501		9.543		4.782		-		4.782	Continuing	Continuing	N/A

Remarks

Funding decrease from FY 2019 to FY 2020 due to BLK X transitioning from development to DT.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	Various	Various : Various	0.000	0.430	Feb 2018	0.443	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Eng & Tech Services	Various	Various : Various	0.262	0.105	Feb 2018	0.107	Nov 2018	0.109	Nov 2019	-		0.109	Continuing	Continuing	Continuing
		Subtotal	0.262	0.535		0.550		0.109		-		0.109	Continuing	Continuing	N/A

Remarks

Funding decrease from FY19 to FY20 for developmental support due to the availability of prior year funding.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intrepid Tiger BLK X Testing	WR	NAWCAD : Patuxent River, MD	1.062	0.000		0.000		0.850	Nov 2019	-		0.850	Continuing	Continuing	Continuing
Intrepid Tiger BLK X Testing	WR	NAWCWD : Point Mugu, CA	0.893	1.397	Dec 2017	2.149	Nov 2018	1.515	Nov 2019	-		1.515	Continuing	Continuing	Continuing
Intrepid Tiger BLK X Testing	Various	Various : Various	0.053	0.082	Jan 2018	0.084	Nov 2018	0.385	Nov 2019	-		0.385	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	2.008	1.479		2.233		2.750		-		2.750	Continuing	Continuing	N/A

Remarks

Funding increase from FY 2019 to FY 2020 due to AN/ALQ-231(V)1 BLK X Developmental Test activities.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Various	Various : Various	0.035	0.036	Oct 2017	0.036	Oct 2018	0.036	Oct 2019	-		0.036	Continuing	Continuing	Continuing
		Subtotal	0.035	0.036		0.036		0.036		-		0.036	Continuing	Continuing	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	16.115	23.551		12.362		7.677		-		7.677	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

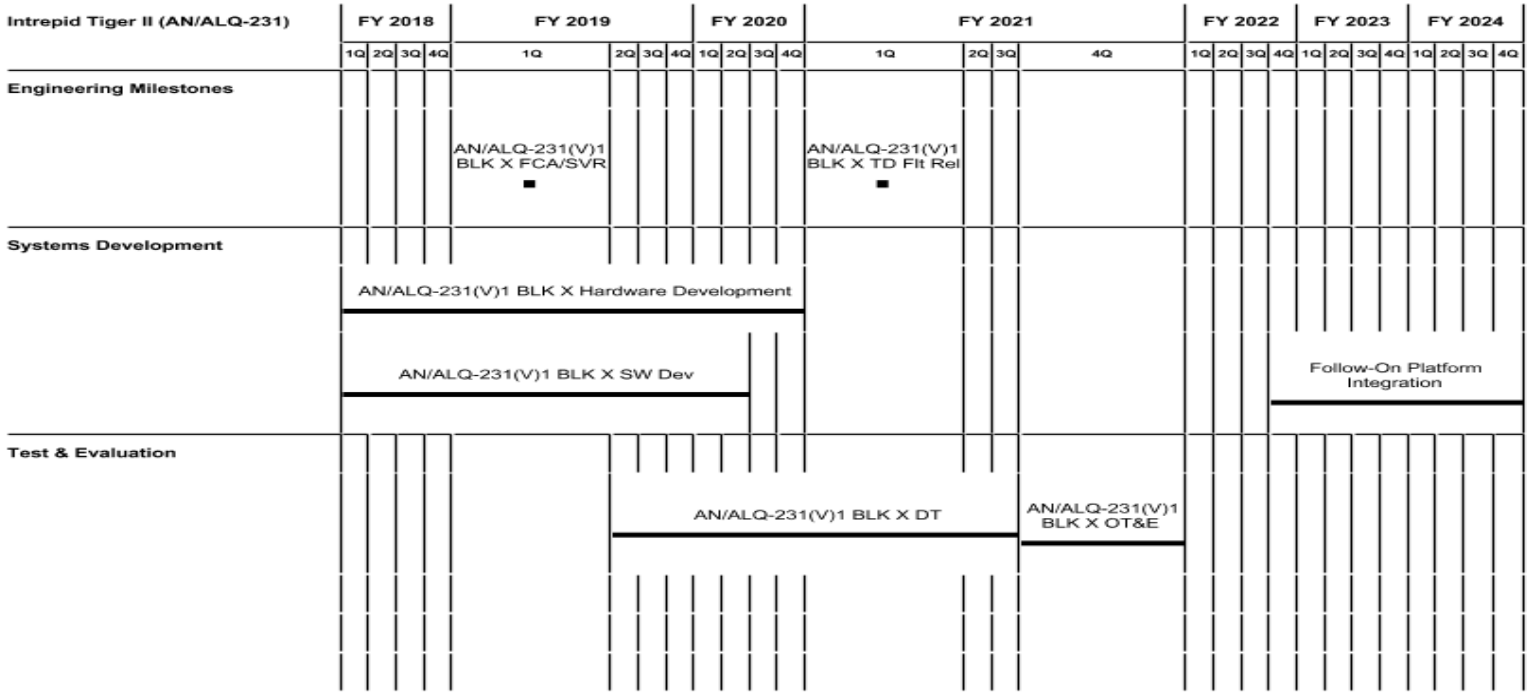

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

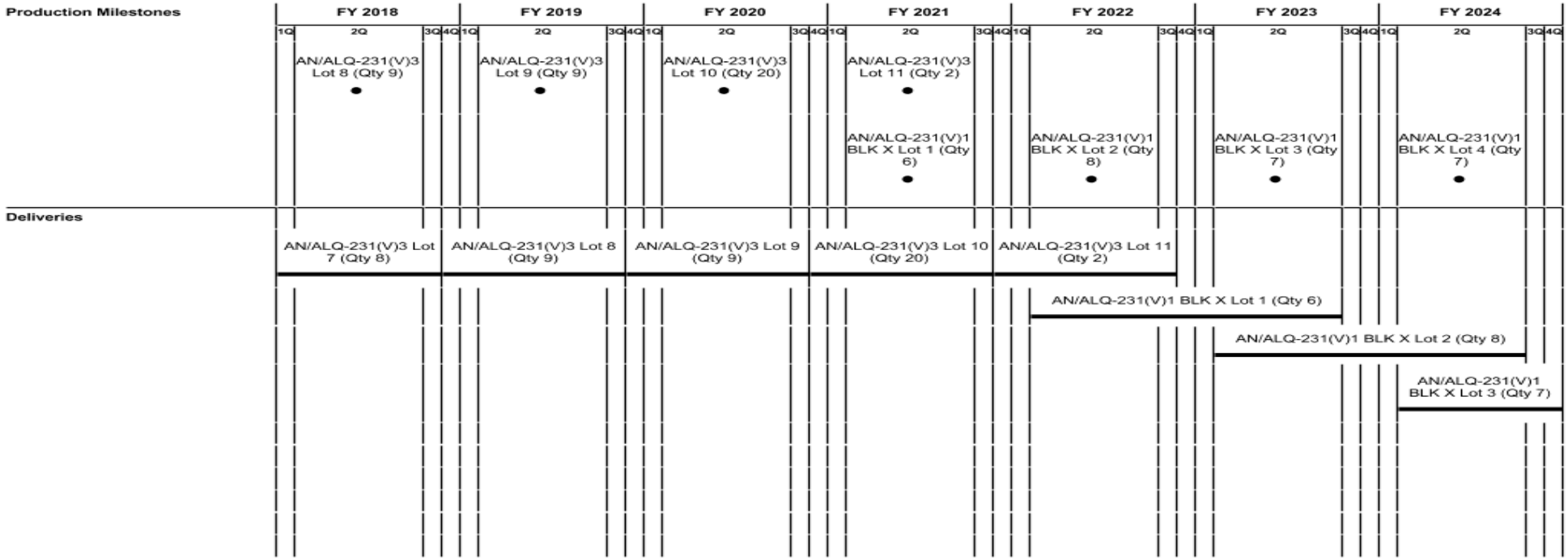

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

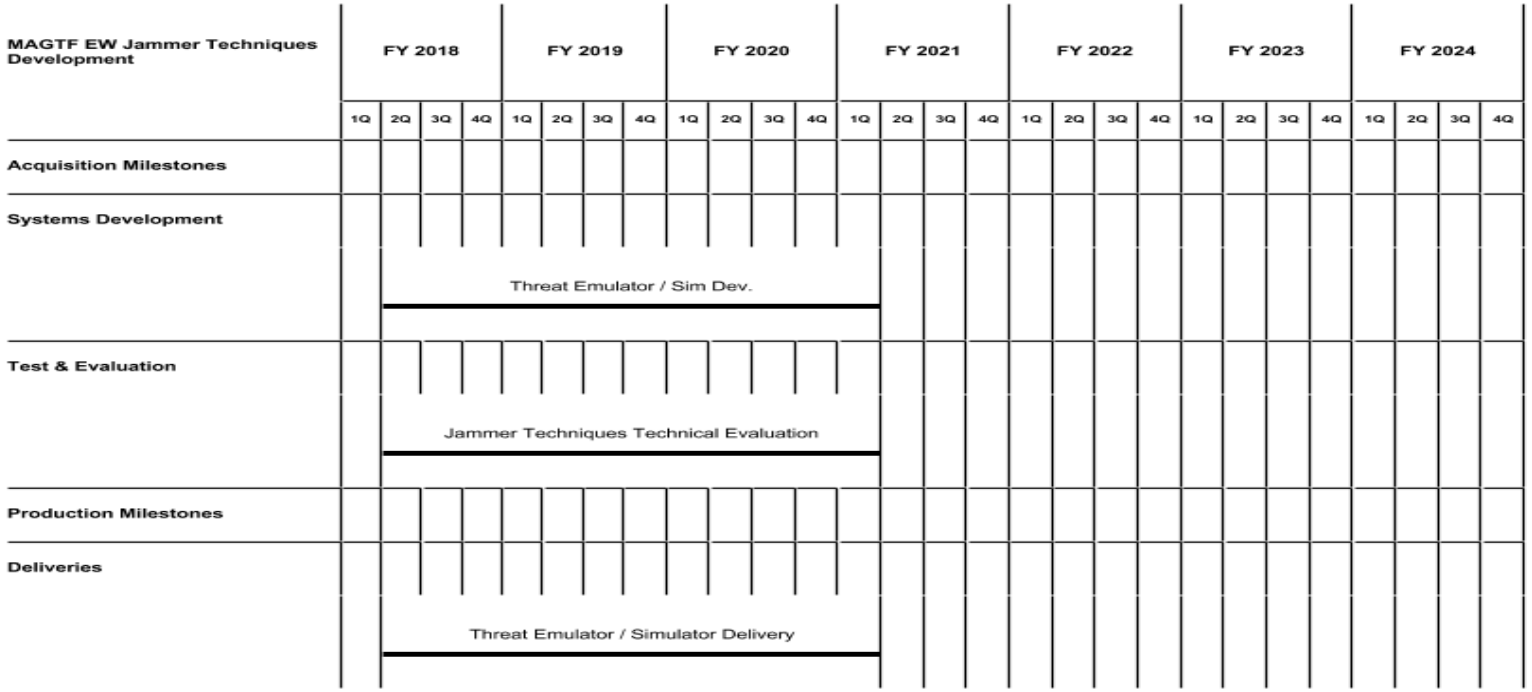

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Intrepid Tiger II (AN/ALQ-231)				
Engineering Milestones: AN/ALQ-231(V)1 BLK X Functional Configuration Audit / System Verification Review	1	2019	1	2019
Engineering Milestones: AN/ALQ-231(V)1 BLK X TD Fleet Release	1	2021	1	2021
Systems Development: AN/ALQ-231(V)1 BLK X Hardware Development	1	2018	4	2020
Systems Development: AN/ALQ-231(V)1 BLK X Software Development	1	2018	2	2020
Systems Development: Follow-On Platform Integration	4	2022	4	2024
Test & Evaluation: AN/ALQ-231(V)1 BLK X Developmental Test	2	2019	3	2021
Test & Evaluation: AN/ALQ-231(V)1 BLK X OT&E	4	2021	4	2021
Production Milestones				
AN/ALQ-231(V)3 Production Lot 8 (Qty 9)	2	2018	2	2018
AN/ALQ-231(V)3 Production Lot 9 (Qty 9)	2	2019	2	2019
AN/ALQ-231(V)3 Production Lot 10 (Qty 20)	2	2020	2	2020
AN/ALQ-231(V)3 Production Lot 11 (Qty 2)	2	2021	2	2021
AN/ALQ-231(V)1 BLK X Production Lot 1 (Qty 6)	2	2021	2	2021
AN/ALQ-231(V)1 BLK X Production Lot 2 (Qty 8)	2	2022	2	2022
AN/ALQ-231(V)1 BLK X Production Lot 3 (Qty 7)	2	2023	2	2023
AN/ALQ-231(V)1 BLK X Production Lot 4 (Qty 7)	2	2024	2	2024
Deliveries: AN/ALQ-231(V)3 Lot 7 Deliveries (Qty 8)	1	2018	3	2018
Deliveries: AN/ALQ-231(V)3 Lot 8 Deliveries (Qty 9)	4	2018	3	2019
Deliveries: AN/ALQ-231(V)3 Lot 9 Deliveries (Qty 9)	4	2019	3	2020
Deliveries: AN/ALQ-231(V)3 Lot 10 Deliveries (Qty 20)	4	2020	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3327 / *MAGTF EW Aviation Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Deliveries: AN/ALQ-231(V)3 Lot 11 Deliveries (Qty 2)	4	2021	3	2022
Deliveries: AN/ALQ-231(V)1 BLK X Lot 1 Deliveries (Qty 6)	2	2022	2	2023
Deliveries: AN/ALQ-231(V)1 BLK X Lot 2 Deliveries (Qty 8)	2	2023	2	2024
Deliveries: AN/ALQ-231(V)1 BLK X Lot 3 Deliveries (Qty 7)	2	2024	4	2024
MAGTF EW Jammer Techniques Development				
Systems Development: Threat Emulator / Simulator Development	2	2018	1	2021
Test & Evaluation: Jammer Techniques Technical Evaluation	2	2018	1	2021
Deliveries: Threat Emulator / Simulator Delivery	2	2018	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3371 / *MAGTF EW Interoperability Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3371: *MAGTF EW Interoperability Development*	1.617	1.609	0.371	1.291	-	1.291	1.196	1.002	1.027	1.047	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project unit supports the United States Marine Corps air-ground interoperability by providing a variety of capabilities through multiple functions of the Software Reprogrammable Payload (SRP) when installed aboard SRP-capable aircraft. The spiral development plans allow adaptable, scalable, and open architecture philosophy to reduce stove-pipe solutions but enable future growth at a reduced operational and sustainment cost.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Software Reprogrammable Payload	1.609	0.371	1.291	0.000	1.291
Articles:	-	-	-	-	-
FY 2019 Plans: Continue the development of the reduced form factor SRP for the identified platforms that can not support the Spiral 2 form factor and field evaluation of the Spiral 2.					
FY 2020 Base Plans: Continue SRP support of a government-owned reference design for a flexible, in-operational reconfigurable software radio designed to meet current and future needs. Continue the development of the reduced form factor SRP for the identified platforms that can not support the Spiral 2 form factor and field evaluation of the Spiral 2. Support transition of Spiral 2 to Program of Record and Request for Proposal. Support the air-ground interoperability by providing a variety of capabilities through multiple functions of the Software Reprogrammable Payload when installed aboard SRP-capable aircraft.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The $92K increase between FY 2019 and FY 2020 will fund integration issues associated with the additional waveforms into the SRP.					
Accomplishments/Planned Programs Subtotals	1.609	0.371	1.291	0.000	1.291

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3371 / *MAGTF EW Interoperability Development*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This project unit is part of United States Marine Corps led efforts to ensure Marine Corps requirements are included in the budget process for the Future Year Defense Program and beyond. This effort is for the Software Reprogrammable Payload. This program is part of the Marine Corps initial steps to create a common interoperable system to distribute multiple data types across the battle-space through spiral development.

E. Performance Metrics

After successful completion of the Spiral 2 development and demonstration onboard MV-22 test platform support transition to Program of Record and support request for proposal package.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 3371 / *MAGTF EW Interoperability Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Patuxent River, MD	0.408	0.706	Nov 2017	0.371	Nov 2018	0.550	Nov 2019	-		0.550	Continuing	Continuing	Continuing
Systems Engineering	WR	NRL : Washington, DC	0.344	0.165	Nov 2017	0.000		0.221	Dec 2019	-		0.221	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	Assurance Technology Corp : Carlisle, MA	0.665	0.489	Dec 2017	0.000		0.300	Dec 2019	-		0.300	0.000	1.454	1.454
Systems Engineering	C/CPFF	DCS : Alexandria, VA	0.200	0.249	Dec 2017	0.000		0.220	Nov 2019	-		0.220	0.000	0.669	0.669
		Subtotal	1.617	1.609		0.371		1.291		-		1.291	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.617	1.609		0.371		1.291		-		1.291	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3371 / *MAGTF EW Interoperability Development*

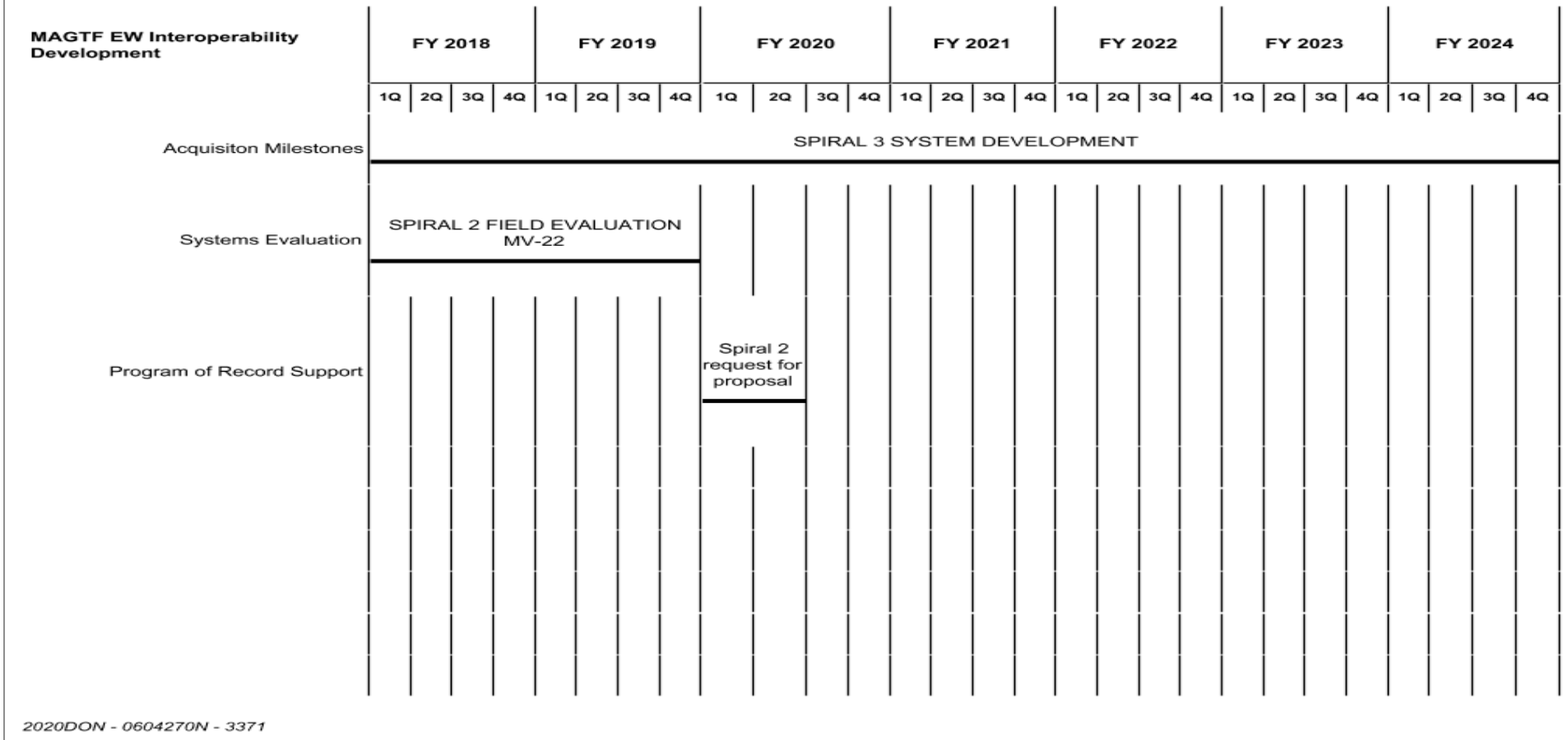

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 3371 / *MAGTF EW Interoperability Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MAGTF EW Interoperability Development				
Acquisiton Milestones: SPIRAL 3 SYSTEM DEVELOPMENT	1	2018	4	2024
Systems Evaluation: SPIRAL 2 FIELD EVALUATION MV-22	1	2018	4	2019
Program of Record Support: Spiral 2 request for proposal	1	2020	2	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604270N / *Electronic Warfare (EW) Dev*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	3.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.000
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

PU C327 was a new Congressional Add beginning in FY 2018.

A. Mission Description and Budget Item Justification

This Congressional Add project unit supports the United States Marine Corps (USMC) development, design, and manufacturing of the AN/ALQ-231(V)3 pod (Rotary-Wing variant) jettison capability on the UH-1Y platform. AN/ALQ-231 (V) 3 pod was originally developed as part of a Rapid Deployment Capability (RDC) program. UH-1Y jettison capability was not developed as part of the RDC program. This FY 2018 Congressional add will develop, integrate and test jettison capability that will be incorporated and integrated on all (V)3 pods.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: Intrepid Tiger II (V)3 UH-1Y Jettison Capability	3.000	0.000
FY 2018 Accomplishments: New start Congressional Add efforts to design, develop, test, and manufacture AN/ALQ-231(V)3 pod (Rotary-Wing variant) jettison capability on the UH-1Y platform.		
FY 2019 Plans: N/A		
Congressional Adds Subtotals	3.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This Congressional Add project unit was included as part of USMC led efforts to ensure Marine Corps Intrepid Tiger II (V)3 jettison requirements are included on all pods.

E. Performance Metrics

Commencement of design, development, manufacturing and testing of Intrepid Tiger II (V)3 UH-1Y Jettison Capability.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intrepid Tiger II (V)3 UH-1Y Jettison Capability Systems Engineering	PO	NAWCWD : Point Mugu, CA	0.000	1.980	May 2018	0.000		0.000		-		0.000	0.000	1.980	-
		Subtotal	0.000	1.980		0.000		0.000		-		0.000	0.000	1.980	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intrepid Tiger II (V)3 UH-1Y Jettison Capability Test & Evaluation	PO	NAWCAD : Patuxent River, MD	0.000	1.020	Oct 2018	0.000		0.000		-		0.000	0.000	1.020	-
		Subtotal	0.000	1.020		0.000		0.000		-		0.000	0.000	1.020	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	3.000		0.000		0.000		-		0.000	0.000	3.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

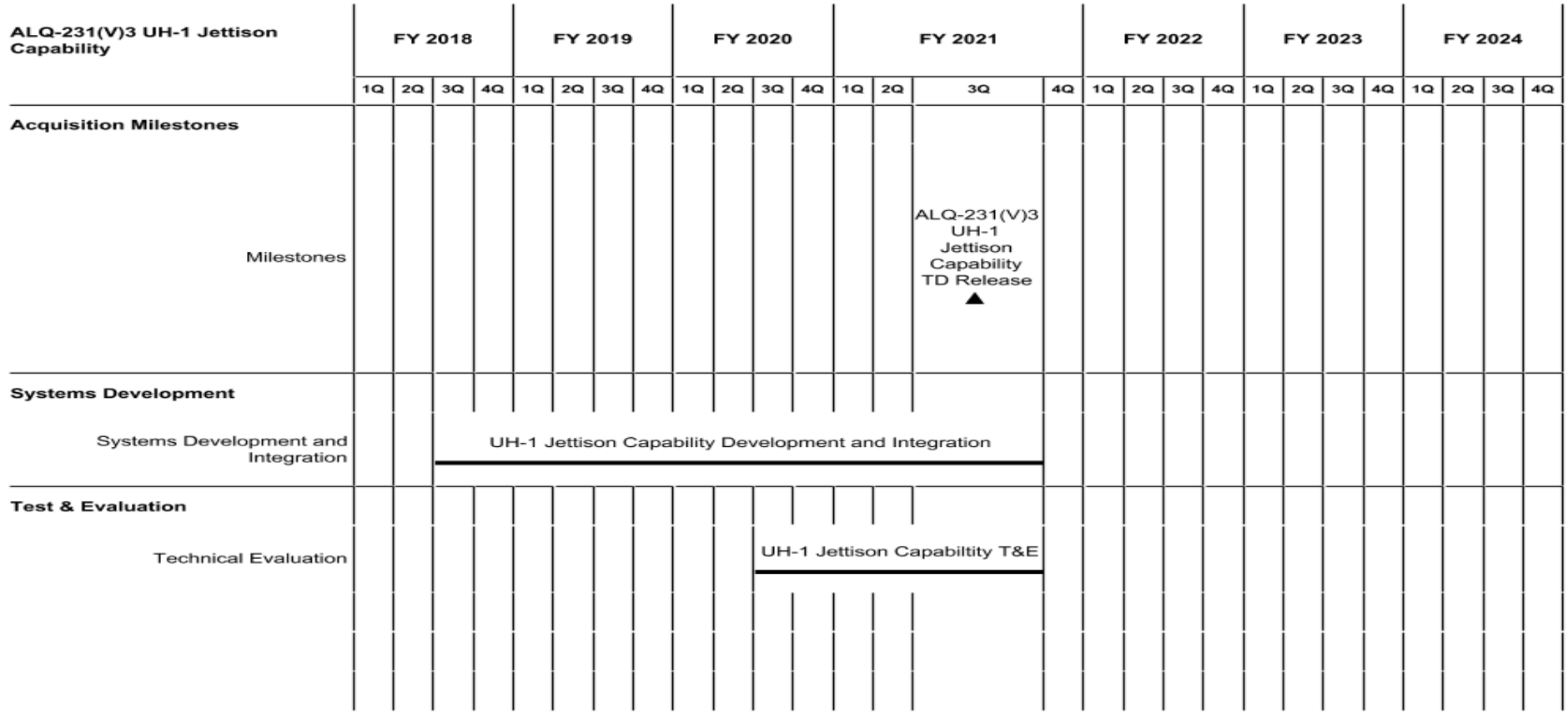

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604270N / *Electronic Warfare (EW) Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ALQ-231(V)3 UH-1 Jettison Capability				
Acquisition Milestones: Milestones: ALQ-231(V)3 UH-1 Jettison Capability TD Release	3	2021	3	2021
Systems Development: Systems Development and Integration: UH-1 Jettison Capability Development and Integration	3	2018	3	2021
Test & Evaluation: Technical Evaluation: UH-1 Jettison Capabiltity T&E	3	2020	3	2021