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 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604707N *I SEW Architecture/Eng Support*							
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	284.288	41.214	7.230	5.263	-	5.263	8.662	9.179	9.407	9.595	Continuing	Continuing
0798: *Allied/Coalition Maritime Environment (ACME)*	33.551	1.081	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	34.632
2144: *Space & Elec Warfare Engineering*	222.046	33.238	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	255.284
2147: *ISR Architecture*	1.482	0.689	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.171
2356: *Maritime Concept Generation & Development*	27.209	6.206	7.230	5.263	-	5.263	8.662	9.179	9.407	9.595	Continuing	Continuing

Note

Beginning in FY19, Allied/Coalition Interoperability and Information Dominance (ACIID) (now called Allied/Coalition Maritime Environment (ACME)) Project 0798, Space & Electronic Warfare (SEW) Engineering Project 2144, and Intelligence, Surveillance, and Reconnaissance (ISR) Architecture Project 2147 were realigned from PE 0604707N SEW Architecture/ENG Support to PE 0606355N Warfare Innovation Management.

A. Mission Description and Budget Item Justification

The Maritime Concept Generation & Development (MCGD) project (2356) focuses on the generation, development and validation of warfighting concepts, Concept of Operations (CONOPS) and doctrine in order to eliminate war fighting gaps. Naval Warfare Development Command (NWDC) also manages the Fleet Experimentation program (formerly Sea Trial). In FY2019 the project will execute a number of new experimentations in the areas of Electromagnetic Maneuver Warfare (EMW), Mine Warfare, Naval Integrated Fires, and Unmanned systems and conduct experiments (war simulations, Modeling & Simulation (M&S), at-sea events) to develop emerging Naval concepts.

The ACIID project (0798), now called ACME, promotes interoperability with allied and coalition forces by facilitating maritime interoperability in both processes and communication systems, including emerging capabilities, to counter growing high-end asymmetric threats.

The SEW Engineering project (2144) is a systems engineering non-acquisition program to develop, test, implement Technical Authority (TA) products, and validate Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System architectures to support naval, Joint and Coalition missions across normal, contested, and degraded cyber/operational environments. The objective of this project is carried out by multiple tasks that ensure development and delivery of naval Information Warfare (IW) capabilities that are well-integrated, interoperable, secure, and resilient to meet validated warfighting requirements.

The Intelligence, Surveillance, and Reconnaissance (ISR) Architecture project (2147) is intended to guide system of systems capability development and promote interoperability across Navy ISR programs, as well as interoperability and alignment with Department of Defense (DoD)-wide enterprise initiatives including Joint

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*

Information Environment (JIE) and Intelligence Community (IC) Information Technology Environment (ITE). This effort to develop integrated ISR architectures will also help instill systems engineering discipline and standardization across the Navy ISR Enterprise and provide a means by which to assess ISR Program of Record (PoR) progress in conforming to a single Navy architecture.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	42.851	7.230	8.160	-	8.160
Current President's Budget	41.214	7.230	5.263	-	5.263
Total Adjustments	-1.637	0.000	-2.897	-	-2.897
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	0.000			
• SBIR/STTR Transfer	-0.748	0.000			
• Program Adjustments	0.000	0.000	-2.897	-	-2.897
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Congressional Directed Reductions Adjustments	-0.888	-	-	-	-

Change Summary Explanation

The FY2020 Project 2356 funding request was reduced by $1.897 million to account for the availability of prior year execution balances. Further decreases are due to the implementation of major concepts experiments during FY19 which will shift focus to continuous concept generation/concept development efforts for FY20 resulting in less resources required.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*				Project (Number/Name) 0798 / *Allied/Coalition Maritime Environment (ACME)*			
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**
0798: *Allied/Coalition Maritime Environment (ACME)*	33.551	1.081	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	34.632
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Project title changed as follows: Allied/Coalition Maritime Environment (ACME) (Previously called Allied/Coalition Interoperability and Information Dominance (ACIID) in FY19 and prior.)

Beginning in FY19, the ACME profile transferred to PE 0606355N.

A. Mission Description and Budget Item Justification

The ACME program advances Information Warfare (IW) (to include Command, Control, Communications, Computers; Intelligence, Surveillance and Reconnaissance (C4ISR); Electronic Warfare (EW); and Cyber Warfare), interoperability with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO), and other Allied and Coalition partners. The program determines maritime operational gaps with our allies, identifies Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) solutions with the potential to fill those gaps, and assesses these solutions and associated concepts of operation in laboratory and at-sea environments. The ACME program includes integration and testing in support of joint and Allied war fighting capabilities, including interoperability testing of IW equipment. Allied and joint interoperability is critical for future maritime operations, especially as the United States Navy (USN) expands Internet Protocol (IP) networking throughout the fleet via Consolidated Afloat Networks and Enterprise Services (CANES), Next Generation Networks (NGEN), Mission Partner Environment/ Future Mission Networking (MPE/FMN), the U.S. Battlefield Information Collection and Exploitation System - eXtended (BICES-X), and with the Joint Information Environment (JIE).

Currently, IP connectivity with AUSCANNZUKUS and other Allied/Coalition forces is limited, requiring extensive backhaul through ashore infrastructure. Higher bandwidth solutions suitable for use over tactical networks require development and assessment for emerging coalition and joint interoperability requirements, such as Maritime Domain Awareness (MDA), Network Operations Without Shore (NOWS), Satellite Communications (SATCOM) Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operations, and to counter Anti-Access Area Denial (A2/AD) threats. Increases in data throughput are required for the effective exchange of rich IW data sets and services via Service Oriented Architectures (SOA) within the limitations of High Frequency (HF), Ultra-High Frequency (UHF), and other portions of the radio frequency spectrum, coupled with appropriate Information Assurance and Computer Network Defense (IA/CND) mechanisms. Development and assessment of potential solutions will integrate improved IP capabilities with the Advanced Digital Network Systems (ADNS) and existing international standards (e.g. Allied Communications Publication 200, NATO Standardization Agreements 5066 and 4691). The continued development and refinement of advanced tactical networking technologies and protocols, to include Low Probability of Intercept (LPI), Low Probability of Detection (LPD), and Anti-Jam (AJ) capabilities as well as Automatic Link Establishment (ALE) standards, will provide for a significant improvement in secure data sharing within, and between, coalition maritime elements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 0798 / *Allied/Coalition Maritime Environment (ACME)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Advanced Relay Capabilities	1.081	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY19 Allied/Coalition Maritime Environment (ACME) funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 Base Plans: FY20 Allied/Coalition Maritime Environment (ACME) funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	1.081	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Allied/Coalition Maritime Environment (ACME) is a non-acquisition program that promotes United States Navy interoperability with allied and coalition forces to achieve the Chief of Naval Operations (CNO) vision by facilitating maritime interoperability in both processes and communications systems, including emerging capabilities, to counter growing high-end asymmetric threats, and is a key enabler of the force multiplying benefits achieved through cooperation among the Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO), and other partner nations. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.

E. Performance Metrics

Advanced Relay Capabilities: The ACME program will employ laboratory testing and at-sea demonstrations to assess specific technologies, operational concepts, and integrated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) solutions pertaining to Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operational environments, Network Operations Without Shore (NOWS), Maritime Domain Awareness (MDA), Mission Partner Environment/ Future Mission Networking (MPE/FMN), Joint Information Environment (JIE), and other aspects of Information Warfare (IW). These assessments will report on identified capability gaps, link capability gaps to technology/DOTMLPF gaps, identify technologies and DOTMLPF solutions considered ready for deployment, transition to a program of record to enhance Fleet war fighting capability, and enhance Allied interoperability.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 0798 / *Allied/Coalition Maritime Environment (ACME)*	

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
Advanced Relay Capabilities	C/CPFF	SAIC : McLean, VA	0.110	0.126	Jan 2018	0.000		0.000		-		0.000	0.000	0.236	Continuing
		Subtotal	0.110	0.126		0.000		0.000		-		0.000	0.000	0.236	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
Advanced Relay Capabilities	Various	Various : Various	31.248	0.135	Jan 2018	0.000		0.000		-		0.000	0.000	31.383	Continuing
Advanced Relay Capabilities	WR	SSC PAC : San Diego	0.716	0.820	Jan 2018	0.000		0.000		-		0.000	0.000	1.536	Continuing
		Subtotal	31.964	0.955		0.000		0.000		-		0.000	0.000	32.919	N/A

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
Management Services	Various	Various : Various	1.477	0.000		0.000		0.000		-		0.000	0.000	1.477	-
		Subtotal	1.477	0.000		0.000		0.000		-		0.000	0.000	1.477	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	33.551	1.081		0.000		0.000		-		0.000	0.000	34.632	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 0798 / *Allied/Coalition Maritime Environment (ACME)*

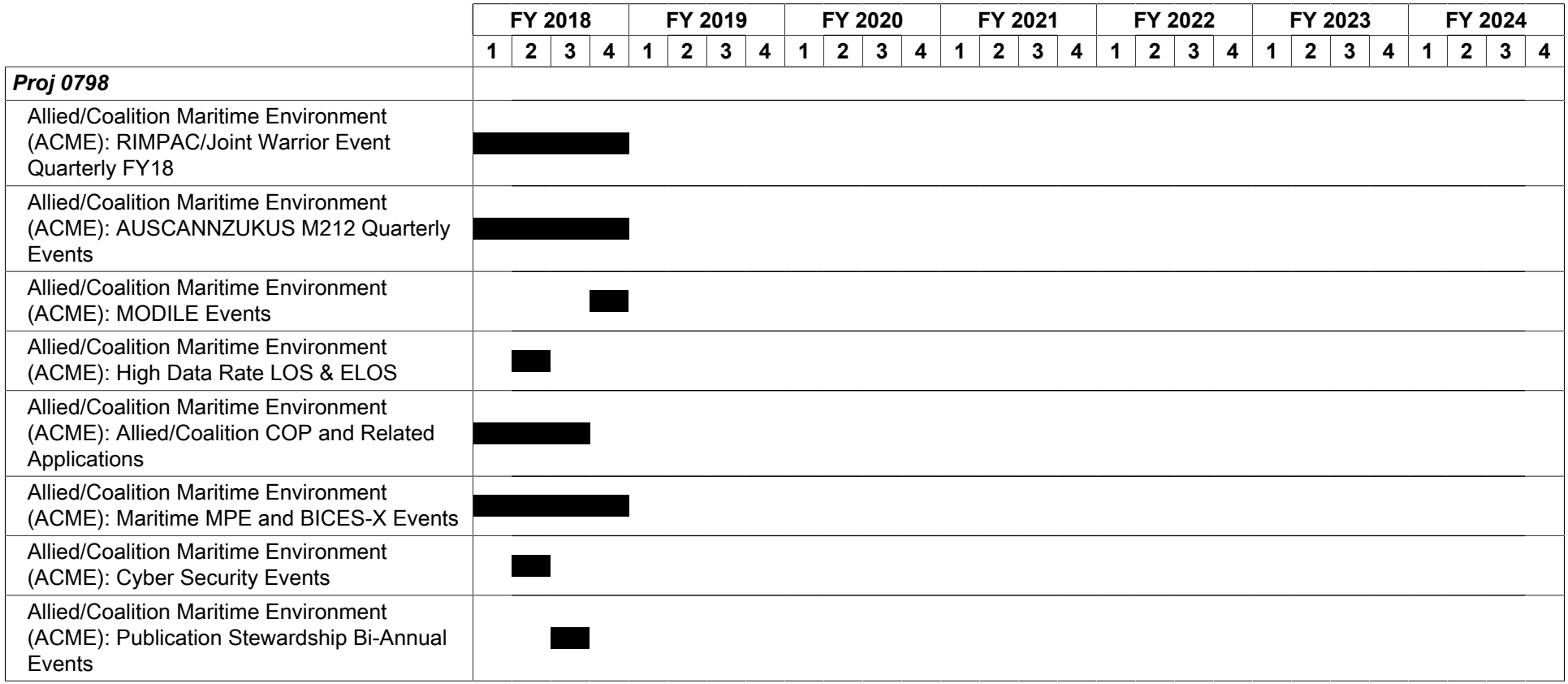

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 0798 / *Allied/Coalition Maritime Environment (ACME)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0798				
Allied/Coalition Maritime Environment (ACME): RIMPAC/Joint Warrior Event Quarterly FY18	1	2018	4	2018
Allied/Coalition Maritime Environment (ACME): AUSCANNZUKUS M212 Quarterly Events	1	2018	4	2018
Allied/Coalition Maritime Environment (ACME): MODILE Events	4	2018	4	2018
Allied/Coalition Maritime Environment (ACME): High Data Rate LOS & ELOS	2	2018	2	2018
Allied/Coalition Maritime Environment (ACME): Allied/Coalition COP and Related Applications	1	2018	3	2018
Allied/Coalition Maritime Environment (ACME): Maritime MPE and BICES-X Events	1	2018	4	2018
Allied/Coalition Maritime Environment (ACME): Cyber Security Events	2	2018	2	2018
Allied/Coalition Maritime Environment (ACME): Publication Stewardship Bi-Annual Events	3	2018	3	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 2144 / *Space & Elec Warfare Engineering*	

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
2144: *Space & Elec Warfare Engineering*	222.046	33.238	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	255.284
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Beginning in FY19, Space and Electronic Warfare Engineering(SEW) funding profile transferred to PE 0606355N.

A. Mission Description and Budget Item Justification

To support Navy objectives in advancing Information Warfare (IW) capabilities, the Space and Electronic Warfare (SEW) Engineering project provides five main functions:

(1) Develop the architectures, specifications and standards, tools, and processes to support a single integrated Navy plan for cybersecurity. These engineering artifacts provide Navy specific guidance to drive common and consistent implementation of security controls across current and future Navy Programs of Record/projects. This eliminates redundancies and inefficiencies characteristic of previous stove-pipe development efforts in which each system addressed security individually. These efforts enable a standardized approach to move out faster to improve the Navy's cyber resiliency.

(2) Provide the cybersecurity vulnerability and functional test capability which supports cybersecurity test requirements and the Command, Control, Communications, Computers, Intelligence (C4I) components of USS Secure. USS Secure is a cyber assessment program within the Navy. This System of Systems (SoS) (Afloat, Aloft, C4I & Shore) capability in a test laboratory environment provides a rapidly re-configurable capability that integrates maritime hardware systems into a virtual platform. This platform level SoS provides cybersecurity research, development, test and evaluation, and training, not otherwise possible. This combination of Systems Commands (SYSCOM) laboratories, cyber ranges, and Red Teams simulating Navy platforms in operational maritime environments is critical for effectively evaluating cyber threats against specified mission threads.

(3) Define an integrated Enterprise Architecture to support design, development and delivery of integrated Navy Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System capabilities. This architecture reflects current (as-is) and future (target) end states to support technical analyses, program planning, and enterprise-level investment decisions across IW capabilities. Perform mission based system of systems analysis to ensure integration and interoperability, and validate end-to-end warfighting capabilities to quickly address emerging threats.

(4) Provides engineering tools and processes to drive rigorous Systems Engineering discipline across the acquisition lifecycle to support rapid development and delivery of secure and interoperable C4ISR, Business IT, and Space Systems capabilities that meet Fleet requirements. Conduct Systems Engineering Technical Reviews (SETRs) to provide independent, objective assessments of technical maturity and compliance with applicable architectures, specifications and standards across IW capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

(5) The Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) provides a means to demonstrate and evaluate the interoperability of United States (US), North Atlantic Treaty Organization (NATO), and coalition information sharing systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Cybersecurity Architecture, Specifications and Standards	8.460	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY19 Cybersecurity Architecture, Specifications and Standards funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 Base Plans: FY20 Cybersecurity Architecture, Specifications and Standards funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 OCO Plans: N/A					
Title: Cybersecurity Vulnerability & Functional Test Capability	20.833	0.000	0.000	0.000	0.000
Articles:	2	-	-	-	-
FY 2019 Plans: FY19 Cybersecurity Vulnerability & Functional Test Capability funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 Base Plans: FY20 Cybersecurity Vulnerability & Functional Test Capability funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 OCO Plans: N/A					
Title: Enterprise Architecture	0.716	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY19 Enterprise Architecture funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 Enterprise Architecture funding resides under PE 0606355N Warfare Innovation Management. ***FY 2020 OCO Plans:*** N/A					
Title: SYSCOM Systems Engineering ***Articles:*** ***FY 2019 Plans:*** FY19 SYSCOM Systems Engineering funding resides under PE 0606355N Warfare Innovation Management. ***FY 2020 Base Plans:*** FY20 SYSCOM Systems Engineering funding resides under PE 0606355N Warfare Innovation Management. ***FY 2020 OCO Plans:*** N/A	2.197 -	0.000 -	0.000 -	0.000 -	0.000 -
Title: Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) ***Articles:*** ***FY 2019 Plans:*** FY19 CWIX funding resides under PE 0606355N Warfare Innovation Management. ***FY 2020 Base Plans:*** FY20 CWIX funding resides under PE 0606355N Warfare Innovation Management. ***FY 2020 OCO Plans:*** N/A	1.032 -	0.000 -	0.000 -	0.000 -	0.000 -
Accomplishments/Planned Programs Subtotals	33.238	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Space and Electronic Warfare (SEW) Engineering is a non-acquisition program that develops, tests, implements technical authority, and validates naval Navy Command, Control, Communications, Computers, Intelligence,

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

Surveillance, and Reconnaissance (C4ISR); provides integrated Architecture products and supports C4ISR systems engineering processes and standards. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.

E. Performance Metrics

The SEW engineering program will employ rigorous and consistent system engineering practices in an evolving value model to support development and deployment of shipboard, undersea, and land based capabilities based on mission and performance requirements, integrated enterprise architectures, model-validated solutions, and sustainment and supportability needs for the Command and Control (C2), Intelligence, Networks, Communications, Space, and Business Information Technology (IT) domains.

Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) Performance Metrics: Three key metrics: (1) Interoperability and compliance with Naval (Navy and Marine Corps), joint, coalition and other non-governmental organization architectures, systems and equipment; (2) Compliance with Defense Information Services Agency (DISA), National Security Agency (NSA), and other joint and coalition information assurance and security standards; and (3) warfighter utility assessment across the joint and coalition spectrum. Specific metrics validate performance of individual technologies participating in CWIX as well as in other venues as appropriate.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 2144 / *Space & Elec Warfare Engineering*	

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
Cybersecurity Architecture, Specifications and Standards	Various	Various : Various	8.667	0.000		0.000		0.000		-		0.000	0.000	8.667	-
Cybersecurity Architecture, Specifications and Standards	C/CPFF	AUSGAR : San Diego, CA	5.667	1.164	Mar 2018	0.000		0.000		-		0.000	0.000	6.831	-
Cybersecurity Architecture, Specifications and Standards	WR	SSC LANT : Charleston, SC	4.145	1.270	Feb 2018	0.000		0.000		-		0.000	0.000	5.415	-
Cybersecurity Architecture, Specifications and Standards	WR	SSC PAC : San Diego, CA	10.502	3.090	Feb 2018	0.000		0.000		-		0.000	0.000	13.592	-
Cybersecurity Architecture, Specifications and Standards	C/CPFF	BAH : McLean, VA	7.631	2.936	Jul 2018	0.000		0.000		-		0.000	0.000	10.567	-
Cybersecurity Vulnerability & Functional Test Capability	C/CPFF	Various : Various	0.000	4.452	Jun 2018	0.000		0.000		-		0.000	0.000	4.452	-
Cybersecurity Vulnerability & Functional Test Capability	WR	SSC PAC` : San Diego, CA	0.000	2.932	Mar 2018	0.000		0.000		-		0.000	0.000	2.932	-
Cybersecurity Vulnerability & Functional Test Capability	C/CPFF	SSC LANT : Charleston, SC	0.000	4.638	Jun 2018	0.000		0.000		-		0.000	0.000	4.638	-
Cybersecurity Vulnerability & Functional Test Capability.	C/CPFF	SSC PAC : San Diego, CA	0.000	6.986	Jun 2018	0.000		0.000		-		0.000	0.000	6.986	-
Cybersecurity Vulnerability & Functional Test Capability	WR	SSC LANT' : Charleston, SC	0.000	1.825	Mar 2018	0.000		0.000		-		0.000	0.000	1.825	-
		Subtotal	36.612	29.293		0.000		0.000		-		0.000	0.000	65.905	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 2144 / *Space & Elec Warfare Engineering*	

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
SEW Development Support/Systems Engineering	Various	Various : Various	78.537	0.000		0.000		0.000		-		0.000	0.000	78.537	-
SEW/C4I Technology Integration	Various	Various : Various	12.985	0.000		0.000		0.000		-		0.000	0.000	12.985	-
MDA Prototype SE Support	Various	Various : Various	17.376	0.000		0.000		0.000		-		0.000	0.000	17.376	-
Enterprise Architecture	Various	Various : Various	3.630	0.000		0.000		0.000		-		0.000	0.000	3.630	-
Enterprise Architecture	C/CPFF	AUSGAR : San Diego, CA	2.120	0.322	Mar 2018	0.000		0.000		-		0.000	0.000	2.442	-
Enterprise Architecture	WR	SSC LANT : Charleston, SC	1.121	0.107	Feb 2018	0.000		0.000		-		0.000	0.000	1.228	-
Enterprise Architecture	WR	SSC PAC : San Diego, CA	2.765	0.287	Feb 2018	0.000		0.000		-		0.000	0.000	3.052	-
SYSCOM Systems Engineering	C/CPFF	AUSGAR : San Diego, CA	4.645	1.297	Mar 2018	0.000		0.000		-		0.000	0.000	5.942	-
SYSCOM Systems Engineering	WR	SSC PAC : San Diego, CA	6.239	0.638	Feb 2018	0.000		0.000		-		0.000	0.000	6.877	-
SYSCOM Systems Engineering	C/CPFF	SAIC : McLean, VA	0.940	0.262	Jan 2018	0.000		0.000		-		0.000	0.000	1.202	-
		Subtotal	130.358	2.913		0.000		0.000		-		0.000	0.000	133.271	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
SEW Eng/CWIX/JRAE	Various	Various : Various	48.685	0.000		0.000		0.000		-		0.000	0.000	48.685	-
SEW Eng/CWIX	MIPR	Defense Information Systems Agency : Arlington, VA	0.709	0.115	Apr 2018	0.000		0.000		-		0.000	0.000	0.824	-
SEW Eng/CWIX	WR	SSC PAC : San Diego, CA	4.526	0.576	Dec 2017	0.000		0.000		-		0.000	0.000	5.102	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

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
SEW Eng/CWIX	C/CPFF	SAIC : McLean, VA	0.711	0.223	Jan 2018	0.000		0.000		-		0.000	0.000	0.934	-
SEW Eng/CWIX	C/CPFF	AUSGAR : San Diego, CA	0.374	0.118	Mar 2018	0.000		0.000		-		0.000	0.000	0.492	-
		Subtotal	55.005	1.032		0.000		0.000		-		0.000	0.000	56.037	N/A

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
ACQ Workforce Fund	Various	Various : Various	0.071	0.000		0.000		0.000		-		0.000	0.000	0.071	-
		Subtotal	0.071	0.000		0.000		0.000		-		0.000	0.000	0.071	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	222.046	33.238		0.000		0.000		-		0.000	0.000	255.284	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

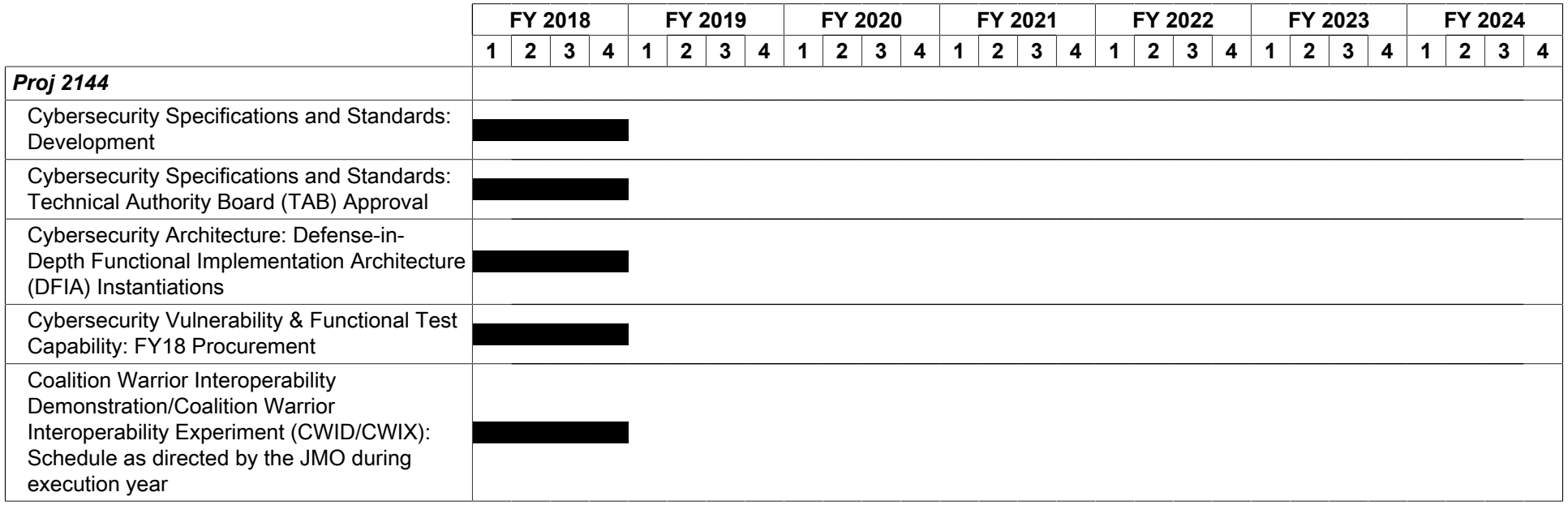

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2144				
Cybersecurity Specifications and Standards: Development	1	2018	4	2018
Cybersecurity Specifications and Standards: Technical Authority Board (TAB) Approval	1	2018	4	2018
Cybersecurity Architecture: Defense-in-Depth Functional Implementation Architecture (DFIA) Instantiations	1	2018	4	2018
Cybersecurity Vulnerability & Functional Test Capability: FY18 Procurement	1	2018	4	2018
Coalition Warrior Interoperability Demonstration/Coalition Warrior Interoperability Experiment (CWID/CWIX): Schedule as directed by the JMO during execution year	1	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 2147 / *ISR Architecture*	

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
2147: *ISR Architecture*	1.482	0.689	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.171
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Beginning in FY19, the Intelligence, Surveillance, and Reconnaissance (ISR) funding profile transferred to PE 0606355N.

A. Mission Description and Budget Item Justification

Integrated architectures provide a technical framework for assessing capability gaps and performance of individual systems and System of Systems (SoS) and their ability to effectively provide the desired effects to support warfighting missions. They also serve as a means to influence and drive Programs of Record (PoR) toward a common, more efficient state that promotes interoperability and security.

The Naval Intelligence, Surveillance, and Reconnaissance (ISR) Reference Architecture project is intended to guide system of systems capability development and promote interoperability across Navy ISR programs, as well as interoperability and alignment with Department of Defense (DoD)-wide enterprise initiatives including Joint Information Environment and Intelligence Community Information Technology Environment and Space & Naval Warfare Systems Command-wide Enterprise Architecture policies. This effort to develop integrated ISR architectures will also help instill systems engineering discipline and standardization across the Navy ISR Enterprise and provide a means by which to assess ISR PoR progress in conforming to a single Navy architecture. These efforts will help reduce Information Technology/ISR infrastructure complexity and variances, making it easier to manage, operate and defend our ISR capabilities, and help inform investment decisions across the Navy's ISR enterprise to support Assured Command and Control, Battlespace Awareness and Integrated Fires.

This effort encompasses the documentation and analysis of current ISR enterprise architectures to inform and guide requirements for target architecture development and performance requirements to support full use and incorporation of ISR capabilities to advance Navy operations afloat. The associated studies will produce both technical and non-technical implementation guidance across the Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities spectrum.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Intelligence, Surveillance, and Reconnaissance (ISR) Architecture	0.689	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY19 ISR Architecture funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 Base Plans: FY20 ISR Architecture funding resides under PE 0606355N Warfare Innovation Management.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2147 / *ISR Architecture*

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					
Accomplishments/Planned Programs Subtotals	0.689	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Naval ISR Architecture project is a non-acquisition program that provides integrated architecture products, engineering analysis of current and target/future capabilities to identify capability gaps and shortfalls, and provides solution recommendations. These combined efforts support the ability to articulate risks, and align/ prioritize investment decision recommendations within the ISR domain for the Navy.

E. Performance Metrics

The Naval (Navy and Marine Corps) ISR Reference Architecture effort will use consistent systems engineering practices to support development of integrated ISR enterprise architectures, and model-validated solution recommendations against quantified technical and operational performance parameters.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2147 / *ISR Architecture*

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
ISR Architecture	C/CPFF	METRON : Reston, VA	1.382	0.582	Dec 2017	0.000		0.000		-		0.000	0.000	1.964	-
ISR Architecture	WR	SSC PAC : San Diego, CA	0.100	0.107	Dec 2017	0.000		0.000		-		0.000	0.000	0.207	-
		Subtotal	1.482	0.689		0.000		0.000		-		0.000	0.000	2.171	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	1.482	0.689		0.000		0.000		-		0.000	0.000	2.171	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2147 / *ISR Architecture*

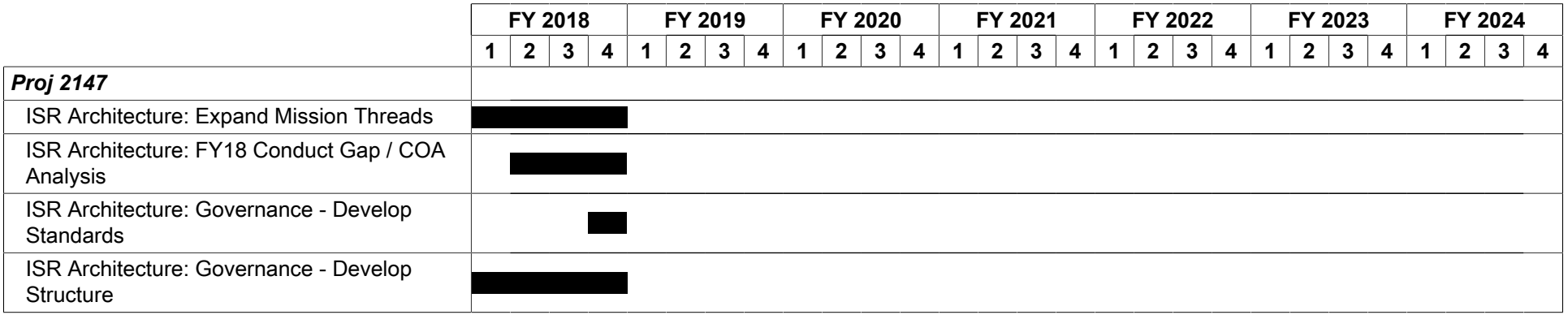

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2147 / *ISR Architecture*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2147				
ISR Architecture: Expand Mission Threads	1	2018	4	2018
ISR Architecture: FY18 Conduct Gap / COA Analysis	2	2018	4	2018
ISR Architecture: Governance - Develop Standards	4	2018	4	2018
ISR Architecture: Governance - Develop Structure	1	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*				Project (Number/Name) 2356 / *Maritime Concept Generation & 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**
2356: *Maritime Concept Generation & Development*	27.209	6.206	7.230	5.263	-	5.263	8.662	9.179	9.407	9.595	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Maritime Concept Generation and Development (MCGD) funding provides naval warfare subject matter expertise, experiment planning expertise, Modeling and Simulation (M&S) support, and analysis expertise to enable execution of the planned experiment efforts (and the individual experiment initiatives contained within) in the areas of Electromagnetic Maneuver Warfare (EMW), Mine Warfare, Naval Force Integration, Operational Level of War/Tactical Level of War Integration, and emerging Naval concepts.

Typical deliverables for each experimental effort include:

- Experiment control plan
- Data Collection and Analysis Plan (DCAP)
- Experiment Analysis Summary Reference Document
- Experiment Engineering Plan
- Final Experiment Report (with Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLP) recommendations)
- New/refined doctrine/Tactics, Techniques and Procedures (TTP)

The Maritime Concept Generation and Concept Development project funds four main efforts:

(1) Provides critical concept development and experimentation manpower and warfighting subject matter expertise aligned with the Concept Generation/Concept Development (CG/CD) program. The priorities for the CG/CD program are to develop concept/concept of operations and explore near/far-term technological and non-technological solutions to war fighting gaps across all naval warfare areas. The associated experimentation efforts include planning, systems engineering and integration, modeling and simulation support, event execution,
data collection, analysis, and assessment for a wide-range of experimentation efforts including the examination of prototypes, tactical development and evaluation, support for Science and Technology (S&T) innovation, and program of record system development; venues such as workshops, seminars, war games, limited objective experiments, limited technical experiments, and live at-sea events are used to execute these experimentation efforts.

(2) Provides naval warfare subject matter expertise, experiment planning expertise, and analysis expertise to plan, execute, and assess experimentation for the fleets and warfighting development centers (WDC) at the operational and tactical levels. This includes a focus on WDC integration role, maritime command and control (C2), advanced cross-domain warfighting, and maritime operations centers (MOCS)/operational level of war (OLW) lines of operations. Seeks to solve fleet-identified warfighting gaps (referenced within the Integrated Prioritized Capability Lists (IPCL), Urgent Operational Needs Statements (UONS), Fleet Commander's Guidance, etc.). The experimentation and prototyping efforts support the "last tactical mile" of many Navy S&T programs by supporting those programs where the technology is mature enough, but requires evaluation on or by a "fleet asset" - ships, airplanes, submarines, and sailors.

(3) Provides modeling and simulation (M&S) support to Navy experimentation efforts. M&S is used to stimulate decision making during seminar-style and system war gaming experiments and provides the simulated operational environment and capabilities with high-fidelity models such as the Joint Semi-Automated Force (JSAF)

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

program. Additionally, where applicable, the Navy Simulation System (NSS) "Monte Carlo" model is also used to give high confidence solutions and outcomes to complex warfighting problems.
(4) Provides for focused, solution-driven tactics development and evaluation through experimentation. This effort is focused on developing near-term doctrine solutions to address specific fleet-identified tactical issues.

Maritime Concept Generation and Concept Development products include:
- Concepts (signed by the CNO that influence future funding and technological development)
- Enabling concepts
- Concepts of operations (CONOPS)
- Final experimentation reports (including findings, insights, and recommendations and DOTMLPF change recommendations and plans for action)
- Experiment Analysis Summary Reference Documents
- New/revised doctrinal and Tactics/Techniques/Procedures publications
- White papers (think pieces) intended to generate further discussion within Navy leadership

Specific products are listed in the Accomplishments/Plans section of this exhibit.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Maritime Concept Generation and Development	6.206	7.230	5.263	0.000	5.263
Articles:	-	-	-	-	-
FY 2019 Plans: Through FY19 Maritime Concept Generation and Development (MDGD) experiment efforts, Navy will continue to provide experiment, analytical and naval mission subject matter expertise support throughout the planning and execution process; identify fleet warfighting deficiencies through experimentation; identify and capture innovative solutions for fleet experiments that address prioritized fleet warfighting gaps; and identify suitable events to support the execution of the following Experimentation Campaigns: FLEET DESIGN EXPERIMENTS In keeping with the CNO's Design for Maintaining Maritime Superiority, the Fleet Design concept has been developed and approved. Continuing the development of the supporting doctrine, Tactics, Techniques and Procedures (TTP), command and control (C2) as well as the integration and interoperability required between weapon systems and decision makers requires a methodical experimental approach. FY19 experiments (both at-sea and via war simulations) will strive to achieve the objectives as laid out in the Fleet Design campaign plan.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
HUMAN-MACHINE INTEGRATION (HMI) OF ARTIFICIAL INTELLIGENCE (AI) EXPERIMENTATION - This effort will examine the incorporation of AI capabilities into Naval technologies, TTPs, and C2 processes such as the development of AI-enabled Tactical Decision Aids that autonomously transition data into information. ELECTROMAGNETIC MANEUVER WARFARE (EMW) EXPERIMENTATION Navy will conduct multiple events designed to synchronize and align experiment initiatives with electromagnetic maneuver warfare (EMW) tasks to provide solutions to EMW capability gaps and to ensure development of doctrine and TTP is synchronized with the introduction of new technology and provides the Fleet and Fleet trainers with required doctrine tools at the tactical and operational levels. Specific events planned for FY19 include: FLEET TACTICAL GRID ENABLERS At-Sea Experiment - This effort will examine and enhance the integration and interoperability of sensors, networks, data fusion, and analytic capabilities across national, theater, and organic platforms to explore the vision for a Fleet Tactical Grid. OFFICE OF NAVAL RESEARCH (ONR) TECHNOLOGY INNOVATION GAMES (TIGS). This series of workshops executed in conjunction with ONR will give Fleet operators the opportunity to examine emerging capabilities and determine potential concepts of employment to effectively incorporate innovative capabilities into Fleet warfighting missions and tasks. Four workshops are planned for FY19 to examine Cross-Platform Integration and Vector Assessment, Arctic Mobile Observing System, Expeditionary Maneuver/Mine Warfare, and Fast Agile Naval Technology Munition Supercavitating Torpedo Prototype (F-STEP). MARITIME CYBERSPACE EXPERIMENT - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary cyber capabilities. PANDARRA WAVE 19 At-Sea Experiment - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary Intelligence, Surveillance, and Reconnaissance (ISR) capabilities. RED NITRUM 19 At-Sea Experiment - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary capabilities.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
COUNTER-UNMANNED SYSTEMS (C-UXS) EXPERIMENT SERIES - This effort will build upon prior year experimentation by examining emerging TTPs and technologies to counter the proliferation of unmanned undersea, surface, and air vehicles. The series will consist of workshops focused on countering various types of unmanned systems culminating in an at-sea cross domain Counter-Unmanned Systems (C-UxS) experiment. NAVAL FORCE INTEGRATION EXPERIMENTATION Naval Force Integration experiments (workshops, war simulations, and at-sea events) will examine integration and interoperability issues associated with coordinated USN-USMC operations. The primary goal of the campaign is to reexamine Navy and Marine Corps organizational and command relationships in order to enable effective Naval operations across the maritime domain. Specific events planned for FY19 include: LARGE SCALE EXERCISE (LSE) 2020 - In FY19, this planning effort will support the execution of LSE 2020 early in calendar year 2020; a Naval exercise at the Operational to Tactical Level of War in a maritime theater with assigned live and synthetic assets in stressing competitor conditions to provide a comprehensive assessment of the three enabling components of fleet design. MINE WARFARE (MIW) EXPERIMENTATION Through workshops, war simulations and at-sea events, the FY 19 efforts will continue to examine TTP and C2 construct for our future Mine Counter Measures (MCM) force as new programs of record and unmanned systems come on line, and legacy systems begin to decommission. Specific events planned for FY19 include: MCM ADAPTIVE FORCE PACKAGES (AFP) At-Sea Experiment - This effort will examine the employment of USN MCM AFPs from alternative platforms. OPERATIONAL LEVEL OF WAR/TACTICAL LEVEL OF WAR (OLW/TLW) INTEGRATION EXPERIMENTATION OLW/TLW Integration experiments (workshops, war simulations and at-sea events) will examine current and emerging tactics, techniques, and procedures (TTPs) and current and emerging technologies with a goal of identifying innovative solutions that will support the capstone naval concept of a Fleet Design based on integration, distribution, and maneuver. Specific events planned for FY19 include: DISTRIBUTED MARITIME OPERATIONS (DMO) Experimentation - This effort will address key Distributed Maritime Operations (DMO) concept action plan items such as a DMO War Simulation, a Fleet Organization					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
War Simulation, an examination of Fleet Command and Maritime Operation Center (MOC) capabilities, and the employment of unmanned systems in support of DMO. SPACE EXPERIMENT SERIES - This effort will build upon prior year experimentation on the employment of space-based capabilities and will focus on SATCOM Agility and MOC Space Integration through a series of workshops and at-sea events leveraging fleet exercises such as Pacific Sentry and Austere Challenge. EMERGING CONCEPTS WAR SIMULATIONS - This effort will employ multiple seminar war simulations to examine emerging concepts such as Fleet Design, Distributed Maritime Operations, and multiple feeder concepts. FOR FY19 CONCEPT GENERATION/CONCEPT DEVELOPMENT (CG/CD) Continue Concept Generation/Concept Development (CG/CD) development efforts that carry-over from FY 2018: Navy will finish enabling concepts for Fleet Design. This includes implementation of the Distributed Maritime Operations (DMO) concept Action Plan. Additional concepts and CONOPs to be developed in FY19 will be determined through the CG/CD development process and additional external factors. Concepts under consideration include Unmanned Systems in support of DMO, Command and Control in support of DMO, Offensive Mine Warfare, Targeting in support of DMO, and Advanced Autonomous/Semi-autonomous Sustainment Systems.					
FY 2020 Base Plans: Through FY20 Maritime Concept Generation and Development (MDGD) experiment efforts, Navy will continue to provide experiment, analytical and naval mission subject matter expertise support throughout the planning and execution process; identify fleet warfighting deficiencies through experimentation; identify and capture innovative solutions for fleet experiments that address prioritized fleet warfighting gaps; and identify suitable events to support the execution of the following Experimentation Campaigns: FLEET DESIGN EXPERIMENTS In keeping with the CNO's Design for Maintaining Maritime Superiority, the emerging concept ""Fleet Design"" has been developed. Continuing the development of the supporting doctrine, TTP, Command and control (C2) as well as the integration and interoperability required between weapon systems and decision makers requires a					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
methodical experimental approach. FY20 experiments (both at-sea and via war games) will strive to achieve the objectives as laid out in the accompanying action/implementation plan. Specific events planned for FY20 include: HUMAN-MACHINE INTEGRATION (HMI) OF ARTIFICIAL INTELLIGENCE (AI) EXPERIMENTATION - This effort will examine the incorporation of AI capabilities into Naval technologies, TTPs, and C2 processes such as the development of AI-enabled Tactical Decision Aids that autonomously transition data into information. ELECTROMAGNETIC MANEUVER WARFARE (EMW) EXPERIMENTATION Navy will conduct multiple events designed to synchronize and align experiment initiatives with EMW tasks to provide solutions to EMW capability gaps and to ensure development of doctrine and TTP is synchronized with the introduction of new technology and provides the Fleet and Fleet trainers with required doctrine tools at the tactical and operational levels. OFFICE OF NAVAL RESEARCH (ONR) TECHNOLOGY INNOVATION GAMES (TIGS). This series of workshops executed in conjunction with ONR will give Fleet operators the opportunity to examine emerging capabilities and determine potential concepts of employment to effectively incorporate innovative capabilities into Fleet warfighting missions and tasks. Potential technology to be examined in FY20 is not yet determined. MARITIME CYBERSPACE EXPERIMENT - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary cyber capabilities. PANDARRA WAVE 20 At-Sea Experiment - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary ISR capabilities. RED NITRUM 20 At-Sea Experiment - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary electronic attack capabilities. COUNTER-UNMANNED SYSTEMS (C-UXS) EXPERIMENT SERIES - This effort will build upon prior year experimentation by examining emerging TTPs and technologies to counter the proliferation of unmanned undersea, surface, and air vehicles. The series will consist of workshops focused on countering various types of unmanned systems culminating in an at-sea cross domain C-UxS experiment. NAVAL FORCE INTEGRATION EXPERIMENTATION					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Naval Force Integration experiments (workshops, War games, and at-sea events) will examine integration and interoperability issues associated with coordinated USN-USMC operations. The primary goal of the campaign is to reexamine Navy and Marine Corps organizational and command relationships in order to enable effective Naval operations across the maritime domain. Specific events currently planned for FY20 include: LARGE SCALE EXERCISE (LSE) 2020 - This Naval exercise at the Operational to Tactical Level of War in a maritime theater with assigned live and synthetic assets in stressing competitor conditions will provide a comprehensive assessment of the three enabling components of fleet design - Integration, Distribution, and Maneuver. MINE WARFARE (MIW) EXPERIMENTATION Through workshops, war games and at-sea events, the FY20 efforts will continue to examine TTP and C2 construct for our future MCM force as new programs of record and unmanned systems come on line, and legacy systems begin to decommission. OPERATIONAL LEVEL OF WAR/TACTICAL LEVEL OF WAR (OLW/TLW) INTEGRATION EXPERIMENTATION OLW/TLW Integration experiments (workshops, war games and at-sea events) will examine current and emerging TTPs and current and emerging technologies with a goal of identifying innovative solutions that will support the capstone naval concept of a Fleet Design based on integration, distribution, and maneuver. Specific events planned for FY20 include: DISTRIBUTED MARITIME OPERATIONS (DMO) Experimentation - This effort will address key DMO concept action plan items such as the examination of Fleet Command and Maritime Operation Center (MOC) capabilities, and the employment of unmanned systems in support of DMO. SPACE EXPERIMENT SERIES - This effort will build upon prior year experimentation on the employment of space-based capabilities at the OLW/TLW. EMERGING CONCEPTS WAR GAMES - This effort will employ multiple seminar war games to examine emerging concepts such as Fleet Design, Distributed Maritime Operations, and multiple feeder concepts. FOR FY20 CONCEPT GENERATION/CONCEPT DEVELOPMENT (CG/CD)					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue CG/CD development efforts that carry-over from FY19: Additional concepts and CONOPs to be developed in FY20 will be determined through the CG/CD development process and additional external factors. Concepts under consideration include Unmanned Systems in support of DMO, Command and Control in support of DMO, Offensive Mine Warfare, Targeting in support of DMO, and Advanced Autonomous/Semi-autonomous Sustainment Systems. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The FY2020 Project 2356 funding request was reduced by $1.897 million to account for the availability of prior year execution balances. Further decreases are due to the implementation of major concepts experiments during FY19 which will shift focus to continuous concept generation/concept development efforts for FY20 resulting in less resources required.					
Accomplishments/Planned Programs Subtotals	6.206	7.230	5.263	0.000	5.263

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This funding is used to acquire intellectual capital in emerging conceptual and technical areas through contracts providing expertise in concepts and experiment design, execution and analysis to mitigate fleet-identified current and future war fighting gaps.

E. Performance Metrics

Maritime Concept Generation and Development/Related Experimentation:
- Integrate emergent concepts and technologies, leading to rapid introduction of needed war fighting capabilities.
- Rapidly mature concepts, technologies, and doctrine.
- Develop near-term doctrine solutions to address specific fleet-identified tactical level / operation level issues.
- Develop recommended Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLP) changes required to introduce emergent technology and tactics.
- Refine concepts and identify key performance levels necessary for implementation.
- Demonstrate feasibility and discriminate among competing concepts and implementation alternatives.
- Identify potential military effectiveness and risk.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

- Evaluate how much of the new capability and attendant force structure is needed.
- Identify how to operate the new force and combine it with the legacy force.
- Focus on near, mid and long term war fighting challenges to realize increased war fighting effectiveness.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 2356 / *Maritime Concept Generation & 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
System Test and Evaluation	C/CPFF	Defense Technical Information Center : Ft Belvoir VA	12.713	3.780	Dec 2017	4.148	Jan 2019	2.315	Jun 2020	-		2.315	Continuing	Continuing	Continuing
System Test and Evaluation	Various	SPAWARSYSCEN : Charleston, SC	2.734	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System Test and Evaluation	Various	ONR : Washington, DC	1.370	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System Test and Evaluation	Various	NAVSEA : Washington, DC	1.334	0.000		0.000		0.000		-		0.000	0.000	1.334	-
System Test and Evaluation	PO	Naval Underwater Warfare Center : Newport RI	0.500	0.000		0.000		0.000		-		0.000	0.000	0.500	-
System Test and Evaluation	C/CPFF	NAVSUP : Norfolk VA	5.694	2.426	Dec 2017	3.082	Jan 2019	2.948	Jun 2020	-		2.948	0.000	14.150	-
Center for Naval Analysis	IA	Center for Naval Analysis : Norfolk, VA	0.154	0.000		0.000		0.000		-		0.000	0.000	0.154	-
		Subtotal	24.499	6.206		7.230		5.263		-		5.263	Continuing	Continuing	N/A

Remarks

The vast majority of the contract costs are for contract labor; primarily on two large Multi-Award contracts, one through DTIC (Defense Services MAC) and one through Joint Staff J-7 MAC. Task orders on the DS MAC contract provide the majority of the Modeling & Simulation support for experimentation and some of the experiment planner support. Task orders on the JS J-7 MAC provide the majority of the experiment design, planner, and execution support.

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	C/FFP	Navy Warfare Development Command : Norfolk, VA	2.710	0.000		0.000		0.000		-		0.000	0.000	2.710	-
		Subtotal	2.710	0.000		0.000		0.000		-		0.000	0.000	2.710	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / *SEW Architecture/Eng Support*	Project (Number/Name) 2356 / *Maritime Concept Generation & 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	27.209	6.206		7.230		5.263		-		5.263	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

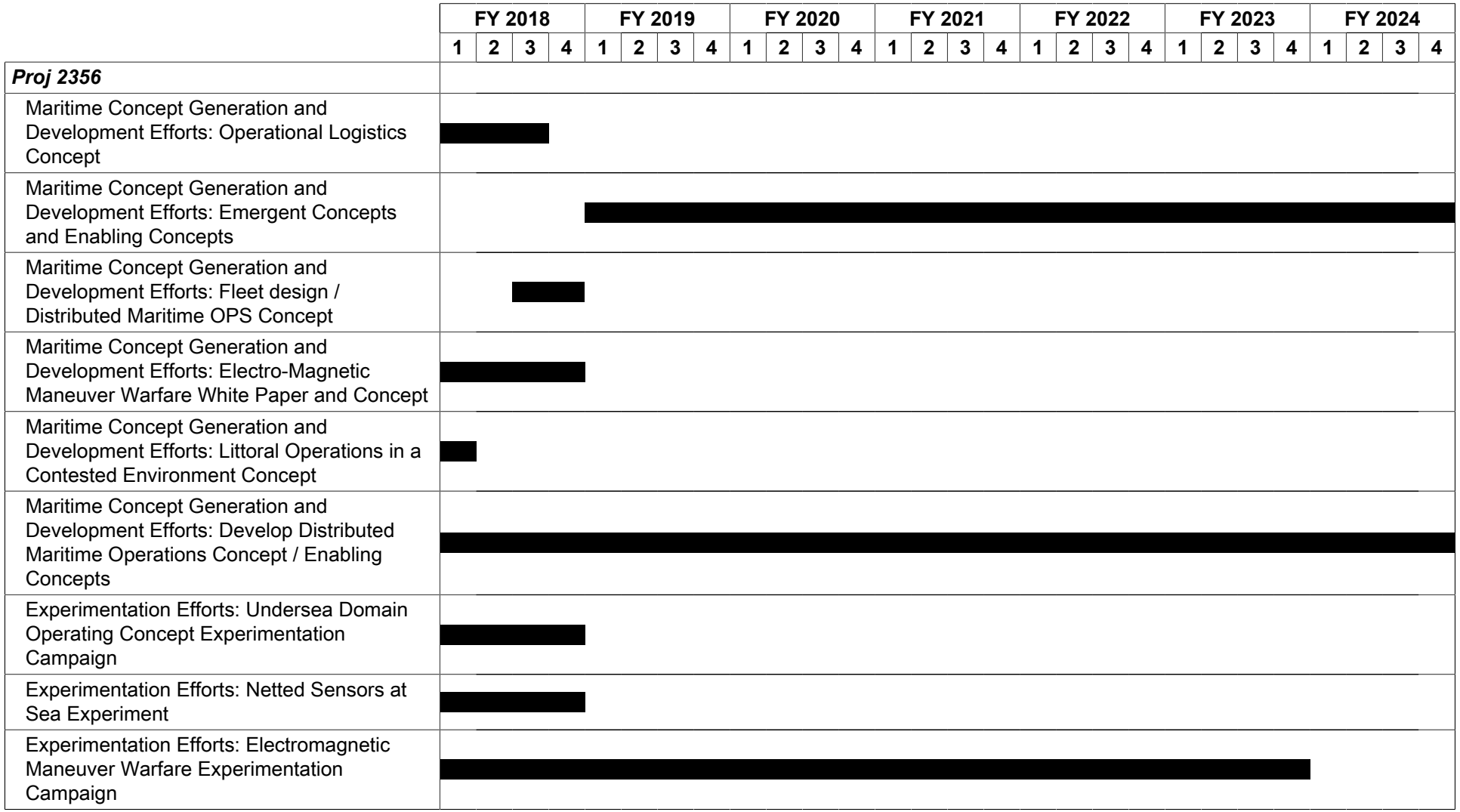

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

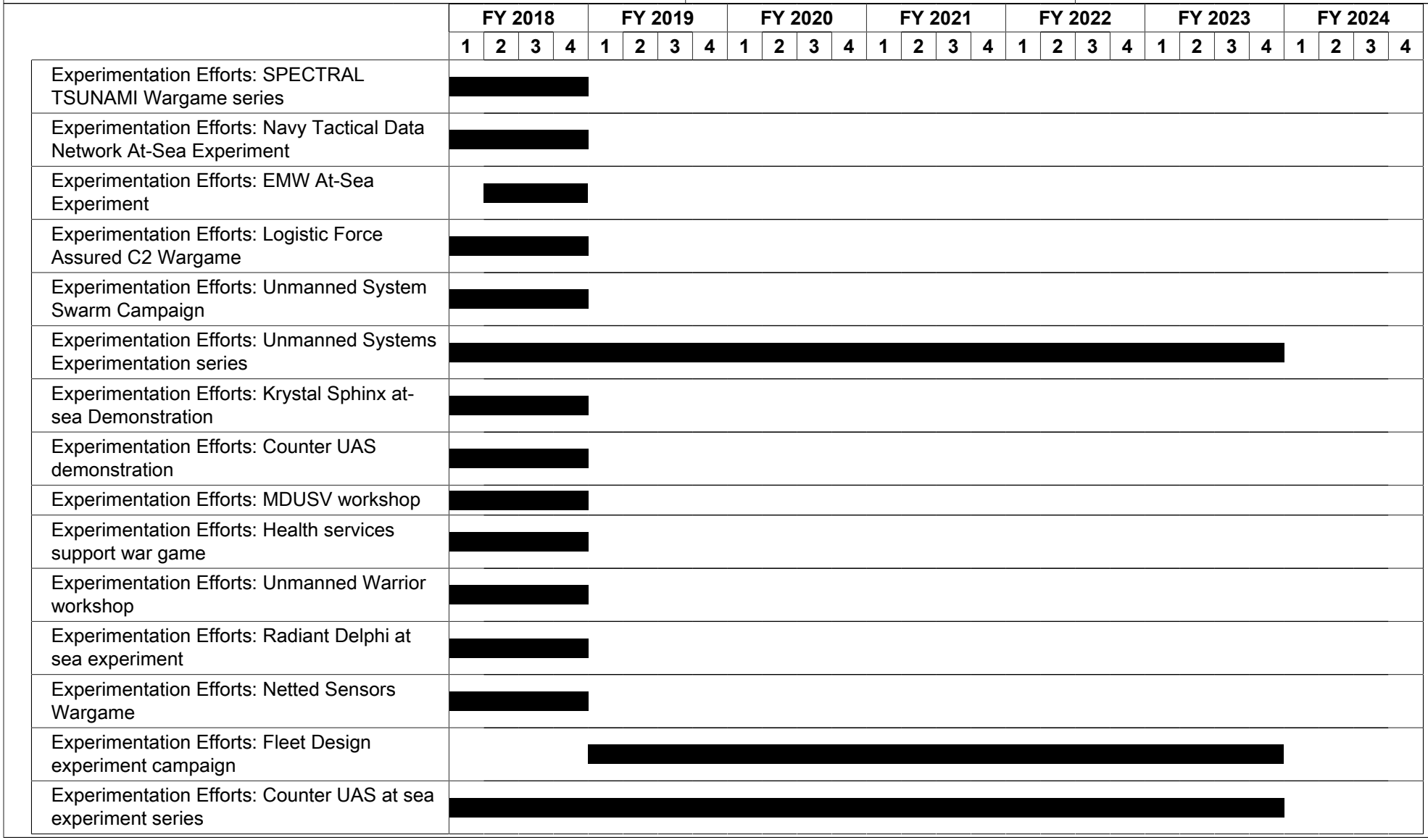

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

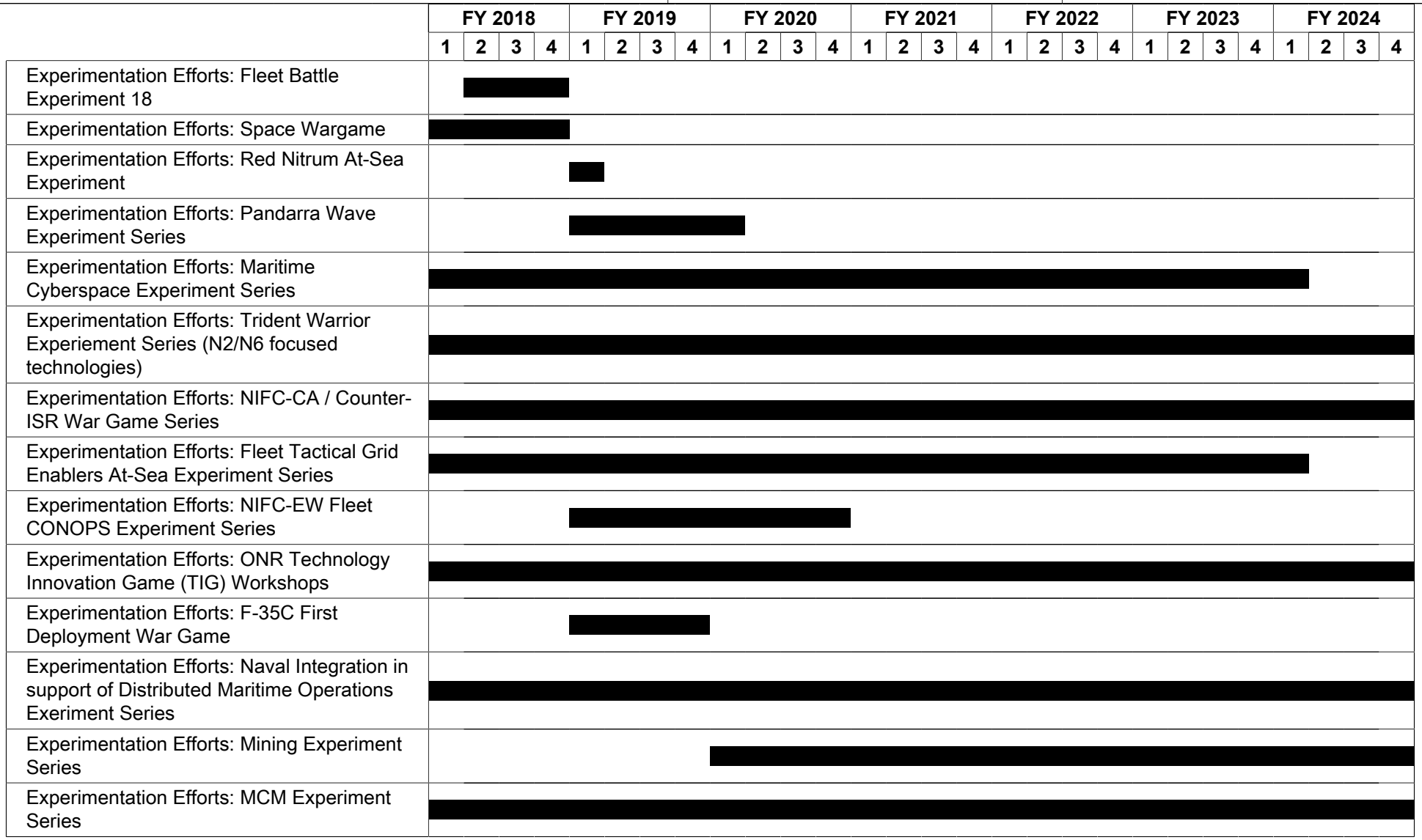

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

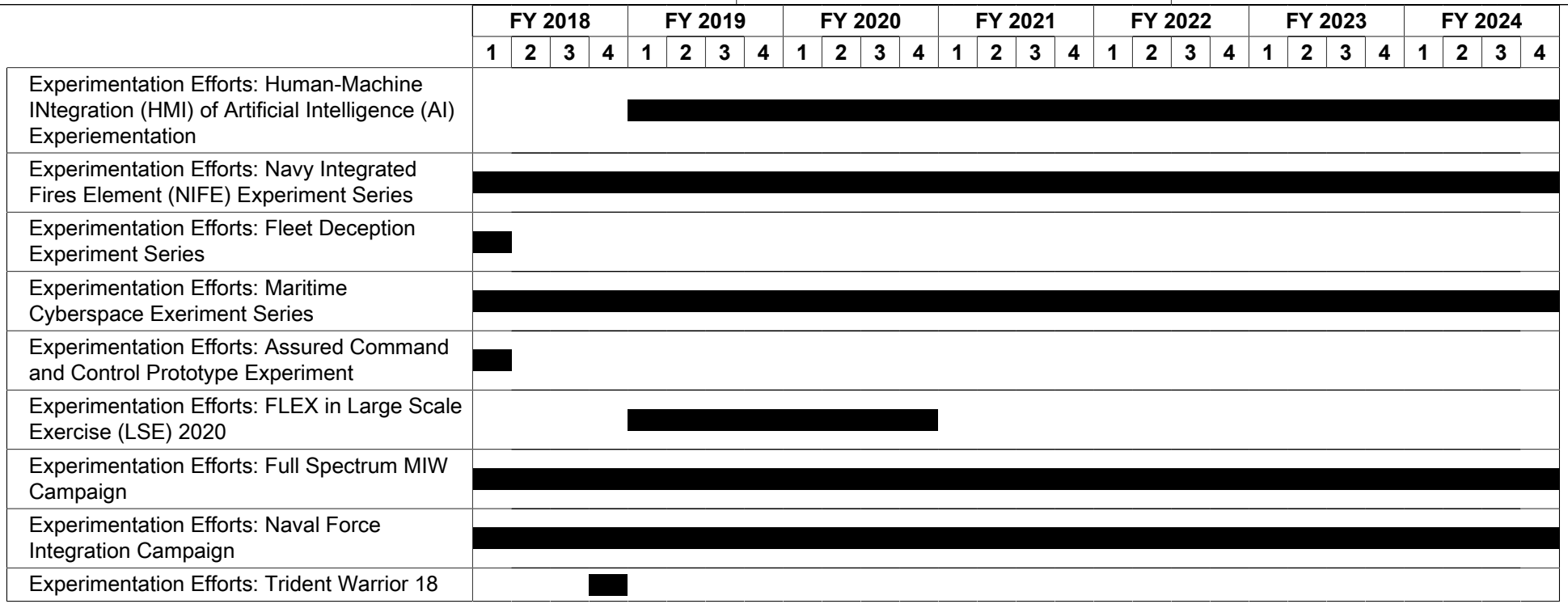

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2356				
Maritime Concept Generation and Development Efforts: Operational Logistics Concept	1	2018	3	2018
Maritime Concept Generation and Development Efforts: Emergent Concepts and Enabling Concepts	1	2019	4	2024
Maritime Concept Generation and Development Efforts: Fleet design / Distributed Maritime OPS Concept	3	2018	4	2018
Maritime Concept Generation and Development Efforts: Electro-Magnetic Maneuver Warfare White Paper and Concept	1	2018	4	2018
Maritime Concept Generation and Development Efforts: Littoral Operations in a Contested Environment Concept	1	2018	1	2018
Maritime Concept Generation and Development Efforts: Develop Distributed Maritime Operations Concept / Enabling Concepts	1	2018	4	2024
Experimentation Efforts: Undersea Domain Operating Concept Experimentation Campaign	1	2018	4	2018
Experimentation Efforts: Netted Sensors at Sea Experiment	1	2018	4	2018
Experimentation Efforts: Electromagnetic Maneuver Warfare Experimentation Campaign	1	2018	4	2023
Experimentation Efforts: SPECTRAL TSUNAMI Wargame series	1	2018	4	2018
Experimentation Efforts: Navy Tactical Data Network At-Sea Experiment	1	2018	4	2018
Experimentation Efforts: EMW At-Sea Experiment	2	2018	4	2018
Experimentation Efforts: Logistic Force Assured C2 Wargame	1	2018	4	2018
Experimentation Efforts: Unmanned System Swarm Campaign	1	2018	4	2018
Experimentation Efforts: Unmanned Systems Experimentation series	1	2018	4	2023
Experimentation Efforts: Krystal Sphinx at-sea Demonstration	1	2018	4	2018

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Experimentation Efforts: Counter UAS demonstration	1	2018	4	2018
Experimentation Efforts: MDUSV workshop	1	2018	4	2018
Experimentation Efforts: Health services support war game	1	2018	4	2018
Experimentation Efforts: Unmanned Warrior workshop	1	2018	4	2018
Experimentation Efforts: Radiant Delphi at sea experiment	1	2018	4	2018
Experimentation Efforts: Netted Sensors Wargame	1	2018	4	2018
Experimentation Efforts: Fleet Design experiment campaign	1	2019	4	2023
Experimentation Efforts: Counter UAS at sea experiment series	1	2018	4	2023
Experimentation Efforts: Fleet Battle Experiment 18	2	2018	4	2018
Experimentation Efforts: Space Wargame	1	2018	4	2018
Experimentation Efforts: Red Nitrum At-Sea Experiment	1	2019	1	2019
Experimentation Efforts: Pandarra Wave Experiment Series	1	2019	1	2020
Experimentation Efforts: Maritime Cyberspace Experiment Series	1	2018	1	2024
Experimentation Efforts: Trident Warrior Experiement Series (N2/N6 focused technologies)	1	2018	4	2024
Experimentation Efforts: NIFC-CA / Counter-ISR War Game Series	1	2018	4	2024
Experimentation Efforts: Fleet Tactical Grid Enablers At-Sea Experiment Series	1	2018	1	2024
Experimentation Efforts: NIFC-EW Fleet CONOPS Experiment Series	1	2019	4	2020
Experimentation Efforts: ONR Technology Innovation Game (TIG) Workshops	1	2018	4	2024
Experimentation Efforts: F-35C First Deployment War Game	1	2019	4	2019
Experimentation Efforts: Naval Integration in support of Distributed Maritime Operations Exeriment Series	1	2018	4	2024
Experimentation Efforts: Mining Experiment Series	1	2020	4	2024
Experimentation Efforts: MCM Experiment Series	1	2018	4	2024
Experimentation Efforts: Human-Machine INtegration (HMI) of Artificial Intelligence (AI) Experiementation	1	2019	4	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604707N / *SEW Architecture/Eng Support*	**Project (Number/Name)** 2356 / *Maritime Concept Generation & Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Experimentation Efforts: Navy Integrated Fires Element (NIFE) Experiment Series	1	2018	4	2024
Experimentation Efforts: Fleet Deception Experiment Series	1	2018	1	2018
Experimentation Efforts: Maritime Cyberspace Exeriment Series	1	2018	4	2024
Experimentation Efforts: Assured Command and Control Prototype Experiment	1	2018	1	2018
Experimentation Efforts: FLEX in Large Scale Exercise (LSE) 2020	1	2019	4	2020
Experimentation Efforts: Full Spectrum MIW Campaign	1	2018	4	2024
Experimentation Efforts: Naval Force Integration Campaign	1	2018	4	2024
Experimentation Efforts: Trident Warrior 18	4	2018	4	2018