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 0604755N *I Ship Self Def (Detect & Cntrl)*							
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	1,237.728	160.475	181.491	192.603	1.122	193.725	156.240	156.080	151.991	153.810	Continuing	Continuing
2178: *QRCC*	1,181.357	145.093	169.668	181.971	-	181.971	138.951	139.723	137.329	140.081	Continuing	Continuing
3172: *Joint Non-Lethal Weapons*	44.586	5.140	3.992	2.100	1.122	3.222	4.714	4.628	4.363	4.449	Continuing	Continuing
3358: *SSDS Training Improvement Program*	11.785	7.347	7.831	8.532	-	8.532	12.575	11.729	10.299	9.280	Continuing	Continuing
9999: *Congressional Adds*	0.000	2.895	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.895

A. Mission Description and Budget Item Justification

The FY 2020 funding request was reduced by $6.214 million to account for the availability of prior year execution balances.

This program element provides Aircraft Carriers and Amphibious Class ships Ship Self Defense System (SSDS) MK2 Combat System upgrades and integrates new equipment and systems to pace the threat and capture advances in technology. Examples of captured advanced technologies are: open architecture, advanced information assurance and initial cyber defense, Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability Improvement Project (FTIIP), and advanced sensor integration all of which require corresponding SSDS MK2 changes. The program element also includes the integrated Combat System project for embedded shipboard training and the Non-Lethal weapons project in support of anti-terrorism/force protection missions.

QRCC project (PU 2178) - implements an evolutionary acquisition of improved ship self-defense capabilities against Anti-Ship Cruise Missiles (ASCMs), and improved multi-warfare capabilities, for Aircraft carriers and Amphibious Class ships. SSDS MK 2 integrates a diverse set of fire control loop sensors and weapons, and C4I systems for each ship class (CVN68/78, LHA6, LHD1, LPD17, and LSD41/49). SSDS MK2 provides combat direction, and joint interoperability via the Cooperative Engagement Capability (CEC) and Tactical Digital Information Link (TADL)-J. System design emphasizes commonality and a single source software library which are major mechanisms for cost control and avoidances. SSDS uses a physically distributed, open system architecture computer network consisting of common hardware such as the Common Processor System (CPS) and the Common Display System (CDS). SSDS MK2 implements new combat system war-fighting capabilities and improvements on phased basis via Advanced Capability Builds (ACB) and Technology Insertion (TI). PU 2178 efforts are divided into three major functional areas: SSDS Product Development, Combat Systems Integration, and Test and Evaluation/Certification.

Joint Non-Lethal Weapons (PU 3172) - provides a long range laser warning and dazzle system, maritime vessel stopper system, and combined effects (light, laser, and sound) system for use in the maritime environment. Optical warning and distraction has been identified by the services as a possible technology solution to mitigate and/or address several known joint non-lethal capability gaps.

SSDS Training Improvement Program (PU 3358) - provides enhancements and upgrades to the SSDS Total Ship Training Capability (TSTC) components within the combat system, combat system elements, Battle-Force Tactical Training (BFTT), and Advanced Training Domain (ATD) to address needs for increased training capability and functionality in conjunction with SSDS MK2 Advanced Capability Builds (ACB)/Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability

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 0604755N *I Ship Self Def (Detect & Cntrl)*

Improvement Project (FTIIP), Task Force Cyber Awakening (TFCA) Boundary Defense Capability (BDC), and Technical Insertion efforts under PU 2178 (QRCC). These enhancements will address current and future training requirements by implementing new functionality to enable the individual warfighter through distributed battle group events to engage in more complex training requirements to support fleet required training certification events. Capability Development and integration are related to Self Defense, Underwater, Surface, and other warfare areas. Capability enhancements and upgrades include development of re-useable common components that can be leveraged by SSDS MK2 combat systems, and/or integration of re-usable common components developed by the TSTC/BFTT Program and AEGIS Advanced Training Domain (ATD)/TSTC Total Ship Training Capability (TSTC) projects to meet AEGIS combat system training requirements. TSTC continues to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including COMPTUEX FST at Sea integration into Live, Virtual and Constructive (LVC) environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and SSDS combat system capability upgrades, and to address the Fleet's Live, Virtual and Constructive (LVC) Fleet Training Wholeness initiative. Additionally, modernization is needed to support the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan and Commander United States Fleet Forces Command Fleet Readiness Training Plan.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	161.713	180.391	199.685	-	199.685
Current President's Budget	160.475	181.491	192.603	1.122	193.725
Total Adjustments	-1.238	1.100	-7.082	1.122	-5.960
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.239	0.000			
• Program Adjustments	0.000	1.100	-4.718	-	-4.718
• Rate/Misc Adjustments	0.001	0.000	-2.364	1.122	-1.242
• Congressional Add Adjustments	3.000	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *C2 Systems for Amphibs - Integrating CACS2 with SSDS*	2.895	0.000
Congressional Add Subtotals for Project: 9999	2.895	0.000
Congressional Add Totals for all Projects	2.895	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
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Change Summary Explanation

The FY 2020 funding request was reduced by $6.214 million to account for the availability of prior year execution balances.

The FY 2019 budget reflects a $1.100 million program adjustment for OCO in PU 3172, Joint Non-Lethal Weapons. FY 2019 OCO efforts include research and prototype development to determine a material solution to satisfy current Visual Augmentation Systems (VAS) capability gaps encountered during missions, including the ability to detect and recognize potential threat craft at the maximum possible range and at the earliest time in all-weather environments and the ability to record both audio/video encounters and incidents for after action reporting.

The FY 2020 budget request was adjusted to account for the reduction for availability of prior year execution and rate adjustments as well as increase in support of the Fleet Training Wholeness Strike Group CEC Training at Sea effort in PU 3358 and Visual Augmentation Systems (VAS) in PU 3172.

The investment to the Fleet Training Wholeness Strike Group CEC Training at Sea effort provides for the integration of the UPX-29 IFF simulation capability with the Cooperative Engagement Capability (CEC) as part of the Ship Self Defense System (SSDS) Integrated Combat System training capability. The UPX-29 IFF SIM provides Mode 5 simulation not available with the legacy Battle Force Tactical Training (BFTT) System.

The investment to the Visual Augmentation Systems (VAS) supports research, development, and testing of material solutions for VAS capability gaps encountered during missions in combat zones. Expeditionary force lacks the ability to detect and recognize potential threat craft at the maximum possible range and at the earliest time in all weather environments during day and night. In addition, the warfighter needs the ability to record both audio/video encounters and incidents for after action reporting.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	Project (Number/Name) 2178 / *QRCC*	

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
2178: *QRCC*	1,181.357	145.093	169.668	181.971	-	181.971	138.951	139.723	137.329	140.081	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The QRCC project (PU 2178) implements an evolutionary acquisition of improved ship self-defense capabilities against Anti-Ship Cruise Missiles (ASCMs), and improved multi-warfare capabilities, for Aircraft carriers and Amphibious Class ships. SSDS MK 2 integrates a diverse set of fire control loop sensors and weapons, and C4I systems for each ship class (CVN68/78, LHA6, LHD1, LPD17, and LSD41/49). SSDS MK2 provides combat direction, and joint interoperability via the Cooperative Engagement Capability (CEC) and Tactical Digital Information Link (TADL)-J. System design emphasizes commonality and a single source software library which are major mechanisms for cost control and avoidances. SSDS uses a physically distributed, open system architecture computer network consisting of common hardware such as the Common Processor System (CPS) and the Common Display System (CDS). SSDS MK2 implements new combat system war-fighting capabilities and improvements on phased basis via Advanced Capability Builds (ACB) and Technology Insertion (TI). PU 2178 efforts are divided into three major functional areas: SSDS Product Development, Combat Systems Integration, and Test and Evaluation/Certification.

SSDS Product Development encompasses systems engineering efforts, technology insertion and cyber-security, including the development and integration of ACB -12 and the required Technology Insertion TI12/12H (SSDS Software Build 10) and TI16 (SSDS Software Build 11) computing and display configurations. SSDS Product Development will provide warfighter upgrades including implementation of common software components for System Track Management; integration of CPS and CDS; expansion of SSDS MK 2 Local Area Network (LAN) to a Combat System LAN; integration of new Combat System/C4I elements (DBR, ESSM Block 1 with JUWL, SLQ-(V)6 SEWIP Block 2, MH-60R and CANES); implementation of cybersecurity boundary defense capabilities and Total Ship Training Capability (TSTC).

SW Build 10 is being fielded on the CVN 78, CVN 72 and LHD 2 currently undergoing Test Analyze and Fix (TAAF) in support of ship testing and certification. The SSDS design evolution also migrates ACB-12 to the TI-12H hardware configuration for initial installation on LHD 6 and TI-16 hardware configuration for initial installation on the CVN 73. SSDS ACB 20 and TI16 development will implement the required SSDS improvements to integrate the EASR/ERS, ESSM Block 2 and SEWIP softkill coordinator and includes system engineering, critical experiments, software development, operating environment, cyber-security software, hardware/software integration, factory qualification testing, land-based engineering testing, system/software TAAF effort in support of CS, logistics products and ashore training course development.

FY 2020 includes continuing the hardware design engineering, development and qualification for the next TI configurations, TI-16 Tech Refresh and TI-22.

For Cybersecurity, initiatives under PU 2178, will provide the SSDS MK 2 ICS protection and detection functionality and introduce critical response functionality to respond and recover from cyber-attacks. SSDS Cybersecurity is a phased multi-year development to define, develop, and integrate enterprise Combat System cybersecurity solutions which enhance the cybersecurity framework pillars of Identify, Protect, React, and Restore and expand force level cyber defense capabilities for the Carrier and Amphibious Fleet to provide a set of boundary defense capabilities for the SSDS MK2 ICS, a set of centralized Combat Systems-level cyber-security capabilities, and a set of element-level cyber-security protections.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

System engineering efforts for Joint Strike Fighter (JSF) F35B&C integration onboard LHA, LHD and CVN Class ships will provide improved F35 interoperability via Link 16 and improve land domain command and control for the Amphibious Readiness Group/Marine Air Ground Task Force (ARG/MAGTF) commanders and staffs through integration of USMC Common Aviation Command and Control System (CAC2S) program of record with LHA/D SSDS combat system.

Combat System Integration under PU 2178 encompasses CS modeling and simulation, system analysis/engineering, and system/software development for integration of sensors, weapons and C4I systems with SSDS MK2 in Aircraft Carrier and Amphibious Class Ships. Combat System Integration includes Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability Improvement Project (FTIIP), and ACB-20 war-fighting improvements, including the integration of EASR/ERS.

FCLIP Phase 2 will provide CIWS integration with CEC/SSDS MK2, ESSM 2T Uplink, RAM Block2 Multi-Target processing in the missile, SoS integration of RAM Block 2 Multi-Target Processing, NSSMS MK9 Multi-Target Discrimination & Reporting, and modeling and analysis to ensure optimization and alignment of capabilities into the CS end-to-end fire control loop.

FTIIP is the second phase of the corrective action plan for the resolution of the strike group interoperability issues. FTIIP includes implementation of Tactical Data Link (TDL) IFF Mode 5 identification capabilities, F/A-18 Digital Air Control (Phase 1) in support of F/A-18 and F-35 Joint Strike Fighter initial deployment, integration of the Shipboard Gridlock System/Automatic Correlation (SGS/AC) system into the SSDS MK2 TI-16 configuration, and implementation of other high priority software.

ACB-20 Combat System Integration provides fire control loop improvements beyond FCLIP Phase 2 for tracking, weapon scheduling and engagement control with ESSM Block 2 missile; SEWIP Block 2 soft kill coordinator, SEWIP Block 3 Electronic Attack.

Test and Evaluation/Certification under PU 2178 encompasses SSDS MK2 Development Test and Evaluation (DT&E) providing for comprehensive testing and certification of the integrated CS for the CVN 68, CVN 78, LPD 17, LHD1, LHA 6 and LSD41/49 ship classes. This includes Land-Based testing at Wallops Island and At-Sea testing for the lead ships for the new CS configurations, and Live Fire testing on the SDTS. The DT&E encompasses test planning, preparation, test conduct, data collection and analysis, and resolution and verification of deficiency corrections. The SSDS MK 2 T&E/Certification supports Integrated Combat System certification, the SSDS Test and Evaluation Master Plan (TEMP) execution and the Air Warfare Ship Self Defense CAPSTONE Enterprise TEMP execution which includes continuation of DT and FOT&E events for the CVN 78 SSDS MK 2 Mod 6C configuration with the DBR, SEWIP Block 2 ES, ESSM Block 1 with JUWL up-link, and RAM Block 2.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SSDS MK2 Product Development/Combat Systems Integration	117.614	141.639	155.616	0.000	155.616
Articles:	-	-	-	-	-
FY 2019 Plans: For FCLIP Phase 2/FTIIP/TFCA BDC - Complete Mode 5 IFF development for Baseline 9.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Complete the software development for CIWS integration with CEC/SSDS MK2, ESSM 2T Up-Link, and NSSMS MK9 Multi-Target Discrimination and Reporting. - Continue engineering and certification testing of FCLIP Phase 2 improved fire control loop improvements. - Complete software development for IFF Mode 5 integration with SSDS MK2 Builds 9, 10 & 11. - Initiate Test, Analyze and Fix period for FCLIP Ph 2 and FTIIP capabilities. - Continue designing and developing TFCA Cybersecurity improvements to secure the combat system enclave. For Build 10 (ACB-12/TI-12 and ACB-12/TI-12H) - Provide TAAF and complete certifications to support LHD 6, CVN 72 and LHD 2 ship installations and CVN 78 developmental testing. For Build 11 (ACB-12/TI-16) - Complete software migration to TI-16. - Complete testing and certification (integration and combat system level), provide required TAAF to support ship installations and deployments. For SSDS MK2 ACB-20/EASR/ERS/TI-16 - Conduct source selection for new CSEA/SDA contract for the SSDS MK2 ICS development - Continue government engineering and design activities in preparation for FY19 contract award. -Conduct government led ACB 20 ICS System Functional Review (SFR). -Commence SSDS ACB 20 software design and development efforts with CSEA. -Conduct SSDS ACB20 SRR, SFR and PDR. For Joint Strike Fighter F35B&C - Initiate systems engineering analysis for LHA and LHD Class ships - Initiate systems engineering analysis for the integration of JSF F35B&C with Link 16 and JSF F35B with CAC2S.					
FY 2020 Base Plans: For Build 10 (ACB-12/TI-12/TI-12H) - Provide required TAAF to support CVN 78 developmental and operational test events and LHD 6, CVN 72 and LHD 2 installation and test events.					

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
For Build 11 (ACB-12/TI-16) - Provide required TAAF, to support CVN 73 ship installation, test and certification. For SSDS MK2 ACB-20/EASR/ERS/TI-16 - Conduct SSDS ACB-20 software design and development efforts with CSEA. - Conduct SSDS ACB-20 Release 1 FSIT and FQT. - Continue government ACB-20 integrated combat system integration engineering activities. For Joint Strike Fighter F35B&C - Continue systems and software engineering effort for integration of CAC2S with SSDS for LHA and LHD Class ships. - Continue system engineering effort for the integration of SSDS and JSF F35B&C with Link 16. - Continue systems and software engineering efforts for integration of CAC2S with SSDS for LHA and LHD ships. - Continue SSDS software engineering effort for the integration of JSF F35B&C with Link 16. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase is required to continue F35B Integration engineering activities to integrate SSDS and CAC2S including execution of design reviews and interface developments as well as continuing to identify and develop solutions to counter Cyber vulnerabilities with the SSDS integrated combat system.					
Title: SSDS MK2 Development Test & Evaluation	27.479	28.029	26.355	0.000	26.355
Articles:	-	-	-	-	-
FY 2019 Plans: For LSD SSDS MK 2 Mod 5C - Complete CSSQT on LSD46 - Conduct DT-III-I Phase 1 at ICSTF - Conduct OT-III-I Phase 2 ET12 SDTS - Conduct OT-III-I Phase 3 ET14 Lead Ship Event For CVN78 SSDS MK2 Mod6C					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue Land-Based integration and engineering testing at WI and aboard ship for ICS software changes/ corrections for CVN78 DT/OT/ OPEVAL and deployment software deliveries. For the CVN 78, FY 17-FY20 requires collaborative Combat System efforts to support CSSQT and DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group interoperability through extensive, Integrated Combat System (ICS) testing and software updates post-PSA. - Conduct Fire Control Loop risk reduction TRKEX/MSLEX on SDTS with DBR (MFR), CEC, SSDS MK2, SEWIP Block 2, ESSM and RAM Block2. - Initiate DT/OT-III J Phase 3/ET09 MSLEX on SDTS. - Conduct CST at WI for authorization OQE for ICS software package for CSSQT Phase 2. For LHD6/LSD 46/LPD23/LPD24 SSDS MK2 MOD 2C3C/5C/ ACB-TI-12H - Conduct CST at WI for authorization OQE for ICS software package for LHD6 SSDS Mod 3C ACB-12/TI-12H for CSLO. For FCLIP Phase 2/FTIIP/TFCA BDC - Initiate land-based integration and engineering testing at WI. For LSD 49/CVN 78/CVN 73 SSDS MK2 Mod 5C/6C/1E - Conduct Baseline 11 Cyber Table Top (CTT) at JHU/APL to support Cybersecurity Phase 1-2 Testing; Cybersecurity Phase 4 Testing for ICS software package for Mod 5C at ICSTF and LSD 49 Cybersecurity Phase 5-6; Cybersecurity Phase 3 Testing Mod 1E and Mod 6C at WIETC.					
FY 2020 Base Plans: For CVN 78 SSDS MK2 Mod 6C - Conduct CST at WI for authorization OQE for ICS software package for CSSQT Phase 2. - Conduct CSSQT for CVN 78. - Complete DT/OT-III J Phase 3/ET-09 MSLEX on SDTS - Continue DTIII-J-Phase 3 on CVN 78. For FCLIP Phase 2/FTIIP/TFCA BDC - Initiate Sea-Based DT on SDTS - Conduct CST at WI for authorization OQE for ICS software package for Baseline 9. For LHD6/CVN73 SSDS MK2 Mod 3C/1E ACB-12/TI-12H					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Conduct CST at WI for authorization OQE for ICS software package for LHD6 SSDS Mod 3C ACB-12/TI-12H for CSLO. For CVN 78 SSDS MK2 Mod 6C - Conduct Cybersecurity Phase 4 Testing for ICS software package at ISCTF and Cybersecurity Phase 5-6 onboard CVN 78. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease reflected to account for the availability of prior year execution balances.					
Accomplishments/Planned Programs Subtotals	145.093	169.668	181.971	0.000	181.971

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
• OPN/ BLI 5231 (SSDS): *SSDS*	68.569	88.950	90.260	-	90.260	95.944	92.320	97.059	99.012	Continuing	Continuing
• RDTEN/0607658N: *Cooperative Engagement Capability*	88.088	128.815	127.924	-	127.924	161.162	182.355	151.318	162.413	Continuing	Continuing

Remarks

D. Acquisition Strategy

D. Acquisition Strategy

A sole source follow-on Cost Plus Incentive Fee (CPIF) Level of Effort (LOE) contract, N00024-14-C-5128, was awarded 18 December 2013 with a Period of Performance (PoP) from FY14-FY17 for the development, test, certification of SSDS MK2 (ACB 12/TI-12) for CVN78, CVN72, LHD2, and the software migration of ACB 12 to TI-12H/TI-16 for CVN 68, LHD 1, LPD 17 ship classes. This contract was extended to June 2020 and an additional extension to Q2 FY21 is planned to provide continued support of the SSDS MK 2 to complete the contract scope requirements for CVN and Amphibious ship Modernization ACB 12 on TI-12 and TI-12H (SSDS Software Build 10), and TI-16 (SSDS Software Build 11).

A new competitive contract for a SSDS Combat System Engineering Agent (CSEA)/Software Design Agent (SDA) is planned to be awarded in Q3 FY 2019 with a ten (10)-year PoP from FY19-FY29. This contract will provide support for the Aircraft Carrier and Amphibious Ship Class SSDS Combat System (CS) element development of ACB 20 (SSDS Software Build 12) and follow-on technology upgrades based on the evolution of the SSDS MK 2 Combat Systems ACB 12/TI-12/TI-12H/TI-16. The

current requirements include systems and software engineering support, development of engineering products to support combat system integration, configuration control, developmental test/operational test (DT/OT) support, training and logistics support, and field technical support for the SSDS ICS.

For SSDS MK2 TI-12H/TI-16 hardware, the SSDS program uses competitive build to specification production contracts, and leverages common enterprise COTS products for computing, storage, display, network, conversion, and cyber security.

E. Performance Metrics

Requirement Documents
- Capability Development Document (CDD) for Ship Self Defense System (SSDS) MK2 approved 19 December 2013.
- Test and Evaluation Master Plan (TEMP No. 1400) For Ship Self Defense System (SSDS) Revision C, 25 May 2018. During the approval cycle, DOT&E requested a major update to Rev. C to include cyber security T&E requirements.

Background
- SSDS MK1 OPEVAL was successfully completed June 1997 with a Milestone III approval in March 1998 - SSDS MK2 MOD 1 FOT&E was conducted on CVN 76 in 2005. All KPP thresholds were met. However, the system was assessed as not suitable and not effective by COMOPTEVFOR based on the identification of SSDS MK2 and Combat Systems deficiencies (24major, 37 minor deficiencies).

- SSDS MK 2 Mod 2 FOT&E was conducted in LPD 17-19 in 2007/2008. All KPPs thresholds were met and the system was assessed OPERATIONALLY EFFECTIVE and OPERATIONALLY SUITABLE by COMOPTEVFOR in the 12 Feb 2010 report. 10 major and minor deficiencies were identified against SSDS MK 2. (Also, major Warfare effects deficiencies were identified against the LPD 17 class Combat System).

- SSDS MK 2 Mod 3A FOT&E was conducted in LHD 8 in Feb 2010. All KPPs thresholds were met and the system was assessed OPERATIONALLY EFFECTIVE and OPERATIONALLY SUITABLE by COMOPTEVFOR in the 13 Dec 2010 report. 10 major deficiencies were identified against SSDS MK 2. (Also, major Warfare effects deficiencies were identified against the LHD 8 Combat System).

- SSDS MK2 FOT&E with ESSM and RAM Block 1 was conducted in the SDTS Oct-Dec 2011 as part of Enterprise Test - 03. Combat System (system-of-system) deficiencies identified during MSLEX with stressing targets has resulted in a phased corrective action plan, designated as Fire Control Loop Improvement Project (FCLIP). - SSDS MK2 FOT&E with RAM Block 2 DT&E was conducted in the SDTS Dec 2014 as part of Enterprise Test - O5 Phase 2. Low altitude, supersonic, maneuvering targets were successfully engaged with RAM Block 2 missiles. - Conducted Enterprise Test (ET) Event 5 and Event 6 against a wide array of subsonic and supersonic targets during live fire testing conducted against the Self Defense Test Ship (SDTS) and the USS America (LHA 6) to assess performance of the Integrated Combat System (ICS).

- April 2016, at the Navy's test facility at Point Mugu, CA, the SDTS LHA6-configured SSDSMK 2 integrated CS utilizing the Rolling Airframe Missile (RAM) Guided Missile Weapons System (comprised of the MK 49 Launcher and the Block 2 missile) successfully completed a live fire test by engaging and killing a pair of supersonic, maneuvering, sea-skimming targets designed to represent current anti-ship missile threats. The test event validated that significant progress has been made FCLIP program which was designed to improve coordination across all elements of the overall SSDS integrated CS. This test was the second successful integrated combat

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systems firing event against this surrogate threat accomplished by the shipboard air search radars and surface to air missiles found on U.S. Navy Amphibious Class ships. The integrated CS is comprised of the SSDS Mk 2 Mod 4B, SPS-48, SPS-49, SPQ-9B, SLQ-32, Evolved Sea Sparrow Missile and RAM Block 2 missile. Status

- The Director, Operational Test and Evaluation (DOT&E) Annual Reports have identified ship self-defense mission deficiencies based on operational testing. The report is a compilation of multiple reports from Commander, Operational Test Force (COTF) including shipboard testing on the CVN 76, CVN 70, LPD 17, LPD 18, LPD 19, LHD 8; and enterprise testing on the SDTS and in the Probability of Raid Annihilation (PRA) test-bed. - SSDS was assessed Operationally Effective and Operationally Suitable for the LPD 17 Class and LHD 8. The Combat Systems (CVN, LPD, LHD) were assessed Not Operationally Effective against several Anti-Ship Cruise Missiles (ASCM). There are system of systems performance issues and design limitations. The issues are divided into four categories: detect, engage, test resources, and threat representation.

- All of the major training deficiencies have been addressed and are pending Verification of Correction of Deficiency (VCD) by COTF. Revised SSDS NTSP was signed 30 Jul 2012.
- OPNAV N96 is working with PEO IWS, DASN, and COTF to address the shortfalls in performance testing with the following initiatives:
a. Develop, test and field combat system improvements through the Fire Control Loop Improvement Project (FCLIP) Phase 1 with SSDS MK2 integration of: High Diver improvements to SPS-48E and CEC; SPQ-9B tracking improvements; North Atlantic Treaty Organization (NATO) Seasparrow Surface Missile System (NSSMS) MK 9 Target Illuminator improvements.
b. Integrate, test, and field SEWIP Block 2, and NULKA improvements.
c. Expand the use of Modeling and Simulation.
d. Develop FCLIP Phase 2 capabilities for RAM Block 2 Multi-Target processing, NSSMS MK9 TI Multi-Target discrimination and reporting, ESSM 2T Up-link and CIWS integration with CEC / SSDS MK2.
e. Consider follow on high return self-defense improvements with FCLIP and Advanced Capability Builds (ACB).

- Additional T&E and certification initiatives include:
a. Conduct element and platform level cyber-security testing using land based test site (LBTS) facilities.
b. Move away from platform centric certification testing towards baseline configuration centric testing for combat systems certification testing.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

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
PD - ACB12/TI12 / LSD - PSEA / SW Dev	SS/CPIF	RSC IDS (5128) : San Diego, CA	121.808	8.006	Dec 2017	18.433	Dec 2019	17.198	Jan 2020	-		17.198	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD / AMIIP - PSEA / SW Dev	SS/CPAF	RSC IDS (5122) : San Diego, CA	38.416	0.000		0.000		0.000		-		0.000	0.000	38.416	-
PD - ACB12/TI12 / LSD - SE	SS/CPFF	JHU/APL : Laurel, MD	73.144	1.250	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - SW Dev/PL-STM	SS/CPAF	Gen. Dyn. (5100) : Fairfax, VA	3.628	0.000		0.000		0.000		-		0.000	0.000	3.628	-
PD - ACB12/TI12 / LSD - SE	WR	NSWC DD : Dalhgren, VA	81.919	1.150	Dec 2017	1.993	Dec 2018	4.584	Nov 2019	-		4.584	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - SE / ILS	WR	CDSA DN : Dam Neck, VA	22.927	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - SE&I/Force Pt	C/CPIF	RSC (IIS) : Suffolk, VA	0.976	0.000		0.000		0.000		-		0.000	0.000	0.976	-
PD - ACB12/TI12 / LSD - LBET/Training I	WR	NSWC PHD : Pt Hueneme, CA	31.774	0.975	Dec 2017	1.792	Nov 2018	3.453	Nov 2019	-		3.453	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - CVN78 LBET/Metrics/On-site Support	WR	NSWC Corona : Corona, CA	1.148	0.125	Nov 2017	0.200	Nov 2018	0.432	Nov 2019	-		0.432	0.000	1.905	-
PD - ACB12/TI12 / LSD -Navy Link Cert/Cross-Domain Spt	WR	SPAWAR : San Diego, CA	0.435	0.000		0.000		0.000		-		0.000	0.000	0.435	-
PD - ACB12/TI12 / LSD - Moriah Integration	WR	NAVAIR : Lakehurst, NJ	0.309	0.000		0.000		0.000		-		0.000	0.000	0.309	-
PD - ACB12/ CVN78 LBET w/DBR/RES	SS/CPIF	RSC IDS : Sudbury, MA	5.080	0.000		0.000		0.000		-		0.000	0.000	5.080	-
PD - ACB12/ CVN78 LBET w/CEC	SS/CPIF	RSC IDS : St. Petersburg, FL	1.275	0.000		0.000		0.000		-		0.000	0.000	1.275	-
PD - ACB12/ CVN78 LBET w/TPX-42	WR	NAVAIR : St. Indigoes, MD	0.111	0.000		0.000		0.000		-		0.000	0.000	0.111	-
PD - ACB12/TI-16/TI12H - HW Dev / ILS / EDM Proc (DN)	WR	CDSA DN : Dam Neck, VA	11.451	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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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
PD - ACB12/TI-16/TI12H - HW Eng	WR	NSWC DD : Dalhgren, VA	10.183	2.480	Dec 2017	0.000		0.834	Nov 2019	-		0.834	Continuing	Continuing	Continuing
PD - ACB12/TI-16/TI12H - SW Migration PSEA	SS/CPIF	RSC IDS (5128) : San Diego, CA	23.371	26.232	Dec 2017	0.000		5.753	Dec 2019	-		5.753	Continuing	Continuing	Continuing
PD - ACB12/TI-16/TI12H - SE	SS/CPFF	JHU/APL : Laurel, MD	1.486	2.000	Dec 2017	0.000		0.632	Dec 2019	-		0.632	0.000	4.118	-
PD - ACB12/TI-16/TI12H - LBET/Training Course Development	WR	NSWC-PHD : Pt Hueneme, CA	0.575	2.000	Nov 2017	0.000		1.082	Nov 2019	-		1.082	Continuing	Continuing	Continuing
PD - ACB12/TI-16/TI12H - Metrics/On-Site Sprt	WR	NSWC Corona : Corona, CA	0.669	0.418	Nov 2017	0.000		0.457	Nov 2019	-		0.457	0.000	1.544	-
PD - ACB12/TI-16/TI12H - CPS Engnr	C/IDIQ	GTS : Virginia Beach, VA	0.042	0.000		0.000		0.000		-		0.000	0.000	0.042	-
PD - ACB12/TI-16/TI12H - Navy Link Cert/Cross-Domain Sprt	WR	SPAWAR : San Diego, CA	0.000	0.326	Nov 2017	0.000		0.000		-		0.000	0.000	0.326	-
PD - Cyber Resiliency / BDC PSEA SW DEV'T	SS/CPIF	RSC IDS (5128) : San Diego, CA	6.131	3.421	Dec 2017	1.000	Dec 2018	0.932	Dec 2019	-		0.932	Continuing	Continuing	Continuing
PD - Cyber Resiliency / BDC REQT & ENG	SS/CPFF	JHU/APL : Laurel, MD	1.237	1.213	Dec 2017	2.050	Dec 2018	3.257	Dec 2019	-		3.257	Continuing	Continuing	Continuing
PD - Cyber Resiliency / BDC SE	WR	NSWC-DD : Dalhgren, VA	2.724	1.422	Nov 2017	0.000		0.932	Nov 2019	-		0.932	Continuing	Continuing	Continuing
PD - Cyber Resiliency / BDC HW EDM	WR	CDSA DN : Dam Neck, VA	0.864	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
PD - Cyber Resiliency / BDC CSTK DEV'T	C/CPIF	Progeny Systems Corp : Manassas, VA	0.181	0.712	Jun 2018	3.500	Dec 2018	3.932	Jan 2020	-		3.932	Continuing	Continuing	Continuing
PD - Cyber Resiliency / BDC NETWORK TOPOLGY	WR	G2OPS : Washington DC	0.207	0.000	Nov 2017	0.667	Nov 2018	0.632	Dec 2019	-		0.632	0.000	1.506	-
PD - Cyber Resiliency / BDC ILS	WR	NSWC PHD : Port Hueneme, CA	0.657	0.450	Nov 2017	0.000		0.000		-		0.000	0.000	1.107	-
PD - Cyber Resiliency / BDC MODELING	WR	NSWCPD : Philadelphia, PA	0.000	0.125	May 2018	0.125	Nov 2018	0.125	Nov 2019	-		0.125	0.000	0.375	-

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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
PD - Cyber Resiliency / BDC SEIT	C/CPIF	Gryphon/DELTA : Washington DC	0.000	0.550	Dec 2017	0.550	Dec 2018	0.632	Dec 2019	-		0.632	0.000	1.732	-
PD - Cyber Resiliency / BDC CSEA	C/CPAF	CSEA Contract : TBD	0.000	0.000		4.000	Jun 2019	17.932	Oct 2019	-		17.932	0.000	21.932	-
PD - TI-16TR/TI22 - HW Engineering	C/CPFF	Gryphon : Washington DC	0.000	0.000		0.000		0.682	Dec 2019	-		0.682	0.000	0.682	-
PD - TI-16TR/TI22 -HW Engineering	WR	NSWC-DD : Dalhgren, VA	0.100	0.920	Nov 2017	5.383	Nov 2018	9.286	Nov 2019	-		9.286	0.000	15.689	-
PD - HQ Travel	Various	PEO IWS : Washington DC	0.370	0.150	Nov 2017	0.150	Nov 2018	0.175	Oct 2019	-		0.175	Continuing	Continuing	Continuing
PD - SE/Dev/Integrate	SS/CPAF	Rayth(5412) (RIDS) : Portsmouth, RI	83.451	0.000		0.000		0.000		-		0.000	0.000	83.451	-
PD - F35B Integration / LHA / LHD	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		8.462	Dec 2018	0.932	Dec 2019	-		0.932	0.000	9.394	-
PD - F35B Integration / LHA / LHD	WR	NSWC DD : Dalhgren, VA	0.000	0.000		7.692	Nov 2018	3.932	Nov 2019	-		3.932	0.000	11.624	-
PD - F35B Integration / LHA / LHD	C/CPIF	SEI&T : Washington DC	0.000	0.000		3.846	Dec 2018	0.000		-		0.000	0.000	3.846	-
PD - F35B/C - ICS Link 16 Integration	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		1.100	Dec 2018	1.182	Dec 2019	-		1.182	0.000	2.282	-
PD - F35B Integration / LHA / LHD	TBD	PEO LS : Quantico, VA	0.000	0.000		0.000		8.431	Dec 2019	-		8.431	0.000	8.431	-
PD - F35B/C - ICS Link 16 Integration	WR	NSWC DD : Dalhgren, VA	0.000	0.000		1.000	Nov 2018	1.931	Nov 2019	-		1.931	0.000	2.931	-
PD - F35B Integration / LHA / LHD	C/CPIF	CSEA : TBD	0.000	0.000		0.000		6.181	Oct 2019	-		6.181	0.000	6.181	-
PD - F35B/C - ICS Link 16 Integration	C/CPIF	SEI&T : Washington DC	0.000	0.000		0.500	Dec 2018	0.682	Dec 2019	-		0.682	0.000	1.182	-
PD - F35B Integration / LHA / LHD	TBD	PEO C4I : San Diego, CA	0.000	0.000		0.000		5.181	Dec 2019	-		5.181	0.000	5.181	-
PD - Misc - Prior Year Cum Cost	C/BA	Misc : Washington DC	278.994	0.000		0.000		0.000		-		0.000	0.000	278.994	-

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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
PD - PM Prod Development	C/CPIF	various : various	33.586	2.943	Dec 2017	3.000	Dec 2018	2.994	Dec 2019	-		2.994	0.000	42.523	-
CSI - ACB20 (Less EASR) - SE	WR	NSWC COR : Corona, CA	0.000	0.000		0.450	Nov 2018	0.557	Nov 2019	-		0.557	0.000	1.007	-
CSI - ACB20 (Less EASR) - SE	WR	NSWC DD : Dalhgren, VA	0.000	5.520	Nov 2017	6.399	Nov 2018	3.750	Nov 2019	-		3.750	0.000	15.669	-
CSI - ACB20 (Less EASR) - SE	WR	NSWC PHD : Port Huneme, CA	0.000	0.323	Nov 2017	1.250	Nov 2018	1.432	Nov 2019	-		1.432	0.000	3.005	-
CSI - ACB20 (Less EASR) - SE	WR	NUWC KP : Keyport, WA	0.000	0.161	Nov 2017	0.175	Nov 2018	0.200	Nov 2019	-		0.200	0.000	0.536	-
CSI - ACB20 (Less EASR) - SE	SS/CPAF	Rayth (RIDS) : Portsmouth, RI	0.000	1.075	Dec 2017	0.000		0.000		-		0.000	0.000	1.075	-
CSI - ACB20 (Less EASR) - SEI&T	C/CPFF	Gryphon : Washington DC	0.000	3.062	Dec 2017	2.233	Dec 2018	1.956	Dec 2019	-		1.956	0.000	7.251	-
CSI - ACB20 (Less EASR) - SE	SS/CPFF	JHU/APL : Laurel, MD	0.000	5.458	Dec 2017	5.906	Dec 2018	3.082	Dec 2019	-		3.082	0.000	14.446	-
CSI - ACB20 (Less EASR) - SE	C/CPAF	CSEA Contract : TBD	0.000	0.000		11.935	Jun 2019	15.428	Oct 2019	-		15.428	0.000	27.363	-
CSI - FCLIP Phase 2 - PSEA	SS/CPIF	RSC IDS (5128) : San Diego, CA	12.197	7.527	Dec 2017	5.370	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	SS/CPFF	JHU/APL : Laurel, MD	9.460	2.258	Dec 2017	1.598	Nov 2018	0.606	Dec 2019	-		0.606	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	NSWC-DD : Dahlgren, VA	1.697	0.724	Nov 2017	1.016	Nov 2018	0.245	Nov 2019	-		0.245	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	CDSA DN : Dam Neck, VA	0.125	0.000		0.000		0.000		-		0.000	0.000	0.125	-
CSI - FCLIP Phase 2 - SE	WR	NSWC PHD : Pt Hueneme, CA	0.406	0.452	Nov 2017	1.308	Nov 2018	1.052	Nov 2019	-		1.052	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE / Planning	C/CPIF	Delta Resources : Alexandria, VA	0.339	0.000		0.000		0.000		-		0.000	0.000	0.339	-
CSI - FCLIP Phase 2 - SE & I	C/CPIF	RSC IIS (4112) : Suffolk, VA	2.136	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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CSI - FCLIP Phase 2 - SEI&T	C/CPFF	Gryphon/Delta : Washington DC	0.527	0.951	Dec 2017	2.019	Dec 2018	0.000		-		0.000	0.000	3.497	-
CSI - FCLIP Phase 2 - SE Multi-Link Antenna	TBD	IWS 5 : TBD	0.250	0.000		0.000		0.000		-		0.000	0.000	0.250	-
CSI - FCLIP Phase 2 - SE RAM/ESSM	WR	NAWC : China Lake	1.897	0.591	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE RAM/CIWS	SS/CPFF	RSC(5432/5410) : Tucson, AZ	1.080	1.882	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	NSWC : Crane, IN	0.250	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	NSWC COR : Corona, CA	0.000	0.000		0.252	Nov 2018	0.244	Nov 2019	-		0.244	0.000	0.496	-
CSI - FCLIP Phase 2 - SE / SW Dev	SS/CPAF	Rayth (RIDS) : Portsmouth, RI	7.552	2.903	Dec 2017	0.000		0.000		-		0.000	0.000	10.455	-
CSI - FCLIP Phase 2 - SE	WR	NUWC KP : Keyport, WA	0.200	0.269	Nov 2017	0.000		0.000		-		0.000	0.000	0.469	-
CSI - FTIIP - PSEA - SW Dev	SS/CPIF	RSC IDS (5128) : San Diego, CA	3.044	7.429	Dec 2017	6.461	Dec 2018	2.241	Dec 2019	-		2.241	Continuing	Continuing	Continuing
CSI - FTIIP - SE	C/BA	JHU/APL : Laurel, MD	0.151	0.300	Nov 2017	0.580	Nov 2018	0.431	Dec 2019	-		0.431	0.000	1.462	-
CSI - FTIIP - SE	WR	NSWC-DD : Dahlgren, VA	1.077	3.602	Nov 2017	1.489	Nov 2018	1.156	Nov 2019	-		1.156	Continuing	Continuing	Continuing
CSI - FTIIP - SE	WR	CDSA DN : Dam Neck, VA	0.616	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FTIIP - SE&I	C/CPIF	RSC IIS (4112) : Suffolk, VA	0.495	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FTIIP - SE	WR	NSWC PHD : Port Hueneme, CA	0.000	0.215	Nov 2017	0.000		0.456	Nov 2019	-		0.456	0.000	0.671	-
CSI - FTIIP - SEI&T	C/CPFF	Gryphon : Washington DC	0.731	1.004	Dec 2017	1.830	Dec 2018	1.447	Dec 2019	-		1.447	0.000	5.012	-
CSI - FTIIP - SE	WR	NUWC KP : Keyport, WA	0.186	0.000		0.200	Nov 2018	0.225	Nov 2019	-		0.225	0.000	0.611	-

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Product Development ($ in Millions)

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CSI - ICS SE - PSEA SE	SS/CPIF	RSC IDS (5128) : San Diego, CA	1.139	0.215	Dec 2017	0.000		0.000		-		0.000	0.000	1.354	-
CSI - ICS SE - SE&I	C/CPIF	RSC (IIS) : Suffolk, VA	2.404	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - ICS SE - SEA 05C	C/BA	SEA 05C : Washington DC	0.402	0.215	Nov 2017	0.000		0.000		-		0.000	0.000	0.617	-
CSI - ICS SE - SEI&T	C/CPFF	Gryphon : Washington DC	1.427	1.222	Nov 2017	2.817	Nov 2018	2.282	Dec 2019	-		2.282	0.000	7.748	-
CSI - ICS SE	SS/CPFF	JHU/APL : Laurel, MD	4.274	1.450	Dec 2017	1.448	Dec 2018	1.581	Dec 2019	-		1.581	Continuing	Continuing	Continuing
CSI - ICS SE	WR	NSWC DD : Dalhgren, VA	3.907	1.669	Nov 2017	1.635	Nov 2018	1.677	Nov 2019	-		1.677	Continuing	Continuing	Continuing
CSI - ICS SE	WR	CDSA DN : Dam Neck, VA	0.515	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - ICS SE	WR	NUWC KP : Keyport, WA	0.403	0.269	Nov 2017	0.225	Nov 2018	0.186	Nov 2019	-		0.186	0.000	1.083	-
CSI - ICS SE	C/CPIF	Delta Resources : Virginia Beach, VA	0.205	0.000		0.000		0.000		-		0.000	0.000	0.205	-
CSI - ICS SE	FFRDC	MITRE : McLean, VA	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	-
CSI - ICS SE	C/CPAF	CSEA Contract : TBD	0.000	0.000		0.500	Jun 2019	0.431	Oct 2019	-		0.431	0.000	0.931	-
CSI - EASR / ESS SE	SS/CPFF	JHU/APL : Laurel, MD	1.817	3.575	Dec 2017	1.648	Dec 2018	0.882	Dec 2019	-		0.882	Continuing	Continuing	Continuing
CSI - EASR / ESS SE	WR	NSWC DD : Dalhgren, VA	1.718	2.970	Nov 2017	4.371	Nov 2018	1.766	Nov 2019	-		1.766	Continuing	Continuing	Continuing
CSI - EASR / ESS / SEI&T	C/CPFF	Gryphon : Washington DC	1.896	2.344	Nov 2017	3.296	Nov 2018	1.538	Dec 2019	-		1.538	0.000	9.074	-
CSI - EASR / ESS SE	WR	CDSA DN : Dam Neck, VA	0.273	0.000		0.000		0.000		-		0.000	0.000	0.273	-
CSI - EASR / ESS SE	C/CPAF	RSC (5202) : St. Pete, FL	0.246	0.788	Nov 2017	0.000		0.000		-		0.000	0.000	1.034	-

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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
CSI - EASR / ERS SE	WR	NSWC PHD : Port Huneme, CA	0.000	0.323	Nov 2017	0.685	Nov 2018	0.277	Nov 2019	-		0.277	0.000	1.285	-
CSI - EASR / ERS SE	C/CPAF	CSEA Contract : TBD	0.000	0.000		9.100	Jun 2019	6.100	Oct 2019	-		6.100	0.000	15.200	-
		Subtotal	904.571	117.614		141.639		155.616		-		155.616	Continuing	Continuing	N/A

Remarks

- For ACB12/TI12(CVN 78), FY 2019-FY 2020 includes collaborative SSDS and ICS maturation efforts through the test, analyze and fix process to support DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group Interoperability though extensive integrated testing and software updates. - In FY 2019, a new contract will be awarded on a competitive basis for a Combat System Engineering Agent/Software Design Agent (CSEA/SDA) for development of SSDS ACB20 and follow baselines.

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
DT&E (PHD)	WR	NSWC PHD : Port Hueneme, CA	105.000	5.286	Nov 2017	6.029	Nov 2018	5.816	Nov 2019	-		5.816	Continuing	Continuing	Continuing
DT&E (SCSC-WI)	WR	SCSC-WI : Wallops Is, VA	73.510	6.954	Nov 2017	7.450	Nov 2018	7.592	Nov 2019	-		7.592	Continuing	Continuing	Continuing
DT&E (JHU/APL)	SS/CPFF	JHU/APL : Laurel, MD	25.287	2.929	Dec 2017	3.356	Dec 2018	2.517	Dec 2019	-		2.517	Continuing	Continuing	Continuing
DT&E (Corona)	WR	NSWC Corona : Corona, CA	14.488	2.959	Nov 2017	2.603	Nov 2018	2.450	Nov 2019	-		2.450	Continuing	Continuing	Continuing
DT&E (RAM/CIWS// ESSM) (RSC)	SS/CPFF	RSC(5432/5410) : Tucson, AZ	4.100	0.424	Nov 2017	0.404	Nov 2018	0.250	Dec 2019	-		0.250	Continuing	Continuing	Continuing
DT&E/CST (DD - CST)	WR	NSWC DD : Dahlgren, VA	26.315	6.404	Nov 2017	5.352	Nov 2018	5.240	Nov 2019	-		5.240	Continuing	Continuing	Continuing
DT&E (COTF)	WR	OPTEVFOR : Norfolk, VA	5.834	1.231	Nov 2017	1.243	Nov 2018	1.172	Nov 2019	-		1.172	Continuing	Continuing	Continuing
DT&E (CDSA-DN)	WR	CDSA DN : Dam Neck, VA	4.656	0.000		0.000		0.000		-		0.000	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 0604755N / *Ship Self Def (Detect & Cntrl)*	Project (Number/Name) 2178 / *QRCC*	

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
DT&E (engility)	C/CPIF	Engility : Virginia Beach, VA	3.037	1.292	Dec 2017	1.592	Dec 2018	1.318	Dec 2019	-		1.318	0.000	7.239	-
DT&E (SPAWAR-SD)	WR	SPAWAR : San Diego, CA	5.780	0.000		0.000		0.000		-		0.000	0.000	5.780	-
DT&E (Raytheon - St. Pete)	SS/CPAF	RSC (5202) : St. Pete, FL	4.708	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
DT&E (RAM/ESSM) (China Lake)	WR	NAWC : China Lake, CA	1.150	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
DT&E (Raytheon - SE&I)	C/CPIF	Rayth - IIS : Suffolk, Va.	0.571	0.000		0.000		0.000		-		0.000	0.000	0.571	-
DT&E Raytheon - PSEA	SS/CPIF	RSC (5128) : San Diego, CA	0.182	0.000		0.000		0.000		-		0.000	0.000	0.182	-
DT&E (GD/AIS - IWS 1.0)	SS/CPAF	GD/AIS : Fairfax Va.	0.266	0.000		0.000		0.000		-		0.000	0.000	0.266	-
DT&E (Raytheon - RIDS)	SS/CPAF	RSC (5412) : Portsmouth, RI	1.902	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	276.786	27.479		28.029		26.355		-		26.355	Continuing	Continuing	N/A

Remarks

- Accomplishment of SSDS MK2 CS integration and certification testing for ship system installation and deployment; - Accomplishment of the CVN78 CSSQT and SSDS MK2 ACB-12/TI-12 integrated CS test and evaluation (At-Sea aboard CVN78 and aboard the Self Defense Test Ship (SDTS).

	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	1,181.357	145.093		169.668		181.971		-		181.971	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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

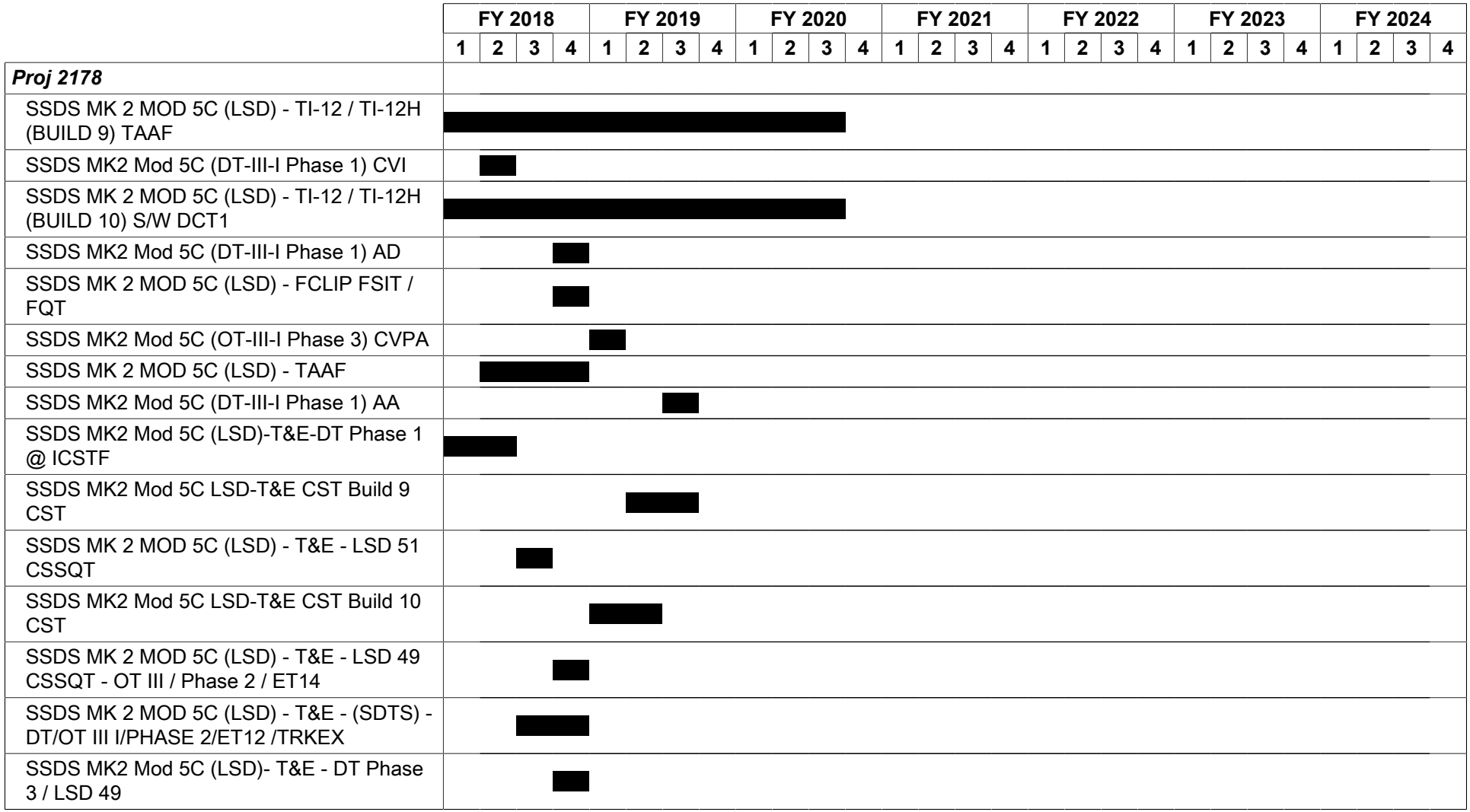

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

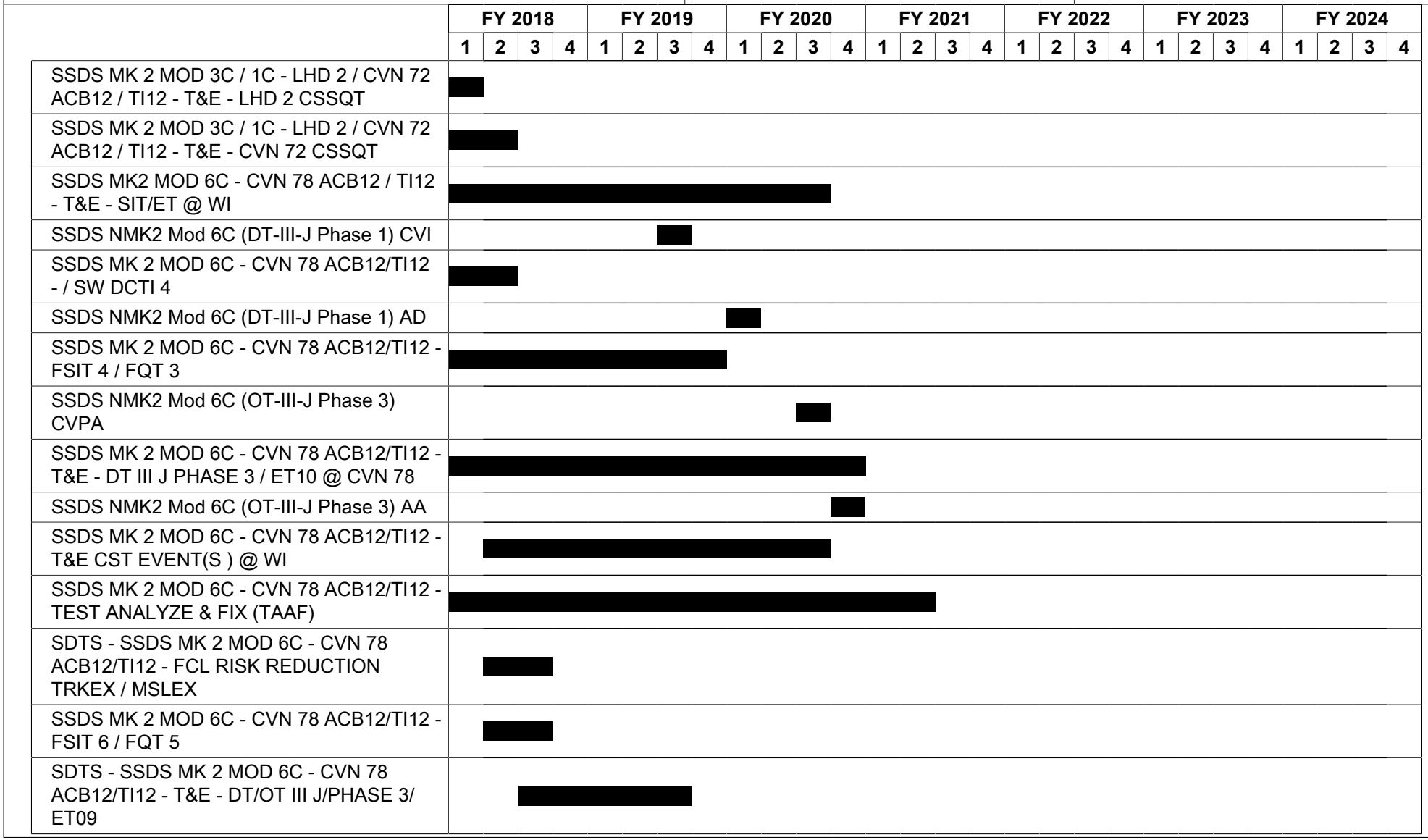

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

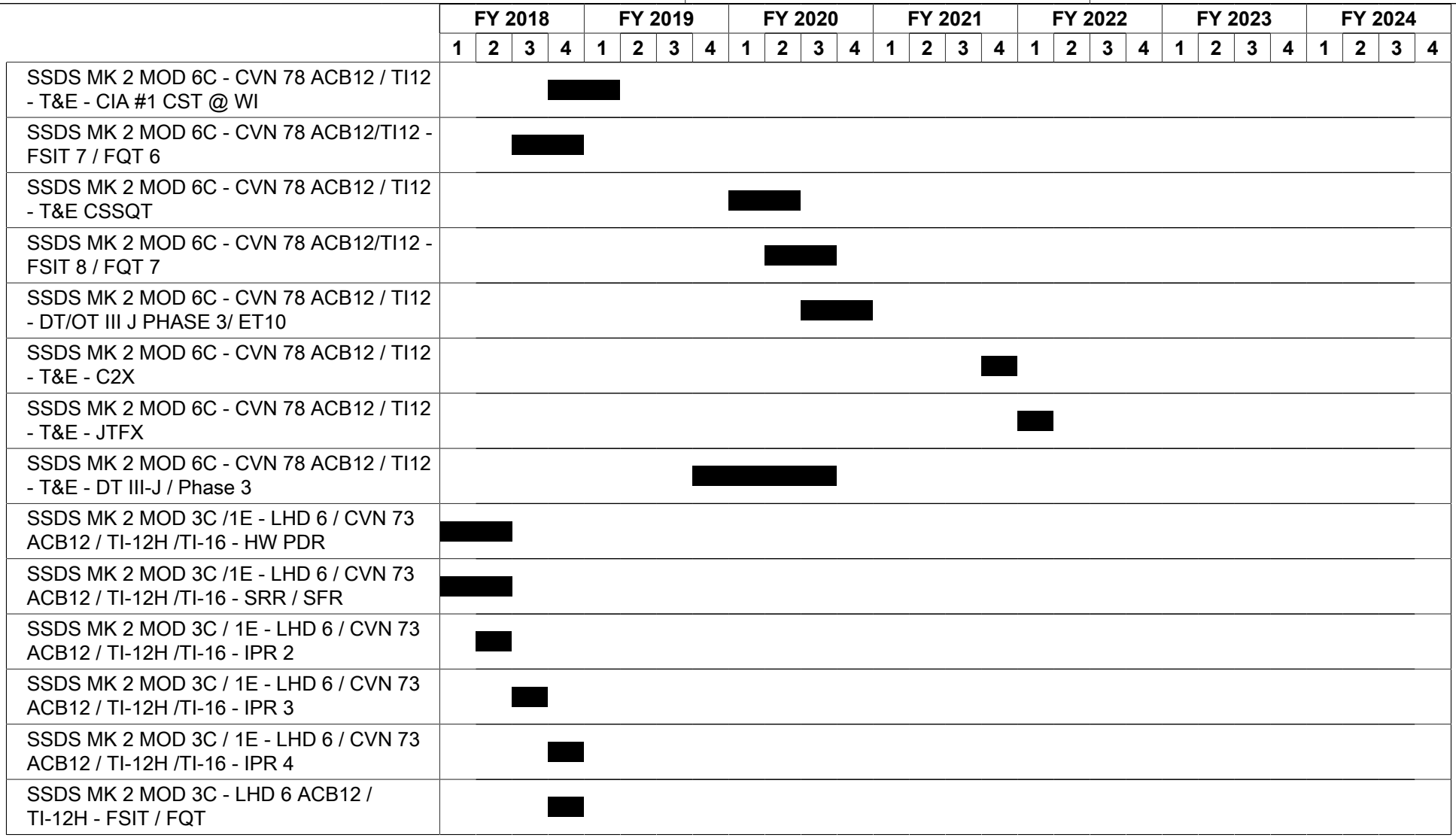

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

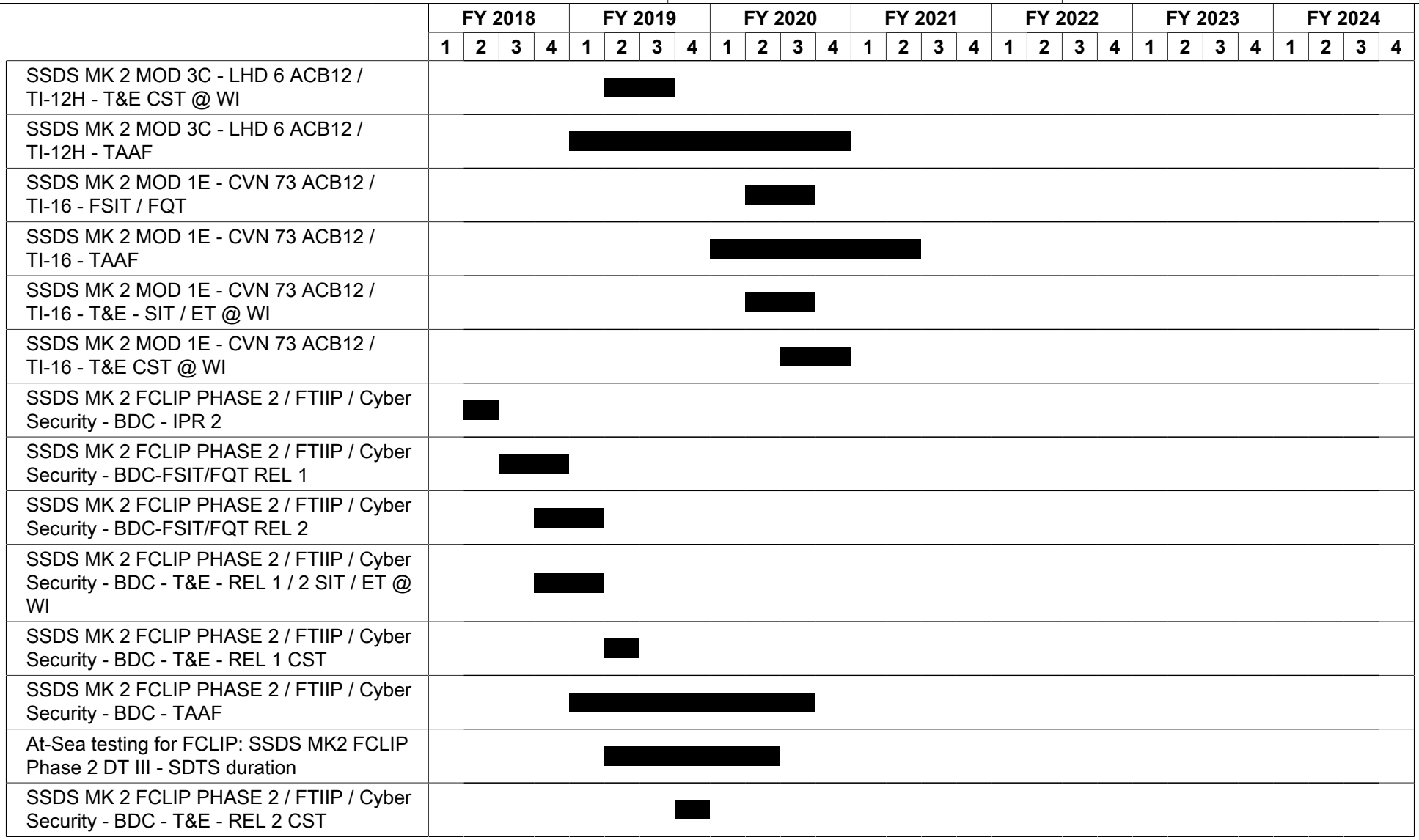

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

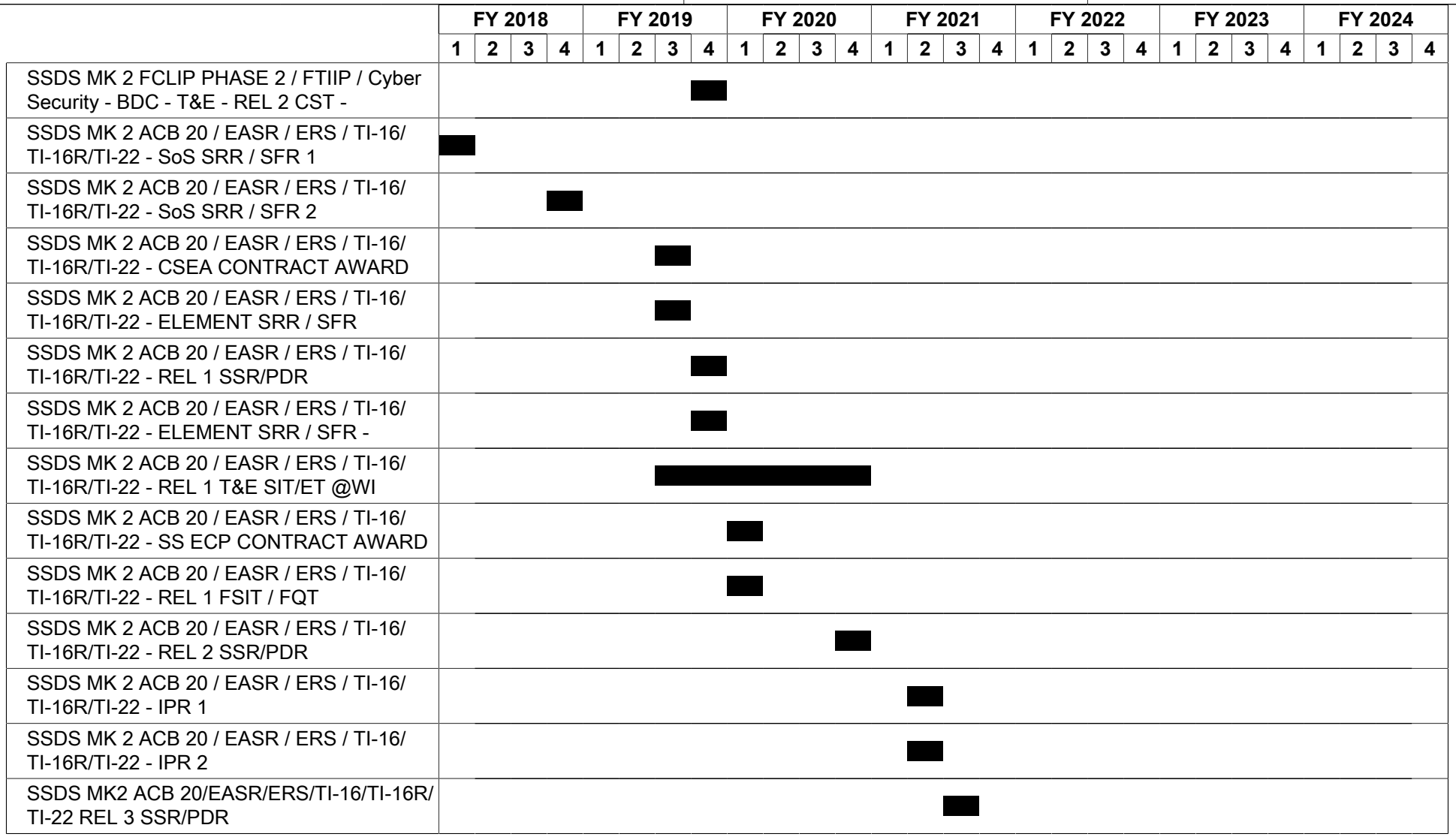

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

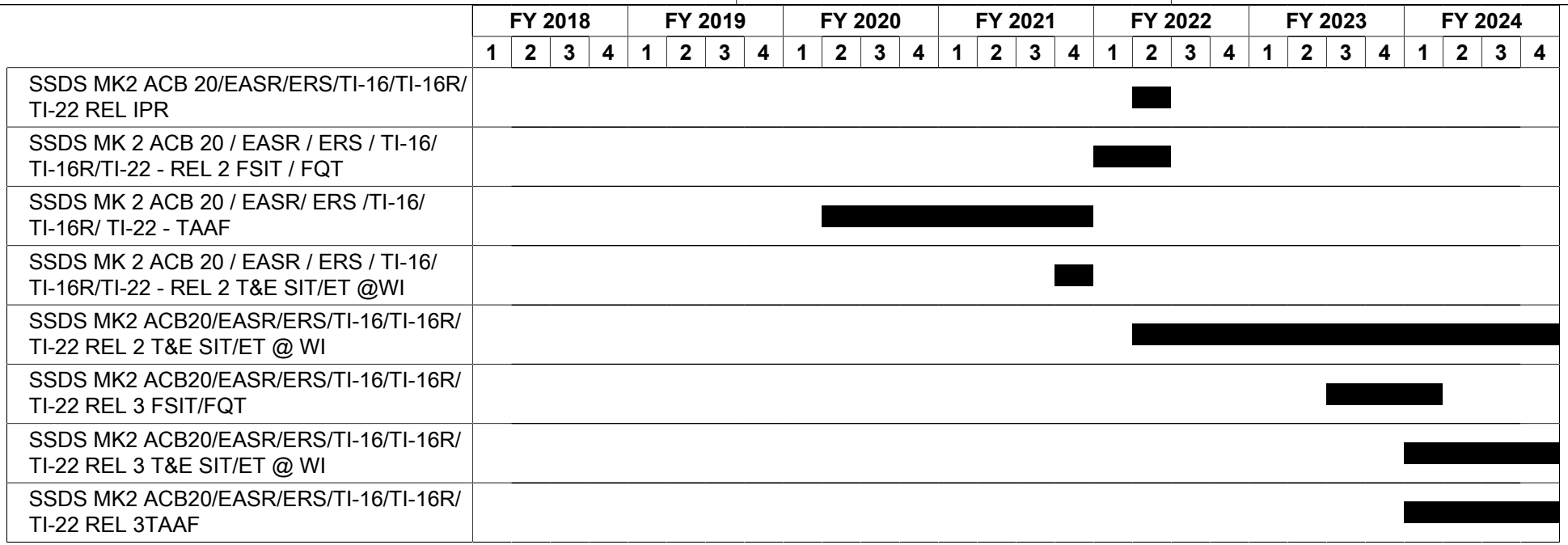

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2178				
SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 9) TAAF	1	2018	3	2020
SSDS MK2 Mod 5C (DT-III-I Phase 1) CVI	2	2018	2	2018
SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 10) S/W DCT1	1	2018	3	2020
SSDS MK2 Mod 5C (DT-III-I Phase 1) AD	4	2018	4	2018
SSDS MK 2 MOD 5C (LSD) - FCLIP FSIT / FQT	4	2018	4	2018
SSDS MK2 Mod 5C (OT-III-I Phase 3) CVPA	1	2019	1	2019
SSDS MK 2 MOD 5C (LSD) - TAAF	2	2018	4	2018
SSDS MK2 Mod 5C (DT-III-I Phase 1) AA	3	2019	3	2019
SSDS MK2 Mod 5C (LSD)-T&E-DT Phase 1 @ ICSTF	1	2018	2	2018
SSDS MK2 Mod 5C LSD-T&E CST Build 9 CST	2	2019	3	2019
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 51 CSSQT	3	2018	3	2018
SSDS MK2 Mod 5C LSD-T&E CST Build 10 CST	1	2019	2	2019
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 49 CSSQT - OT III / Phase 2 / ET14	4	2018	4	2018
SSDS MK 2 MOD 5C (LSD) - T&E - (SDTS) - DT/OT III I/PHASE 2/ET12 /TRKEX	3	2018	4	2018
SSDS MK2 Mod 5C (LSD)- T&E - DT Phase 3 / LSD 49	4	2018	4	2018
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - LHD 2 CSSQT	1	2018	1	2018
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - CVN 72 CSSQT	1	2018	2	2018
SSDS MK2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - SIT/ET @ WI	1	2018	3	2020
SSDS NMK2 Mod 6C (DT-III-J Phase 1) CVI	3	2019	3	2019
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - / SW DCTI 4	1	2018	2	2018
SSDS NMK2 Mod 6C (DT-III-J Phase 1) AD	1	2020	1	2020

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 4 / FQT 3	1	2018	4	2019
SSDS NMK2 Mod 6C (OT-III-J Phase 3) CVPA	3	2020	3	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 -T&E - DT III J PHASE 3 / ET10 @ CVN 78	1	2018	4	2020
SSDS NMK2 Mod 6C (OT-III-J Phase 3) AA	4	2020	4	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 -T&E CST EVENT(S) @ WI	2	2018	3	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - TEST ANALYZE & FIX (TAAF)	1	2018	2	2021
SDTS - SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FCL RISK REDUCTION TRKEX / MSLEX	2	2018	3	2018
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 6 / FQT 5	2	2018	3	2018
SDTS - SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - T&E - DT/OT III J/PHASE 3/ ET09	3	2018	3	2019
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CIA #1 CST @ WI	4	2018	1	2019
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 7 / FQT 6	3	2018	4	2018
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E CSSQT	1	2020	2	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 8 / FQT 7	2	2020	3	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - DT/OT III J PHASE 3/ ET10	3	2020	4	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - C2X	4	2021	4	2021
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - JTFX	1	2022	1	2022
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - DT III-J / Phase 3	4	2019	3	2020
SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - HW PDR	1	2018	2	2018
SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - SRR / SFR	1	2018	2	2018
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 2	2	2018	2	2018
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 3	3	2018	3	2018
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 4	4	2018	4	2018
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - FSIT / FQT	4	2018	4	2018

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E CST @ WI	2	2019	3	2019
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - TAAF	1	2019	4	2020
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - FSIT / FQT	2	2020	3	2020
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - TAAF	1	2020	2	2021
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E - SIT / ET @ WI	2	2020	3	2020
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E CST @ WI	3	2020	4	2020
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - IPR 2	2	2018	2	2018
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC-FSIT/FQT REL 1	3	2018	4	2018
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC-FSIT/FQT REL 2	4	2018	1	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 / 2 SIT / ET @ WI	4	2018	1	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 CST	2	2019	2	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - TAAF	1	2019	3	2020
At-Sea testing for FCLIP: SSDS MK2 FCLIP Phase 2 DT III - SDTS duration	2	2019	2	2020
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 2 CST	4	2019	4	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 2 CST -	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 1	1	2018	1	2018
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 2	4	2018	4	2018
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - CSEA CONTRACT AWARD	3	2019	3	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR	3	2019	3	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 SSR/PDR	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR -	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 T&E SIT/ET @WI	3	2019	4	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SS ECP CONTRACT AWARD	1	2020	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 FSIT / FQT	1	2020	1	2020

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 2178 / *QRCC*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 SSR/PDR	4	2020	4	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 1	2	2021	2	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 2	2	2021	2	2021
SSDS MK2 ACB 20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3 SSR/PDR	3	2021	3	2021
SSDS MK2 ACB 20/EASR/ERS/TI-16/TI-16R/TI-22 REL IPR	2	2022	2	2022
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 FSIT / FQT	1	2022	2	2022
SSDS MK 2 ACB 20 / EASR/ ERS /TI-16/TI-16R/ TI-22 - TAAF	2	2020	4	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 T&E SIT/ET @WI	4	2021	4	2021
SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 2 T&E SIT/ET @ WI	2	2022	4	2024
SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3 FSIT/FQT	3	2023	1	2024
SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3 T&E SIT/ET @ WI	1	2024	4	2024
SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3TAAF	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 0604755N / *Ship Self Def (Detect & Cntrl)*				Project (Number/Name) 3172 / *Joint Non-Lethal Weapons*			
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**
3172: *Joint Non-Lethal Weapons*	44.586	5.140	3.992	2.100	1.122	3.222	4.714	4.628	4.363	4.449	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Develop non-lethal weapon systems in support of anti-terrorism/force protection missions. Technologies include, but are not limited to: ocular interrupters, vessel propeller occlusion systems, and acoustic hailing devices. Current efforts are focused on the Long-Range Ocular Interrupter (LROI), Hailing Acoustic Laser and Light Tactical System (HALLTS), and Maritime Vessel Stopper (MVS) technologies.

The LROI is intended to provide the U.S. Navy with the capability to deliver a bright light producing a dazzling or glare effect on a closing target to warn and/or suppress potential threats through increasing levels of visual degradation. The planned LROI will generate controlled, high-intensity output, providing warning and suppression effects. The extended range capability of LROI will effectively increase tactical decision-making time in support of escalation of force (EoF) tactics, techniques and procedures (TTP) across a broad range of military operations (ROMO). Further, the LROI will enhance Joint Force operations in determining the intent of a potential threat as early as possible.

HALLTS is a single-operator, personnel-portable, hailing and warning system developed to enhance the ability of security forces to effectively execute escalation of force and intent determination procedures. HALLTS integrates three Navy non-lethal devices consisting of an ocular interrupter, an acoustic hailing device, and a high intensity white light. HALLTS utilizes a common system controller interface and common mounting options while reducing the manpower requirements for operation of multiple non-lethal devices to more efficiently implement escalation of force procedures.

MVS technologies are systems designed to temporarily disable, slow, or stop waterborne vessels of varying degrees of size and different propulsion types in order to effectively execute escalation of force and intent determination procedures. The MVS technologies will provide the US Navy with lightweight, compact, biodegradable materials, which will stop or slow marine platforms by occlusion of any type of marine propeller or propulsor.

Develop Visual Augmentation Systems (VAS) in support of expeditionary / anti-terrorism / force protection missions.
Expeditionary force must maintain situational awareness by using VAS equipment in operational conditions during low-light and no-light environments to obtain and maintain battlefield dominance during missions to Find, Fix, Track, Target, Engage and Assess (F2T2EA) enemy combatants. Technologies include, but are not limited to: image ntensification devices, thermal imaging systems, and laser systems. Current efforts are focused on the development of a Wide Field Of View (WFOV) Goggle (>40 degrees), M2HB/M2A1 Weapon Sight (M2WS) and Visual Augmentation Module for Portable Imaging and Recording - Expeditionary (VAMPIRE). The WFOV goggle will provide enhanced situational awareness for target
detection and dismounted/mounted operations, while maintaining existing visual accuity performance levels. The purpose of the M2WS program is to provide an advanced day/night crew-served weapon sight capability to surface and expeditionary Navy personnel. The M2WS will provide for increased target detection ranges as well as provide for improved firing accuracy to minimize the number of rounds required to successfully hit the target. The VAMPIRE is a hand-held multi-spectral imaging system that provides situational awareness, allowing the user to detect and recognize potential threat craft at the maximum possible range so that Navy forces

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

can assess nearby craft and engage appropriately. The VAMPIR contains an integrated recording (video/audio) capability which is used to document the incident. Visual Augmentation Systems are necessary to avoid accidental engagement of noncombatants while maintaining the greatest possible distance from threats. (References: COMNECC ltr Ser N43/695 dated 2 Oct 2014 (Visual Augmentation System Capability Requirements and Associated Capability Gaps); endorsed by USFFC ltr Ser N8/ N9/014 dated 17 Dec 2014; approved by OPNAV N957 ltr Ser 17U140063 dated 23 May 2017.)

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Joint Non-Lethal Weapons Development	5.140	3.992	2.100	1.122	3.222
Articles:	-	-	-	-	-

FY 2019 Plans:
Continue development, including testing, of next generation LROI prototypes to fulfill NECC's Letter of Requirement and implement any additional engineering updates as needed. Conduct accelerated Engineering & Manufacturing Development (EMD) phase for Long Range Ocular Interrupter (LROI) as part of the recently established Navy Non-Lethal Effects (NNLE) Family of Systems (FoS) ACAT IVM program. Conduct market research of COTS acoustic hailing system to assess their performance on land and over water. Continue development, including testing, of MVS occlusion technologies to fulfill the MVS Capability Development Document, using various biodegradable materials such as polymers and synthetic proteins. Will conduct necessary research and prototype development, to include the WFOV goggle and Visual Augmentation Module Portable Imager Recorder-Expeditionary (VAMPIRE), to determine a material solution to satisfy current Visual Augmentation Systems (VAS) capability gaps encountered during missions in combat zones while in theater. The warfighter lacks the ability to detect and recognize potential threat craft at the maximum possible range and at the earliest time in all weather environments during day and night. In addition, the warfighter needs the ability to record both audio/video encounters and incidents for after action reporting.

FY 2020 Base Plans:
Finish EMD phase for LROI and prepare for Production & Deployment phase. Continue development of MVS occlusion technologies, including deployment methods, and enter Technology Development Phase as part of the NNLE FoS ACAT IVM program. Update HALLTS design to incorporate LROI, new COTS acoustic hailing device, and high intensity white light.

FY 2020 OCO Plans:
Finish test and evaluation of VAMPIRE and prepare for Milestone C. Continue development and testing of the WFOV
image tube and prepare for Milestone B for WFOV goggle.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The FY 2020 funding request was reduced to account for the availability of prior year execution balances.					
Accomplishments/Planned Programs Subtotals	5.140	3.992	2.100	1.122	3.222

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
• OPN/8128: *NCW Forces Active*	6.198	6.512	7.235	-	7.235	7.219	6.736	6.907	7.045	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Navy Non-Lethal Effects (NNLE) Family of Systems (FoS) ACAT IVM Program of Record is being established as a single program with two areas of emphasis: Counter-Personnel (CP) and Counter-Materiel (CM). The initial Long Range Ocular Interrupter (LROI), which is a CP system, was designed and developed as a Rapid Acquisition. Following a FY 2016 Military Utility Assessment (MUA), the LROI was recommended to be a Program of Record (PoR), with engineering changes being made in the next generation to meet issues identified in the MUA. To that end, LROI will enter EMD phase within the NNLE FoS during FY 2019. A final developmental Technical Data Package (TDP) will be developed with user input incorporated. The developmental TDP will be included in the Request for Proposal (RFP) to industry to be further refined for a production-level TDP to be used for production decision during FY 2020. The RFP will be provided to industry to solicit offers for LRIP production after refining the TDP; subsequently, it will be provided to industry for full rate production.

The initial Hailing Acoustic Laser and Light Tactical System (HALLTS) system, another CP capability, was designed and developed using Physical Security Enterprise & Analysis Group (PSEAG) RDT&E funding. HALLTS units were included in the MUA in order to receive Fleet feedback and identify any needed engineering changes, including the development of a dual-mount to support HALLTS use by Navy Expeditionary Combat Command (NECC). Once subsystems (LROI, new acoustic hailing device, and high intensity white light) are identified, the HALLTS design will be updated along with a production-level TDP, and an RFP will be released to industry to build production units.

Maritime Vessel Stopping Occlusion Technologies (MVSOT), a CM effort, is currently in the Material Solution Analysis phase. Both Navy and Joint funding are being used for continuing research through test and evaluation of various material solutions with biodegradable polymers and synthetic proteins. Technology development phase entry is planned for FY 2020, as part of the NNLE FoS.

M2WS will deliver through two separately funded phases. Phase I was funded in FY 2016/2017 and consists of developing Product Demonstration Models (PDM) that are in accordance with all Performance Specification (PSPEC) requirements. Phase II will provide low rate initial production representative units which comply with all system requirements and subsequently for full rate production for a total of 825 systems to be fielded to NECC.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

Initial VAMPIRE systems will be developed and tested based on KPPs identified. These units will go through user assessment for their feedback. ECP will be performed to incorporate user inputs. The RFP, including the developmental TDP, will be provided to the industry to solicit offers for the LRIP production after refining the TDP and subsequently for full rate production for a total of 200 VAMPIRE systems to be fielded to NECC.

The WFOV Goggle will first focus on the development of an enhanced resolution image intensifier tube with an active input area of approximately 20mm in diameter. Upon successful development of the new image tube, the second phase will be to develop a new binocular and/or monocular goggle including associated WFOV optics that will be optimized for use
with the 20mm image tubes producing a WFOV goggle system with no loss of visual acuity from existing systems.

E. Performance Metrics

Achieve entry into engineering and manufacturing development phase for LROI in Q1FY19 and receive production decision in Q2FY20. Enter technology development phase for MVSOT in Q2FY20.

Successfully achieve Milestone C for M2WS and VAMPIRE and transition to FRP. Achieve Milestone B for WFOV Goggle in Q4FY20. Successfully conduct testing and fielding to Navy users.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

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
System Engineering	WR	NSWC Panama City : Panama City, FL	0.000	3.765	Jun 2018	1.661	Jan 2019	0.500	Jan 2020	-		0.500	Continuing	Continuing	Continuing
System Engineering	MIPR	Army SOC : TBD	0.000	0.000		0.400	Feb 2019	0.000		0.408	Feb 2020	0.408	0.000	0.808	-
System Engineering	WR	NSWC Dahlgren : Dahlgren, VA	17.057	0.600	Jan 2018	0.238	Jan 2019	0.272	Jan 2020	-		0.272	Continuing	Continuing	Continuing
System Engineering	WR	NSWC Port Hueneme : Port Hueneme, CA	0.628	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System Engineering	WR	NSWC Crane : Crane, IN	0.580	0.175	Jan 2018	0.700	Feb 2019	0.000		0.714	Jan 2020	0.714	Continuing	Continuing	Continuing
		Subtotal	18.265	4.540		2.999		0.772		1.122		1.894	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
Engineering Services (NSWC)	WR	NSWC Dahlgren : Dahlgren, VA	4.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Services	MIPR	Army NVESD : Ft. Belvoir, VA	0.000	0.000		0.750	Feb 2019	0.000		-		0.000	0.000	0.750	-
Program Management	WR	NUWC Newport : Newport, RI	2.857	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Services (NSWC)	WR	NSWC Panama City : Panama City, FL	2.075	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	8.932	0.000		0.750		0.000		-		0.000	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 0604755N / *Ship Self Def (Detect & Cntrl)*	Project (Number/Name) 3172 / *Joint Non-Lethal Weapons*	

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
Test and Evaluation	WR	NSWC Dahlgren : Dahlgren, VA	3.300	0.309	Jan 2018	0.000		0.200	Mar 2020	-		0.200	Continuing	Continuing	Continuing
Test and Evaluation	MIPR	Military Sealift Command : Washington, DC	2.200	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test and Evaluation	WR	NSWC Carderock : Carderock, MD	0.000	0.193	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test and Evaluation	WR	NSWC Panama City : Panama City, FL	0.000	0.000		0.000		0.628	Dec 2019	-		0.628	0.000	0.628	-
Test and Evaluation	WR	COMOPTEVFOR : Norfolk, VA	4.925	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	10.425	0.502		0.000		0.828		-		0.828	Continuing	Continuing	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
Program Management	WR	NSWC Panama City : Panama City, FL	0.000	0.000		0.125	Jan 2019	0.250	Jan 2020	-		0.250	0.000	0.375	-
Program Management	WR	NSWC Dahlgren : Dahlgren, VA	6.964	0.098	Jan 2018	0.118	Jan 2019	0.250	Jan 2020	-		0.250	Continuing	Continuing	Continuing
		Subtotal	6.964	0.098		0.243		0.500		-		0.500	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	44.586	5.140		3.992		2.100		1.122		3.222	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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

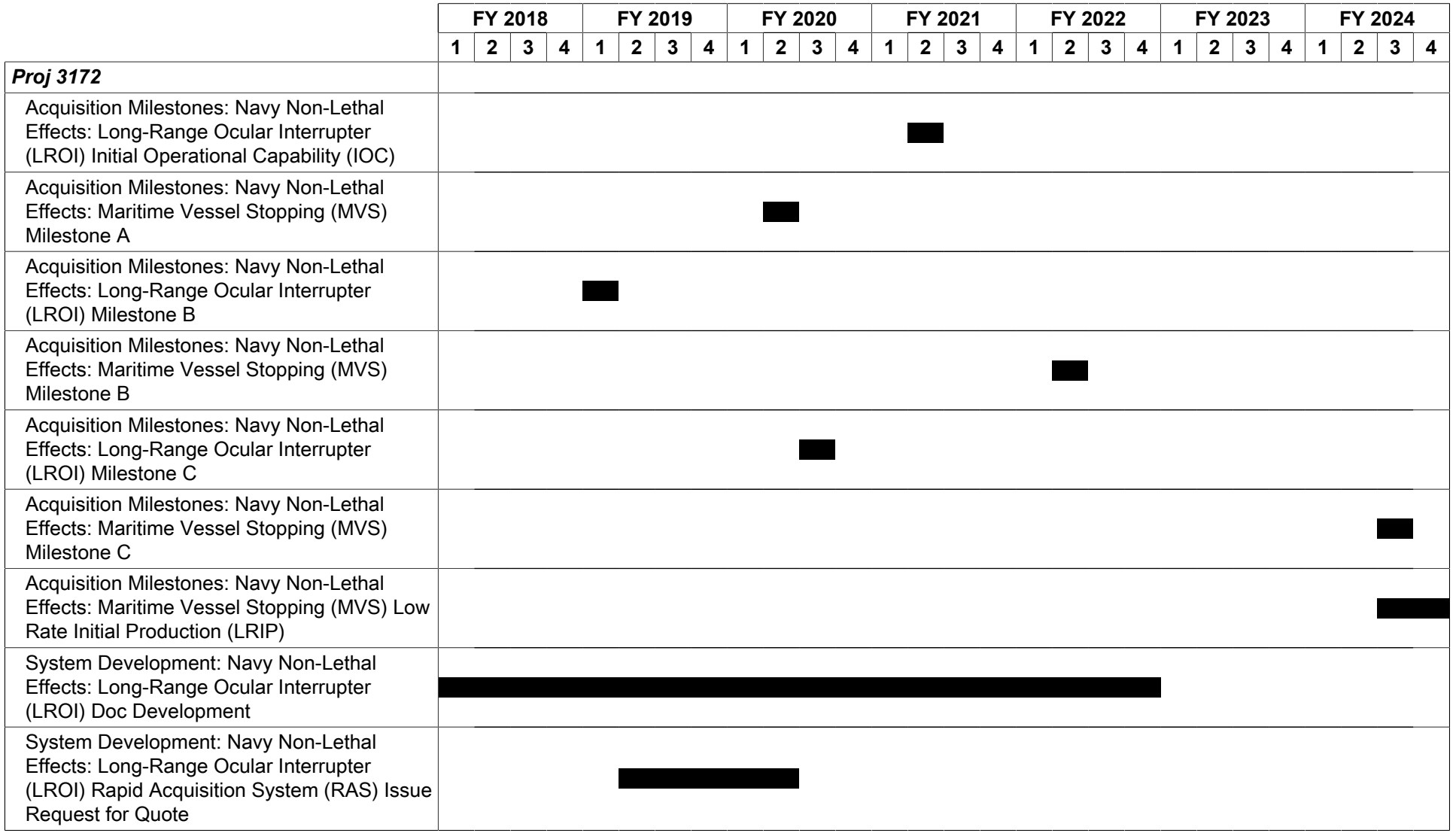

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

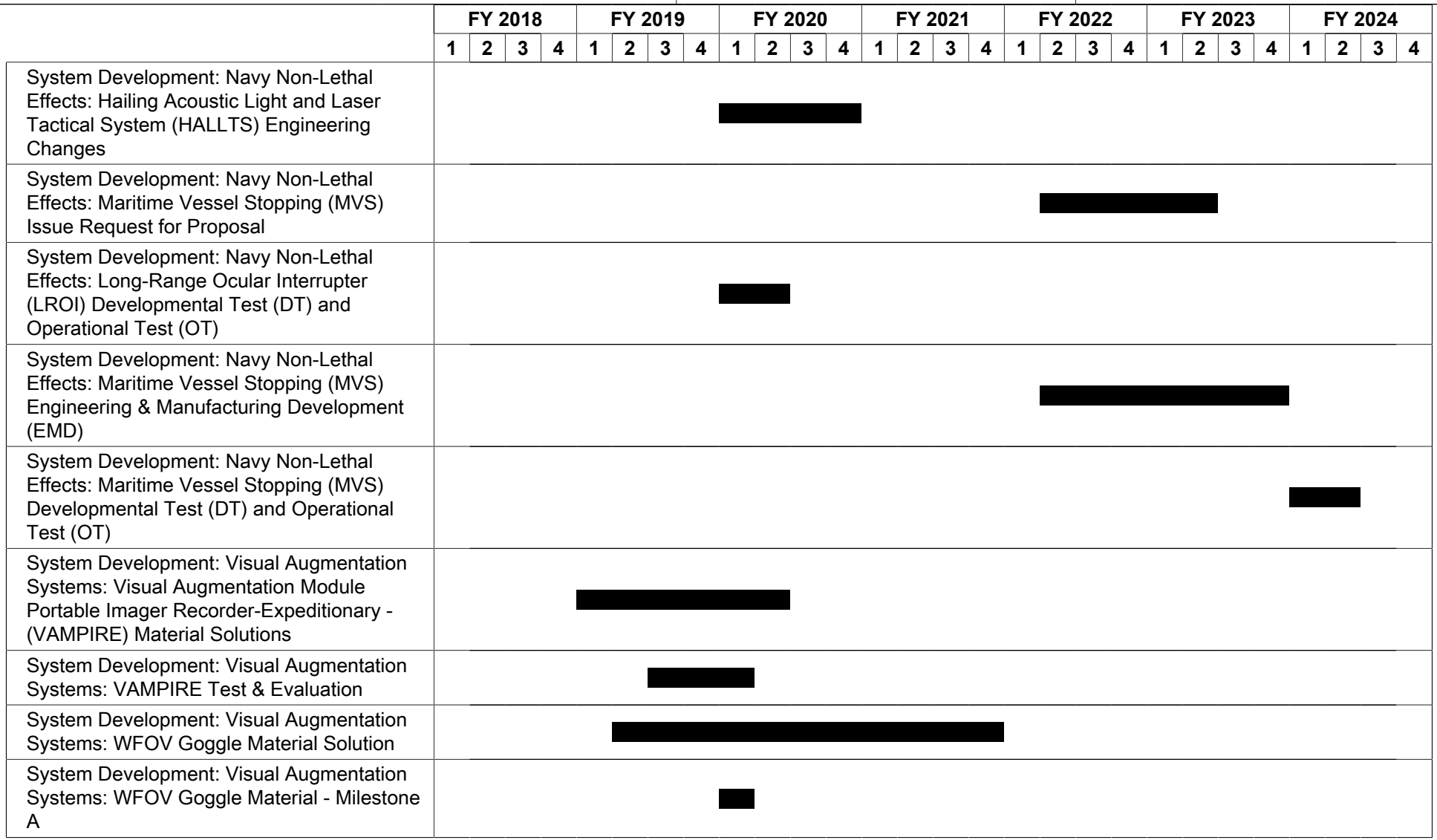

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

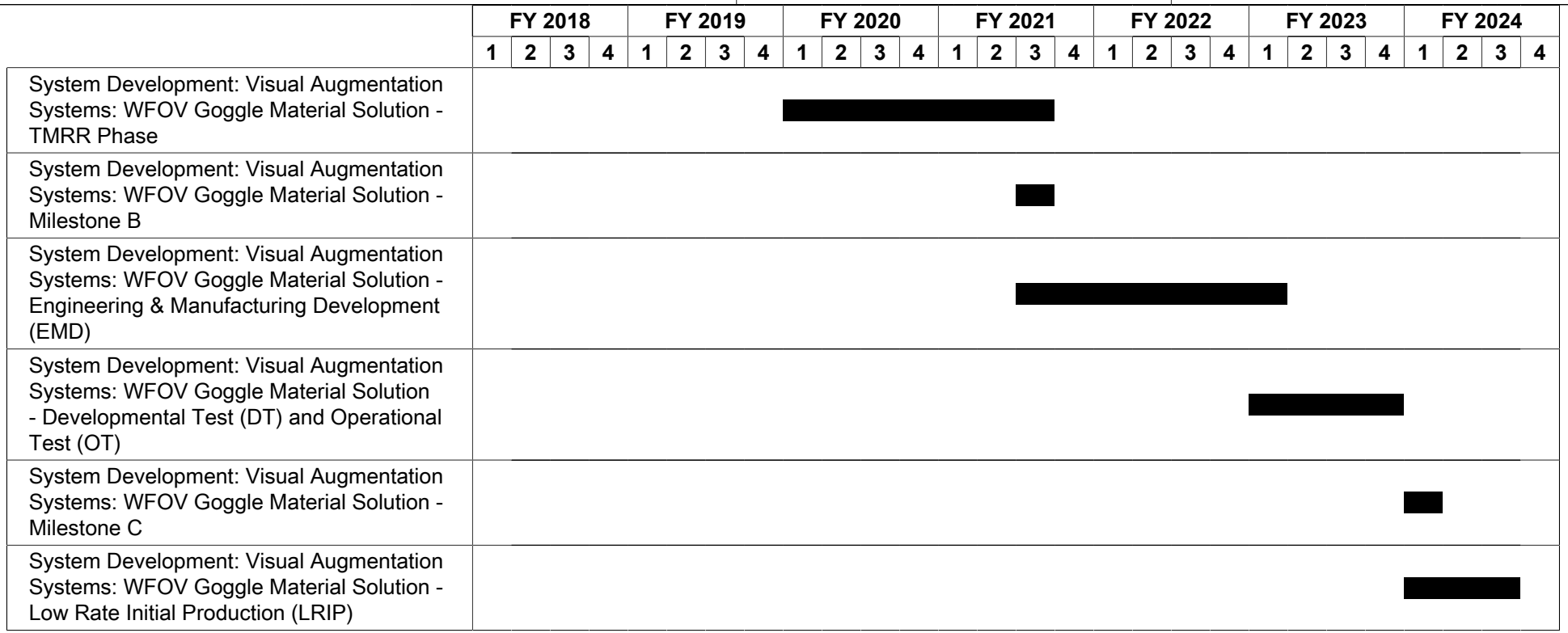

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3172				
Acquisition Milestones: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Initial Operational Capability (IOC)	2	2021	2	2021
Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Milestone A	2	2020	2	2020
Acquisition Milestones: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Milestone B	1	2019	1	2019
Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Milestone B	2	2022	2	2022
Acquisition Milestones: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Milestone C	3	2020	3	2020
Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Milestone C	3	2024	3	2024
Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Low Rate Initial Production (LRIP)	3	2024	4	2024
System Development: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Doc Development	1	2018	4	2022
System Development: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Rapid Acquisition System (RAS) Issue Request for Quote	2	2019	2	2020
System Development: Navy Non-Lethal Effects: Hailing Acoustic Light and Laser Tactical System (HALLTS) Engineering Changes	1	2020	4	2020
System Development: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Issue Request for Proposal	2	2022	2	2023
System Development: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Developmental Test (DT) and Operational Test (OT)	1	2020	2	2020

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3172 / *Joint Non-Lethal Weapons*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
System Development: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Engineering & Manufacturing Development (EMD)	2	2022	4	2023
System Development: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Developmental Test (DT) and Operational Test (OT)	1	2024	2	2024
System Development: Visual Augmentation Systems: Visual Augmentation Module Portable Imager Recorder-Expeditionary - (VAMPIRE) Material Solutions	1	2019	2	2020
System Development: Visual Augmentation Systems: VAMPIRE Test & Evaluation	3	2019	1	2020
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution	2	2019	4	2021
System Development: Visual Augmentation Systems: WFOV Goggle Material - Milestone A	1	2020	1	2020
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - TMRR Phase	1	2020	3	2021
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Milestone B	3	2021	3	2021
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Engineering & Manufacturing Development (EMD)	3	2021	1	2023
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Developmental Test (DT) and Operational Test (OT)	1	2023	4	2023
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Milestone C	1	2024	1	2024
System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Low Rate Initial Production (LRIP)	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 0604755N / *Ship Self Def (Detect & Cntrl)*				Project (Number/Name) 3358 / *SSDS Training Improvement Program*			
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**
3358: *SSDS Training Improvement Program*	11.785	7.347	7.831	8.532	-	8.532	12.575	11.729	10.299	9.280	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

SSDS Training Improvement Program provides enhancements and upgrades to the SSDS Total Ship Training Capability (TSTC) components within the combat system, combat system elements, Battle-Force Tactical Training (BFTT), and Advanced Training Domain (ATD) to address needs for increased training capability and functionality in conjunction with SSDS MK2 Advanced Capability Builds (ACB)/Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability Improvement Project (FTIIP), Task Force Cyber Awakening (TFCA) Boundary Defense Capability (BDC), and Technical Insertion efforts under PU 2178 (QRCC). These enhancements will address current and future training requirements by implementing new functionality to enable the individual warfighter through distributed battle group events to engage in more complex training requirements to support fleet required training certification events. Capability Development and integration are related to Self Defense, Underwater, Surface, and other warfare areas. Capability enhancements and upgrades include development of re-useable common components that can be leveraged by SSDS MK2 combat systems, and/or integration of re-usable common components developed by the TSTC/BFTT Program and AEGIS Advanced Training Domain (ATD)/TSTC Total Ship Training Capability (TSTC) projects to meet AEGIS combat system training requirements. TSTC continues to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including COMPTUEX FST at Sea integration into Live, Virtual and Constructive (LVC) environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and SSDS combat system capability upgrades, and to address the Fleet's Live, Virtual and Constructive (LVC) Fleet Training Wholeness initiative. Additionally, modernization is needed to support the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan and Commander United States Fleet Forces Command Fleet Readiness Training Plan.

The Advanced Training Domain (ATD) is being developed to combine BFTT and the AEGIS Combat Training System (ACTS) into a common system that integrates with AEGIS BL 9.2.2AF, and SSDS BL 11.xAF. ATD is being hosted along with the AEGIS and SSDS combat system on TI-16 common processing and display hardware. ATD is being designed to be the core of the Total Ship Training Capability, and is projected to be more reliable, simpler to use, and architected to be extensible to meet interoperability and capability enhancement challenges in the future.

BFTT is being updated to maintain integration and capability enhancements developed for the Cooperative Engagement Capability (CEC), Surface Electronic Warfare Improvement Program (SEWIP), and the Carrier Tactical Support Center (CV-TSC), and SSDS Fire Control Loop Improvement Program.

TSTC provides realistic joint warfare training across the spectrum of armed conflict, realistic unit level team training in all warfare areas (e.g. NIFC-CA and BMD missions to support IAMD). TSTC provides ships' Commanding Officers and Battle Group/Battle Force Commanders with the ability to conduct coordinated realistic, high stress, combat system level team training as an integral part of the Afloat Training Organization, the Tactical Training Groups and C2F/C3F FST/LVC events.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

Develop and integrate MH-60R simulator to enable embedded shipboard training in support of basic and sustainment training, as well as establishes the pathway to support pier-side Fleet Synthetic Training (FST) events.

Develop and Integrate Cooperative Engagement Capability (CEC) Enhanced Training (CET) to support basic and sustainment level training, as well as provide ability to distribute and establish CEC data link during pier-side fleet synthetic training exercises. CET will also provide enable proficiency training of NIFC-CA capability.

Develop and integrate CEC Interim Training (CIT) capability to support pier-side fleet synthetic training events. This is an interim capability support the distributed portion of the CET capability, until CET is fully deployed. This supports training of strike groups of new tactical capabilities that were integrated into the AEGIS BL9 ships, and provides the necessary functionality to allow ships to train as a strike group.

Develop and integrate upgrades to Battle-Force Electronic Warfare Trainer (BEWT) to support soft kill training with NULKA.

Develop Identification Friend or Foe (IFF) simulator to enable training of Modes 1, 2, 3A, 4, C, 5 and S on both AEGIS and SSDS ships. Capability will support AEGIS and SSDS IFF MODE 4/5 Integration program will address training Mode 4 Inoculation, and allow training of Modes 5 and S IFF.

Develop and integrate commensurate training improvements to SSDS ACB 20 for Enhanced Sea Sparrow Missile (ESSM) and Electronic Warfare (EW) tactical improvements.

Integrate Navy Continuous Training Environment (NCTE) networking and cyber security upgrades to maintain authorization to participate in distributed shipboard training events.

TSTC integrated on SSDS provides the capability to complete system and operational level testing of the combat system.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SSDS Total Ship Training Capability	7.347	7.831	8.532	0.000	8.532
Articles:	-	-	-	-	-
FY 2019 Plans: - Initiate requirements for the SSDS Integrated Combat System (ICS) that will provide SSDS ships the ability to train using Live-Virtual-Constructive (LVC). LVC will improve the Navy's competitive advantage via high end training and enable contested environment strike group training in accordance with strategic documents. - For the SSDS MK2 ACB-20 Baseline, continue the development of the requirements to support ESSM Block 2 simulation increased capability against closely spaced objects, and stream raids. Provide 2T uplink simulation that provided continuous targeting data to synthetic ESSM missile through intercept.					

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- For the SSDS MK2 ACB-20 Baseline, continue the design and development for integrated and optimized employment of decoys, Electronic Attack (EA), and hard kill and soft kill weapons effects against emerging threats. Provide the capability to support training with Soft Kill Coordination, EW Battle Management, and AOEW. - Continue development of re-hosting Battle Force Tactical Training (BFTT) / Advanced Training Domain (ATD) capability into SSDS MK2 TI-16 Hardware. Continue development and integration of this capability in support of installation on CVN-73 and future SSDS baselines. - Continue supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training. Continue systems engineering of CEC Tactical Software Full Training Support.					
FY 2020 Base Plans: - Complete functional requirements and initiate design for the SSDS MK2 ACB-20 Combat System that will provide the ability to train using Live-Virtual-Constructive (LVC). LVC will improve the Navy's competitive advantage via high end training and enable contested environment strike group training in accordance with strategic documents. - For the SSDS MK2 ACB-20 Baseline, continue implementation to support ESSM Block 2 simulation increased capability against closely spaced objects, and stream raids. Continue the design and development for integrated and optimized employment of decoys, Electronic Attack (EA), and hard kill and soft kill weapons effects against emerging threats. Provide the capability to support training with Soft Kill Coordination, and Advanced Off board Electronic Warfare. - Continue development of integrating the Advanced Training Domain (ATD) capability into SSDS MK2 TI-16 Hardware. Continue development and integration of this capability in support of installation on SSDS MK2 ACB-12 Baselines. Initiate requirements and design for integrating ATD with SSDS MK2 ACB-20 baselines. - Continue supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training. Continue systems engineering of CEC Tactical Software Full Training Support.					

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate requirements for developing a PHALANX Close-In Weapon System (CIWS) simulation capability that includes CIWS operator training capability and supports Fast Attack Craft (FAC) / Fast Inshore Attack Craft (FIAC) training capability. - Begin integration of the UPX-29 IFF simulation capability with the Cooperative Engagement Capability (CEC) as part of the Ship Self Defense System training capability. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase is for Fleet Training Wholeness Strike Group CEC Training at Sea efforts. This investment provides for the integration of the UPX-29 IFF simulation capability with the Cooperative Engagement Capability (CEC) as part of the Ship Self Defense System (SSDS) Integrated Combat System training capability. The UPX-29 IFF SIM provides Mode 5 simulation not available with the legacy Battle Force Tactical Training (BFTT) System. The FY 2020 funding request was reduced by $1.925 million to account for the availability of prior year execution balances.					
Accomplishments/Planned Programs Subtotals	7.347	7.831	8.532	0.000	8.532

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
• RDTEN/0204571N/1427: *Surface Tactical Team Trainer (PU 1427)*	15.081	42.046	67.790	-	67.790	51.628	37.067	19.183	16.325	Continuing	Continuing
• RDTEN/0604307N/3357: *AEGIS Training Improv. Prog. (PU 3357)*	7.717	6.946	10.078	-	10.078	8.898	7.968	6.139	5.348	Continuing	Continuing

Remarks

D. Acquisition Strategy

For the SSDS MK2 software development, including the integration of TSTC software improvements and the TI-16 Open Architecture Computing Environment, the acquisition strategy identified for SSDS MK2 for QRCC Project (PU 2178) (R-2A exhibit) applies.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

E. Performance Metrics

Performance metrics for SSDS MK2 for QRCC Project (PU 2178) apply (R-2A exhibit). The milestones identified in the R-4A exhibit for PU2178 apply for the CVN78 SSDS MK2 ACB-12 / TI-12 baseline development and the integration of the DBR simulation software to provide CVN78 in-port and underway fire control loop training capabilities. The milestones for implementation of TSTC improvements into future SSDS MK2 ICS baselines for the SSDS MK2 FCLIP Phase 2 / FTIIP / Cyber Security BDC, and ACB-20 / EASR / ERS baselines in QRCC Project (PU 2178) apply and are listed in the R-4A exhibits for PU 3358.

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 0604755N / *Ship Self Def (Detect & Cntrl)*	Project (Number/Name) 3358 / *SSDS Training Improvement Program*	

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
TSTC Sys Eng	WR	NSWC DD : Dahlgren, VA	0.423	0.350	Nov 2017	0.767	Nov 2018	0.542	Nov 2019	-		0.542	0.000	2.082	-
TSTC Sys Eng	WR	CDSA DN : Dam Neck, VA	2.286	0.000		0.000		0.000		-		0.000	0.000	2.286	-
TSTC Sys Eng / Integration	C/CPIF	Raytheon (4112) : Suffolk, VA	1.076	0.079	Dec 2017	0.275	Dec 2018	0.185	Dec 2019	-		0.185	0.000	1.615	-
TSTC TDL Gateway	WR	SPAWAR PMW 150 : San Diego, CA	0.421	0.000		0.000	Nov 2018	0.000		-		0.000	0.000	0.421	-
TSTC Sys Eng / PSEA	SS/CPIF	RSC (5128) : San Diego, CA	3.095	1.665	Nov 2017	0.258	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
TSTC Sys Eng / MH-60R Training Capability	WR	Keyport (NUWC) : Keyport, RI	0.409	0.750	Nov 2017	0.000	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
TSTC Planning Support	C/CPIF	TMB : Washington, DC	0.025	0.000		0.000		0.000		-		0.000	0.000	0.025	-
TSTC ATD	TBD	IWS 1.0 : Washington, DC	0.000	3.038	Dec 2017	3.048	Dec 2018	2.947	Dec 2019	-		2.947	0.000	9.033	-
TSTC ESSM BLK2/EW Upgrades	TBD	Various : Various	4.050	0.000		0.000		0.000		-		0.000	0.000	4.050	-
TSTC EW	TBD	IWS 2.0 : Washington, DC	0.000	1.019	Nov 2017	0.000		0.000		-		0.000	0.000	1.019	-
TSTC NCTE	WR	Corona(NSWC) : Corona, CA	0.000	0.405	Nov 2017	0.000		0.000		-		0.000	0.000	0.405	-
TSTC GWS	TBD	IWS 3.0 : Washington, DC	0.000	0.041	Dec 2017	0.000		0.000		-		0.000	0.000	0.041	-
TSTC FTW SENSOR	TBD	PEO IWS 2.0 : Washington, DC	0.000	0.000		2.353	Dec 2018	1.976	Dec 2019	-		1.976	0.000	4.329	-
TSTC FTW FCLIP / CSEA	TBD	TBD : Not Specified	0.000	0.000		1.130	Dec 2018	1.491	Dec 2019	-		1.491	0.000	2.621	-
TSTC FTW / STRIKE CEC	TBD	PEO IWS 6.0 : Washington, DC	0.000	0.000		0.000		1.391	Dec 2019	-		1.391	0.000	1.391	-
		Subtotal	11.785	7.347		7.831		8.532		-		8.532	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 0604755N / *Ship Self Def (Detect & Cntrl)*	Project (Number/Name) 3358 / *SSDS Training Improvement Program*	

	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	11.785	7.347		7.831		8.532		-		8.532	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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

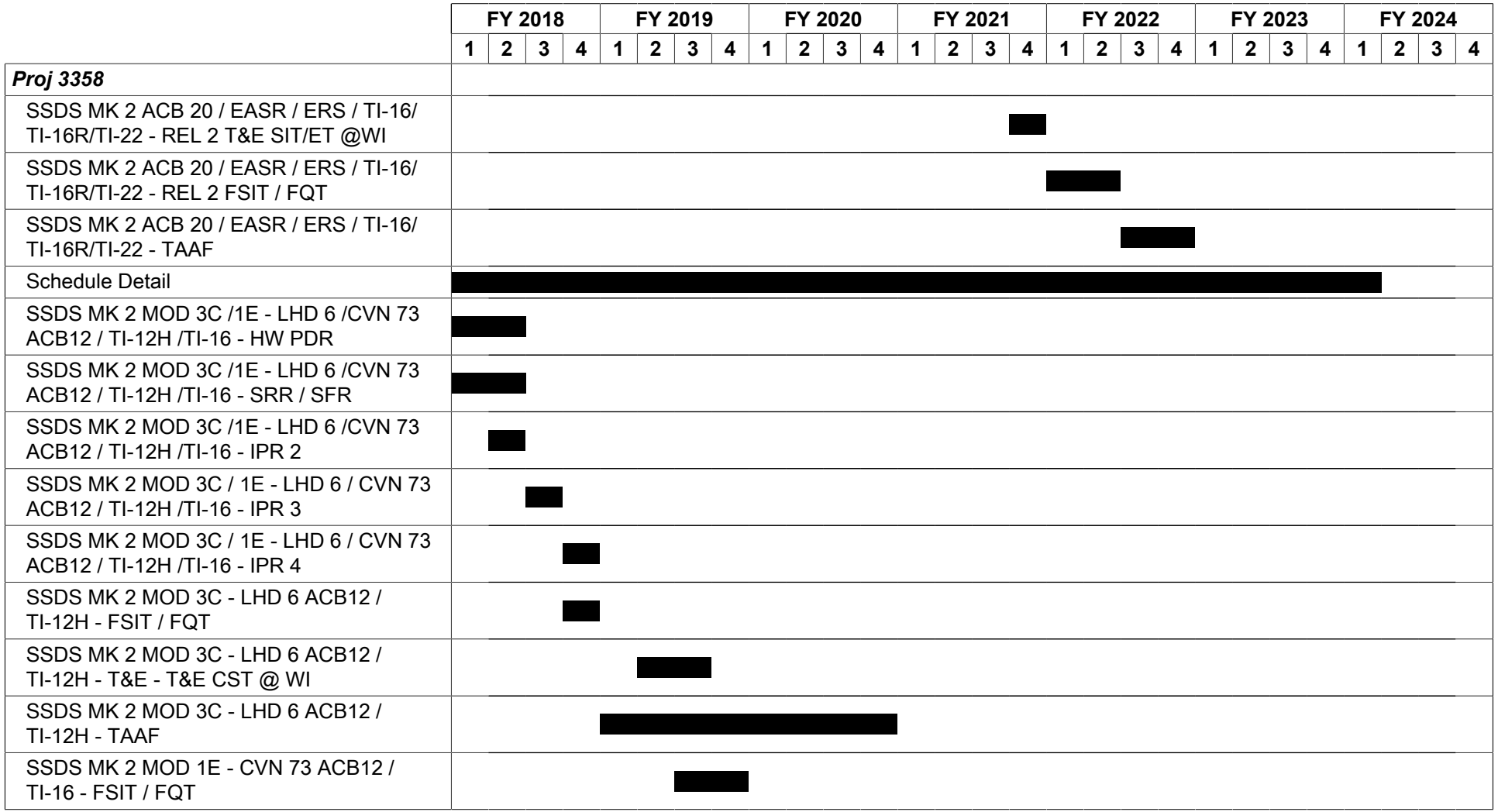

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

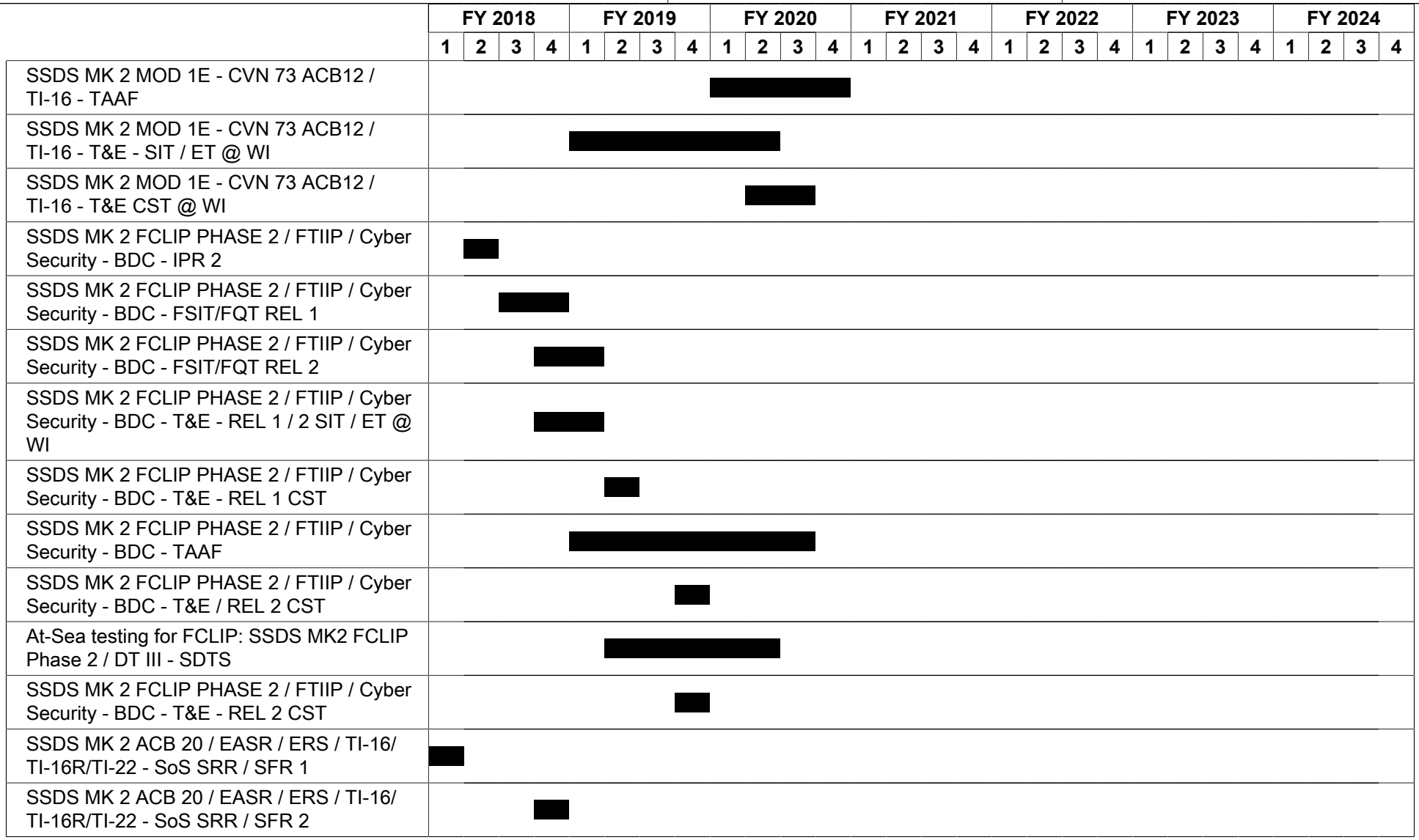

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

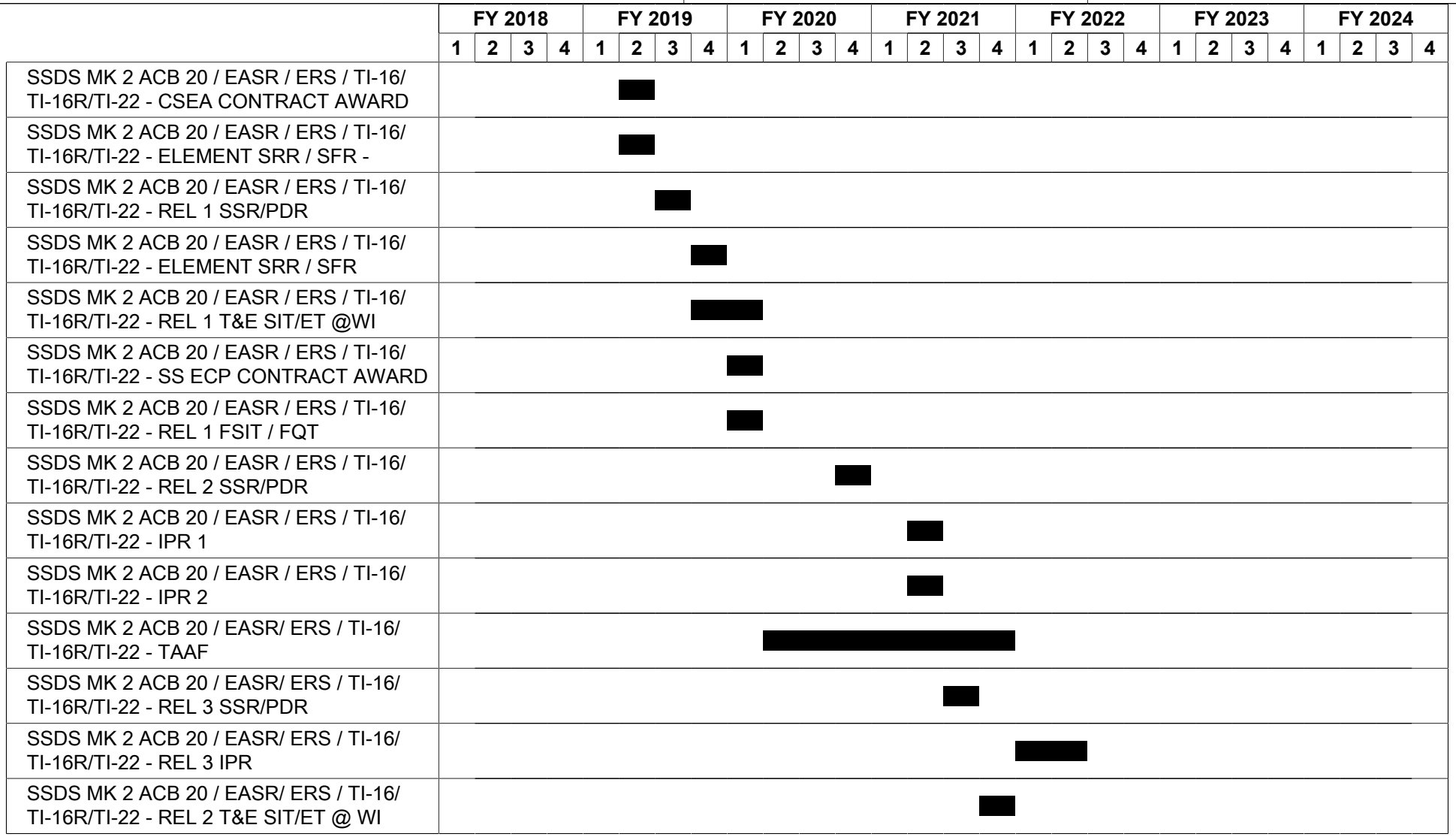

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

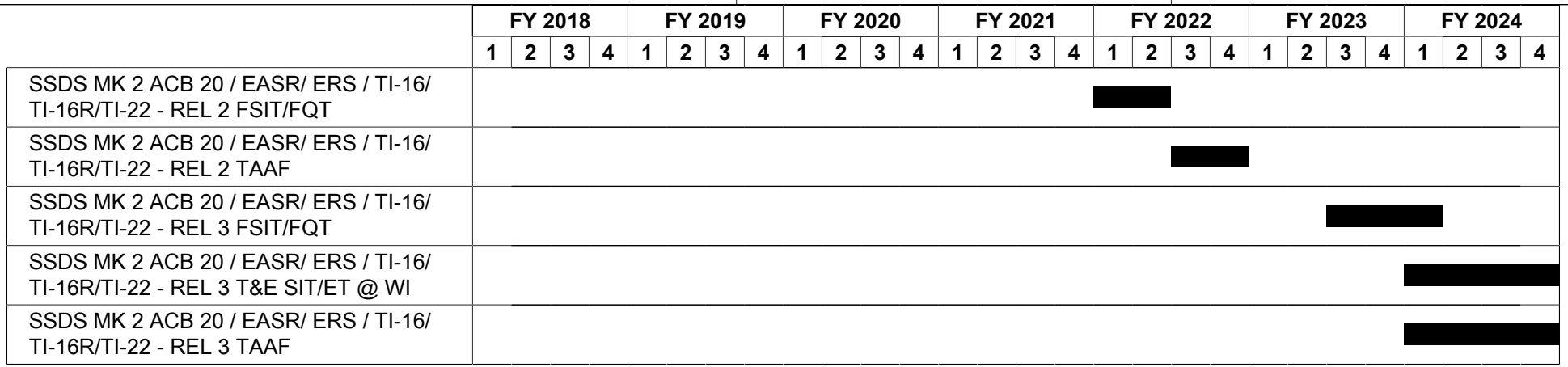

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3358				
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 T&E SIT/ET @WI	4	2021	4	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 FSIT / FQT	1	2022	2	2022
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - TAAF	3	2022	4	2022
Schedule Detail	1	2018	1	2024
SSDS MK 2 MOD 3C /1E - LHD 6 /CVN 73 ACB12 / TI-12H /TI-16 - HW PDR	1	2018	2	2018
SSDS MK 2 MOD 3C /1E - LHD 6 /CVN 73 ACB12 / TI-12H /TI-16 - SRR / SFR	1	2018	2	2018
SSDS MK 2 MOD 3C /1E - LHD 6 /CVN 73 ACB12 / TI-12H /TI-16 - IPR 2	2	2018	2	2018
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 3	3	2018	3	2018
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 4	4	2018	4	2018
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - FSIT / FQT	4	2018	4	2018
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E - T&E CST @ WI	2	2019	3	2019
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - TAAF	1	2019	4	2020
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - FSIT / FQT	3	2019	4	2019
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - TAAF	1	2020	4	2020
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E - SIT / ET @ WI	1	2019	2	2020
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E CST @ WI	2	2020	3	2020
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - IPR 2	2	2018	2	2018
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - FSIT/FQT REL 1	3	2018	4	2018
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - FSIT/FQT REL 2	4	2018	1	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 / 2 SIT / ET @ WI	4	2018	1	2019

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 CST	2	2019	2	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - TAAF	1	2019	3	2020
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E / REL 2 CST	4	2019	4	2019
At-Sea testing for FCLIP: SSDS MK2 FCLIP Phase 2 / DT III - SDTS	2	2019	2	2020
SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 2 CST	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 1	1	2018	1	2018
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 2	4	2018	4	2018
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - CSEA CONTRACT AWARD	2	2019	2	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR -	2	2019	2	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 SSR/PDR	3	2019	3	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 T&E SIT/ET @WI	4	2019	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SS ECP CONTRACT AWARD	1	2020	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 FSIT / FQT	1	2020	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 SSR/PDR	4	2020	4	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 1	2	2021	2	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 2	2	2021	2	2021
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - TAAF	2	2020	4	2021
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 SSR/PDR	3	2021	3	2021
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 IPR	1	2022	2	2022
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 2 T&E SIT/ET @ WI	4	2021	4	2021
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 2 FSIT/FQT	1	2022	2	2022
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 2 TAAF	3	2022	4	2022
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 FSIT/FQT	3	2023	1	2024
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 T&E SIT/ET @ WI	1	2024	4	2024

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 3358 / *SSDS Training Improvement Program*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 TAAF	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 0604755N / *Ship Self Def (Detect & Cntrl)*	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	2.895	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.895
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The integration of the LHA/D SSDS combat system with the USMC CAC2S program of record provides Land Domain command and control for the ARG/MAGTF commanders and staffs. The improved capability provides USN/USMC users, in required C2 spaces, with command and control information from multiple sources including Link 16, VMF messages, AFATDS and Blue Force Tracker to improve USN-USMC force integration.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: C2 Systems for Amphibs - Integrating CACS2 with SSDS	2.895	0.000
FY 2018 Accomplishments: - Initiated Systems Engineering effort for CAC2S integration with SSDS for LHA/ LHD/LPD platforms initiated JSF Integration engineering effort for initial Digital Air Control (DAC) capability. - Initiated establishment of system integration laboratory environment for early integration efforts.		
FY 2019 Plans: N/A		
Congressional Adds Subtotals	2.895	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

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 0604755N / *Ship Self Def (Detect & Cntrl)*	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
CAC2S - SE	WR	NSWC DD : Dahlgren, VA	0.000	0.579	Jun 2018	0.000		0.000		-		0.000	0.000	0.579	-
CAC2S HW SW license	WR	NSWC CR : Crane, IN	0.000	1.453	Jun 2018	0.000		0.000		-		0.000	0.000	1.453	-
CAC2S - ID / IQ	C/FFP	SPAWAR PAC : Not Specified	0.000	0.263	Jun 2018	0.000		0.000		-		0.000	0.000	0.263	-
TBD - SE	WR	TBD : Not Specified	0.000	0.200	Jul 2018	0.000		0.000		-		0.000	0.000	0.200	-
CAC2S	C/CPIF	Raytheon : San Diego, CA	0.000	0.200	Jul 2018	0.000		0.000		-		0.000	0.000	0.200	-
CAC2S	C/CPIF	Raytheon - Solipsys : Not Specified	0.000	0.200	Jul 2018	0.000		0.000		-		0.000	0.000	0.200	-
		Subtotal	0.000	2.895		0.000		0.000		-		0.000	0.000	2.895	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	2.895		0.000		0.000		-		0.000	0.000	2.895	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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 9999 / *Congressional Adds*

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 9999																												
Integrating CAC2S with SSDS			■																									

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 0604755N / *Ship Self Def (Detect & Cntrl)*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Integrating CAC2S with SSDS	3	2018	3	2018