

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>
--	---

COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	959.065	145.229	134.619	161.713	-	161.713	135.374	123.426	109.865	122.736	Continuing	Continuing
2178: <i>QRCC</i>	921.590	133.299	127.578	148.982	-	148.982	124.911	112.872	97.876	110.506	Continuing	Continuing
3172: <i>Joint Non-Lethal Weapons</i>	35.621	4.806	4.177	5.177	-	5.177	2.990	3.056	3.122	3.185	Continuing	Continuing
3358: <i>SSDS Training Improvement Program</i>	1.854	7.124	2.864	7.554	-	7.554	7.473	7.498	8.867	9.045	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

This program element consolidates efforts related to the integrated control of Ship Self Defense (SSD) and multi-warfare Combat Direction for Aircraft Carriers and Amphibious Class ships. Analysis and demonstration have established that surface SSD based on single-sensor detection point-to-point control architecture is inadequate against current and projected Anti-Ship Cruise Missile (ASCM) threats. The supersonic sea-skimming ASCM reduces the effective battle space to the horizon and the available reaction time-line to less than 30 seconds from first opportunity to detect until the ASCM impacts its target ship. Against such a threat, multi-sensor integration is required for effective detection, and parallel processing is essential to reduce reaction time to acceptable levels and to provide vital coordination/integration of hard-kill and soft-kill assets. The program element also includes integrated Combat System embedded shipboard training, and Non-Lethal weapons in support of anti-terrorism/force protection missions.

Quick Reaction Combat Capability (QRCC, PU2178): This project provides for the evolutionary acquisition of the Ship Self Defense System (SSDS), the core combat system control element for the Quick Reaction Combat Capability (QRCC) in aircraft carriers and amphibious class ships. In addition, the project provides for Combat System Integration (CSI) with the central system engineering and software for the integration of advanced sensor, weapon and C4I upgrades, and for the test and evaluation and certification of the integrated Combat System (CS).

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 the capabilities for integrated air and missile defense, multi-warfare situational awareness and combat direction, and joint interoperability via the Cooperative Engagement Capability (CEC) and Tactical Digital Information Link (TDL)-J. SSDS MK2 is being fielded with the new construction carriers (CVN78 class) and amphibious ships (LHA6, LPD17 classes). SSDS MK2 is replacing the Advanced Combat Direction System (ACDS) in the LHD1 class and SSDS MK1 in the LSD 41/49 class as fleet modernization initiatives. In addition, with the decision to replace the Dual Band Radar (DBR) for CVN 79/80 and Amphibious Class Ships (LHA 8) with an Enterprise Radar Suite (ERS), consisting of a new radar (Enterprise Air Search Radar (EASR), and an X-Band Illuminator, SSDS will require development of system and software changes for ERS Combat System Integration.

In order to meet the Navy's war fighting capabilities and modernization concepts described in SEA POWER 21, Navy Open Architecture (OA) is being introduced in conjunction with SSDS Commercial off the Shelf (COTS) Technology Refresh initiatives. This is the first step in unifying a set of war fighting functions into a common architecture shared among many ship classes. This principle of commonality is a major mechanism for cost control and avoidances in the Navy's future war fighting systems. Starting in 2008, SSDS MK 2 re-hosted existing tactical computer program applications into the Open Architecture Computing Environment (OACE)

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604755N I <i>Ship Self Def (Detect &amp; Cntrl)</i>	
<p>specifications with equipment suites concurrent with COTS Technology Insertion (TI) cycles, prior to migration and integration with other Navy OA applications for implementation on future new construction ships or during future ship modernization.</p> <p>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.</p> <p>The SSDS Product Development under PU 2178 encompasses technology insertion and cyber-security, including the development and integration of ACB-12 with an Open Architecture Computing Environment (OACE), product line System Track Manager, and phased technology insertion configurations. CVN78 is the lead ship for ACB-12. For the CVN 78, FY 17-FY18 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.</p> <p>For Cyber-Security, TFCA BDC initiative under PU 2178 will provide SSDS MK2 and Combat Systems-level cyber-security protection based on system of systems risk assessment. TFCA BDC is a phased multi-year development to define, develop, and integrate enterprise Combat System cyber-security solutions. These solutions will 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.</p> <p>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 the CVN and Amphibious Class Ships for integrated air and missile defense, ship self-defense, multi-warfare combat direction and strike group interoperability. 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.</p> <p>PU 2178 also includes the SSDS MK 2 Developmental Test/Operational Test (DT/OT) efforts and Combat System certification efforts.</p> <p>Non-Lethal Weapons (PU 3172) - This project 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.</p> <p>SSDS Training Improvement Program (PU 3358) - The SSDS Training Improvement project will provide enhancements and upgrades to the Total Ship Training Capability (TSTC) training components within the combat system 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) Project 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 to engage in more complex training requirements and distributed battle group events to support fleet required training certification events. Capability development and integration are related to Integrated Air and Missile Defense, Underwater,</p>		

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
---	-----------------------

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>
--	---

Surface, and other warfare areas. Capability enhancements and upgrades include development of re-useable common components that can be leveraged by AEGIS combat systems, and/or integration of re-usable common components developed by the TSTC Battle Force Tactical Training (BFTT) Program (PE 0204571/PU1427) and AEGIS TSTC Training Improvement program (PE 0604307/PU 3357), and integration with the SSDS MK2 TI-12/TI-16/TI-22 configurations, to meet Aircraft Carrier and Amphibious Class ship SSDS integrated combat system embedded training requirements.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
Previous President's Budget	145.336	134.619	161.639	-	161.639
Current President's Budget	145.229	134.619	161.713	-	161.713
Total Adjustments	-0.107	0.000	0.074	-	0.074
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	4.050	0.000			
• SBIR/STTR Transfer	-4.157	0.000			
• Program Adjustments	0.000	0.000	-0.047	-	-0.047
• Rate/Misc Adjustments	0.000	0.000	0.121	-	0.121

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification: FY 2018 Navy</b>										<b>Date: May 2017</b>		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>				<b>Project (Number/Name)</b> 2178 / QRCC			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
2178: QRCC	921.590	133.299	127.578	148.982	-	148.982	124.911	112.872	97.876	110.506	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. The SSDS is the integrating element of QRCC. The design integrates CS elements that do not individually provide the complete detection, control, and engagement capabilities needed against low flying, high speed ASCMs with low radar cross sections. The SSDS integration concept fulfills the need for an automated detection, quick reaction and multi-target engagement capability, emphasizing performance in the littoral environment. System design emphasizes use of non-developmental items, commercial standards, commercial processors, computer program reuse and open system architecture. SSDS is a physically distributed, open system architecture computer network consisting of commercially available or previously developed hardware. It includes the Navy's standard computers (Common Processor System) and displays (AN/UYQ-70 and Common Display System) and command table for human system interface, commercially based network switching and interface units, and commercially available fiber optic cabling.

SSDS MK1, the first generation of SSDS, integrates the SPS-49A(V)1 radar, SPS-67(V)1 radar, AN/SLQ-32A/B electronic warfare system, Combat Identification Friend or Foe-Self Defense (CIFF-SD), Rolling Airframe Missile (RAM) and Phalanx Close-In Weapon System (CIWS) and is installed on LSD41/49 class ships. SSDS MK1 successfully completed Operational Evaluation in June 1997. SSDS received Milestone III Approval for Full Rate Production (Mar 98) and authority to integrate with ACDS and Cooperative Engagement Capability (CEC) on CVN, LPD-17, LHD and LHA ship classes (as SSDS MK 2).

SSDS MK2 integrates other CS elements, such as AN/SPQ-9B radar, NATO Sea-sparrow system, CEC and TDL for joint interoperability. SSDS MK2 provides enhanced capabilities for Self-Defense against air and surface threats using both own-ship and remote data to address AAW Capstone requirements. SSDS MK2 is the integrated, coherent real time Command and Control System 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 the capabilities for integrated air and missile defense, multi-warfare situational awareness and combat direction, and joint interoperability via the Cooperative Engagement Capability (CEC) and TDL-J. SSDS MK2 is being fielded with the new construction carriers (CVN78 class) and amphibious ships (LHA6, LPD17 classes). SSDS MK2 is replacing the Advanced Combat Direction System (ACDS) in the LHD1 class and SSDS MK1 in the LSD 41/49 class as fleet modernization initiatives. In addition, with the decision to replace the Dual Band Radar (DBR) for CVN 79/80 and L-Class Ships (LHA 8) with an Enterprise Radar Suite (ERS), consisting of a new radar (Enterprise Air Search Radar (EASR), and an X-Band Illuminator, SSDS will require development of system and software changes for ERS Combat System Integration. The overall scope of the multi-year development for EASR/ERS integration will include systems engineering/analysis, M&S, hardware and software development, cyber-security implementation, Factory System Integration Test (FSIT) and Wrap Around Simulation, and Wallops Island integration and engineering Test for Fire Control Loop Elements.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
<p>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.</p> <p>The SSDS Product Development encompasses technology insertion and cyber-security, including the development and integration of ACB -12 with an Open Architecture Computing Environment (OACE), product line System Track Manager, and multiple technology insertion configurations. CVN78 is the lead ship for ACB-12. SSDS Product Improvement includes system engineering, critical experiments, software development, hardware development, operating environment, cyber-security software, hardware/software integration, factory qualification testing, land-based engineering testing, system/software test analyze and fix (TAAF) effort in support of CS testing (CS integration, engineering, certification and at-sea testing), logistics products and ashore training course development.</p> <p>New hardware TI baselines are required every four years to refresh the Commercial-Off-The-Shelf (COTS) assemblies to sustain system production and to support the incorporation of new capabilities. Each individual ship is planned for a TI upgrade on an eight to ten-year interval to replace obsolescent COTS hardware and support the fielding of the war-fighting capabilities and improvements.</p> <p>Due to prior year budget constraints, the TI-16 hardware development and associated ACB-12 software migration have been delayed. In order to support critical Ship Combat System modernization installation schedules, production of the TI-12 configuration has been extended for SSDS with technology refresh of obsolescent (designated TI-12H). The FY17 plans has been adjusted to support the migration to the TI-12H configuration in addition to the migration to the TI-16 configuration with the new lead ships identified. The TI-12H and TI-16 software migrations will be completed in FY18.</p> <p>FY16-FY18 SSDS Product Development includes the integration and test of the ACB-12/TI-12 baseline for the CVN 78, CVN 72 and LHD2, and transition to the TI-12Hybrid (TI-12H) baseline for follow on ships with replacement assemblies for unprocurable TI-12 COTS assemblies. FY16-18 also includes completion of the TI-16 hardware development and qualification, and migration of the SSDS MK 2 ACB-12 software to the TI-16 configuration. FY17-FY18 includes the initiation of the system engineering analysis and hardware engineering for the next TI configurations, TI-16 Tech Refresh and TI-22, to define the architecture for the SSDS MK2 CS ship class variants, and the hardware requirements for common infrastructure for computing, display and, network and cyber-security.</p> <p>For Cyber-Security, TFCA BDC initiative under PU 2178 will provide SSDS MK2 and Combat Systems-level cyber-security protection based on system of systems risk assessment. TFCA BDC is a phased multi-year development to define, develop, and integrate enterprise Combat System cyber-security solutions. These solutions will 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. The boundary defense capabilities will protect and detect threats entering and leaving the Combat System. The centralized Combat System-level cyber-security capabilities will provide cyber situational awareness and management of various (e.g. malware detection, file integrity verification, etc.) cyber-security protection and detection capabilities. Element-level cyber-security protections will provide additional measures to ensure system integrity. Development of enterprise Combat System risk management processes will occur, to include a system of systems risk assessment methodology to support Combat System execution of the Risk Management Framework.</p>		

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
<p>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 CVN and Amphibious Class Ships for integrated air and missile defense, ship self-defense, multi-warfare combat direction and strike group interoperability. 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.</p> <p>FCLIP is planned as a phased corrective action plan for system-of-systems deficiencies in SSDS MK2 ships, identified during live-fire testing with stressing anti-ship missile targets.</p> <p>FCLIP Phase 2 is a phased multi-year development effort (FY16-FY19) that includes: 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 &amp; Reporting, and modeling and analysis to ensure optimization and alignment of capabilities into the CS end-to-end fire control loop. CEC/SSDS MK2 Engage on Remote capability will be analyzed to determine performance improvements for potential implementation as part of FCLIP Phase 2. The overall scope of the multi-year development effort will include systems engineering/analysis, M&amp;S, hardware and software development, cyber-security implementation, Factory Systems Integration Test (FSIT) with Wrap Around Simulation, and Wallops Island System integration and engineering testing for Fire Control Loop Elements.</p> <p>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.</p> <p>In FY09, system development was initiated for SSDS MK1 technology refresh for the LSD 41/49 class ships. The effort will transition these ships to an SSDS MK OACE and SSDS MK 2 single source library. The new system designation is SSDS MK2 Mod 5C. The system development effort encompasses TI of new OA computing and display equipment (Common Processor System (CPS) and Common Display System (CDS)), modifications and additions to the SSDS MK 2 software for an upgraded interface with the Phalanx Closed-In-Weapon System (CIWS) Block 1B Baseline 2 and Battle Force Tactical Trainer (BFTT), and other unique LSD SSDS interfaces and functionality. The first LSD SSDS MK 2 Mod 5C was installed in LSD-50 in FY14 after land-based Combat System Integration and Certification Testing with an IOC in FY16.</p> <p>In FY10, SSDS MK 2 system development commenced for the first phase of migration to the Navy OA objective functional architecture designated as SSDS MK 2 ACB-12/TI-12. For the CVN78, the lead ship for ACB-12/TI-12, the baseline encompasses: implementation of common product line software components for System Track Management; integration of the product line System Track Management components and associated data model with other SSDS software components; integration of CPS and CDS; and expansion of SSDS MK 2 Local Area Network (LAN) to Combat System LAN; integration of new CS Combat System/C4I elements (Dual Band Radar(DBR), ESSM Block 1 with JUWL, SLQ-(V)6 SEWIP Block 2, MH-60R and CANES); implementation of cyber-security boundary defense capabilities and Total Ship Training Capability (TSTC). ACB-12/TI-12 is planned for fielding in the CVN 78, CVN 72 and LHD 2 in FY17. For the CVN 78, FY17-FY18 requires collaborative Combat System efforts to support 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.</p>		

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** FY 2018 Navy **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

Funds were added in FY13 for the integration and test of SSDS MK2 Tactical Data Link (TDL) 16 interoperability improvements to address critical Strike Group interoperability issues under the AEGIS Wholeness Initiative, designated AMIIP. In FY13, software defect corrections were implemented as Phase 1 of the Fire Control Loop Improvement Project (FCLIP) to correct specific anti-ship missile defense deficiencies identified during live-fire testing. In FY16, FCLIP Phase 2 and FTIIP were initiated as follow on efforts for fire control loop and strike group interoperability improvements.

In PB15, SSDS MK 2 Advance Capability Build (ACB)-16 was delayed 2 years due to the need to prioritize critical SSDS system improvements. ACB-16 was the designation for the next major SSDS baseline for the integration of new sensor, weapon, and C4I capabilities for anti-ship missile defense and strike group interoperability. As a result of the delay, ACB-16 has been re-designated to ACB-20. The SSDS MK 2 ACB-12 capability baseline development, test, and fielding will continue as planned. However, with the delay in development and fielding of ACB-16, an increased number of SSDS MK2 ships will receive the ACB-12 capability baseline and specific fire control loop, interoperability and cyber-security improvements, in lieu of ACB-16.

In addition to the integration of the Enterprise Radar Suite (EASR and X-Band TI), SSDS MK2/CS cyber-security enhancements, and integration of TSTC enhancements for ACB-20, ACB-20 SSDS MK 2 Combat System Integration development includes 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, and SEWIP Block 2/3 integration with SSDS MK2 TI-16 configuration.

SSDS MK2 Development Test and Evaluation (DT&E) provides for comprehensive testing 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) and the Air Warfare Ship Self Defense CAPSTONE Enterprise TEMP.

The initial DT&E and Follow on Operational Test and Evaluation (FOT&E) for SSDS MK 2 was conducted with the CVN 76 SSDS MK 2 Mod 1 configuration in FY05. In FY07, the SSDS MK 2 FOT&E requirements were linked with the Air Warfare Ship Self Defense Enterprise T&E initiative to combine At-Sea Combat System element DT&E and OT&E requirements to synergize the resources required for testing in the SSDS MK 2 ships and the SDTS. The LPD-17 class SSDS MK 2 Mod 2 FOT&E was conducted in FY07/FY08 as part of the Enterprise T&E initiative. Live fire, Combat System end-to-end testing was conducted against Anti-Ship Cruise Missile (ASCM) targets on the SDTS in FY07/08/09 with the CVN/LHD/LPD configurations. FOT&E of ESSM integration with SSDS MK 2 was initiated on the CVN 68 class in FY08 and extended through FY16. FOT&E for the CVN class SSDS MK 2 Mod 1B OACE COTS TI was conducted in FY09. FY16/FY17 FOT&E includes the LHA 6 SSDS MK 2 Mod 4B configuration with the RAM Block 2 missile, ESSM, AMIIP and FCLIP. FY16-FY18 FOT&E includes the LSD SSDS MK 2 Mod 5C configuration with the Phalanx CIWS 1B Baseline 2 system and RAM Block2. FY16-FY19 DT/ FOT&E includes 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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<b>Title:</b> SSDS MK2 Product Development/Combat Systems Integration	108.034	100.638	121.503	0.000	121.503
<b>Articles:</b>	-	-	-	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
<p><b><i>FY 2016 Accomplishments:</i></b>                      The FY2016 plans included a major increase in scope for the SSDS MK2 product development efforts identified below to meet ship new construction and modernization schedules.</p> <p>For LSD SSDS MK2 Mod 5C configuration with the Phalanx CIWS Block 1B Baseline 2, RAM Block 2 and CPS/CDS;                      -Provided TAAF support for CST for LSD 49 and LSD 51 TI-12 configurations with software Build 9. This included test data analysis and system/software trouble report resolution.                      For CVN78 SSDS MK2 Mod 6C.                      - Continued SSDS MK2 software design, code, test, and integration for software delivery to the ship for CS testing.                      - Conducted FSIT and FQT for this baseline.                      - Support for ICS Land-Based integration and engineering tests at WI, and for system / software trouble report resolution.                      - Continued development of operator and maintenance training courses for SSDS MK 2 Mod 6C ACB-12/TI-12                      For CVN72 SSDS MK2 Mod 1C ACB-12/TI-12 configuration with SPS-48G, SPS-49A, SPQ-9B, CEC, PL STM, UPX-29, ESSM, NSSMS MK57 MOD13, RAM Block2, SLQ-32(v)4, NULKA, CV-TSC (with MH-60R link) and BFTT                      - Provided support for ICS Land Based integration and engineering tests at WI, and CSA for the RCOH Combat System Light-off (CSLO) software. This included test data analysis and system/software trouble report resolution                      For LHD 2 SSDS MK2 Mod 3C ACB12 / TI12                      - Provided support for ICS Land Based integration and engineering test at WI, and for CSA for the CSLO. This included test data analysis and system / software trouble report resolution</p> <p>For LHD6/CVN73 SSDS MK2 MOD 3C/1E ACB-12/TI-12H/TI-16:                      -Continued the development of the SSDS MK2 TI-16 equipment and TI-12H COTS obsolescence changes to support equipment production, and initiate SSDS ACB-12 software re-host to the TI-16 and TI-12H configurations; continued the development of the equipment software operating environment, and conducted SRR, SFR, and design reviews for the re-host of the SSDS MK2 ACB-12 software.</p> <p>For FCLIP Phase 2</p>					



**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
<p>- Defined and allocated System of Systems (SoS) CS functional requirements for FCLIP Phase 2 and initiated system and software requirements for SSDS (and ICS elements) for capabilities for CIWS integration with CEC / SSDS MK2, ESSM 2T Uplink, and RAM Block 2 Multi-Target processing in the missile. Accomplished modeling and analysis to ensure optimization and alignment of capabilities into the ICS end-to-end fire control loop. Conduct studies and analysis to define capability phasing, concepts of integration and Combat System functional requirements / allocation for SoS integration of RAM Block2 Multi-Target processing, NSSMS MK9 Multi-Target Discrimination Reporting.</p> <p>For FTIIP, defined and allocated Combat System functional requirements and initiated system and software requirements specifications for SSDS (and ICS elements) for TDL capabilities for IFF Mode 5 and F/A-18 Digital Air Control (Phase) in support of F/A-18 and F-35 initial deployment, and conducted studies for the integration of SGS/AC into the SSDS MK2 TI-16 configuration.</p> <p>For TFCA BDC, defined and allocated Combat System functional requirements and initiated system and software requirements specifications for SSDS (and ICS elements) for cyber-security protections. The boundary defense capabilities will protect and detect threats entering and leaving the Combat System. The centralized Combat System-level cybersecurity capabilities will provide cyber situational awareness and management of various (e.g. malware detection, file integrity verification, etc.) cyber-security protection and detection capabilities. Element-level cyber-security protections will provide additional measures to ensure system integrity.</p> <p>For EASR/ERS, started the systems engineering / analysis to determine the Concept of Integration and initiate the definition and functional allocation of the Combat System requirements to support the full scale development of system and software changes to the Ship Self Defense System (SSDS) ICS for CVN 79/80 and Amphibious Class ships ICS variants in order to integrate the EASR and fire control capabilities for tracking and missile illumination/uplink. The overall scope of the multi-year development will include Systems Engineering/Analysis, M&amp;S, Hardware and Software development, Cyber-Security Capabilities, Factory System Integration Test (FSIT) and Wrap Around Simulation, and Wallops Island System Integration Test for Fire Control Loop elements.</p> <p>- For SSDS MK2 ACB-20/EASR/ERS/TI-16</p> <p>- Defined the Combat System architecture and initiated the definition and functional allocation of the Combat System requirements for the ACB-20 capabilities, including the integration of ERS (EASR and X-Band TI), to support the full scale development of the ACB-20 / EASR / ERS ICS baseline.</p>					

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
--	-----------------------

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
---	----------------	----------------	---------------------	--------------------	----------------------

- Initiated the RFP for the competitive CSEA contract for the SSDS MK2 ICS development including the SSDS MK2 ACB-20 baseline development and the integration of EASR/ERS/TI-16.

***FY 2017 Plans:***

- For LSD SSDS MK 2 Mod 5C
- Initiated software development to transition to software Build 10 with the TI-12H configuration.
- For CVN78 SSDS MK2 MOD 6C
- For the CVN 78, FY 17-FY18 requires collaborative CS efforts to support CSSQT and DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group interoperability through extensive integrated testing and software updates.
- Complete SSDS MK 2 software design, code, test and integration (DCTI) for the CVN78 ACB-12 baseline for PSA including SEWIP Block 2 and CV-TSC interfaces. Conduct FSIT and FQT for this baseline.
- Provide Support for ICS Land-Based integration and engineering tests at WI. This includes test data analysis and system / software trouble report resolution.

- For LHD6/CVN73 SSDS MK2 MOD 3C/1E ACB-12/TI-12H/TI-16:
- Continue the ACB-12 software migration to TI-16 and TI-12H and conduct FSIT/FQT for LHD6 software Build 10.
  - Provide support for ICS Land-Based integration and engineering test at WI. This includes test data analysis and system / software trouble report resolution.

- For FCLIP Phase 2 / FTIIP / TFCA BDC baselines
- FCLIP: Complete the design and continue software development for CIWS integration with CEC/SSDS MK2.
  - FCLIP: Complete the design and continue development for the ESSM 2T Up-Link, and NSSMS MK9 Multi-Target Discrimination & Reporting.
  - FCLIP: Complete the design and continue software development for SoS integration of RAM Block 2 multi-Target processing
  - FCLIP: Conduct SSDS MK2/CS element design reviews for the FY17 initiatives identified above.
  - FTIIP: Initiate design and software development for IFF Mode 5 integration with Combat System.
  - TFCA BDC: Continue designing and developing TFCA Cyber-security improvements to secure the combat system enclave.

For SSDS MK2 ACB-20/EASR/ESS/TI-16

<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
<p>- Develop the SoS Combat System and Interface Requirements Documentation for the ACB-20 Warfighting Capability Improvements including EASR and ERS.</p> <p>- Initiate the system engineering analysis for the TI-16 Tech Refresh configuration to define the architecture for the SSDS MK2 ICS ship class variants and the hardware requirements for common infrastructure for computing, display, network and cyber-security.</p> <p>- Complete the RFP for the competitive CSEA contract for the SSDS MK2 ICS development including the SSDS MK2 ACB-20 baseline development and the integration of EASR/ERS/TI-22.</p> <p><b>FY 2018 Base Plans:</b> For LSD SSDS MK 2 Mod 5C</p> <p>- Complete the development of software Build 10 for the TI-12H configuration. Conduct FSIT/FQT for this baseline.</p> <p>For CVN78 SSDS MK2 MOD 6C</p> <p>- For the CVN 78, FY 17-FY18 requires collaborative CS efforts to support CSSQT and DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group interoperability through extensive integrated testing and software updates.</p> <p>- Provide TAAF support for LBET at Wallops Island (including TRKEXs with DBR), shipboard post delivery test and trials, and implement software changes/correction for CST for CSSQT.</p> <p>For LHD6/CVN73 SSDS MK2 MOD 3C/1E ACB-12/TI-12H/TI-16</p> <p>- Complete the ACB-12 software migration to TI-16 and TI-12H and conduct FSIT/FQT for these ship baselines</p> <p>- Provide support for integrated CS land-based integration and engineering test at WI. This includes test data analysis and system / software trouble report resolution</p> <p>For FCLIP Phase 2 / FTIIP / TFCA BDC baselines</p> <p>- Complete the software development for CIWS integration with CEC/SSDS MK2, ESSM 2T Up-Link, and NSSMS MK9 Multi-Target Discrimination &amp; Reporting</p> <p>- Initiate engineering and certification testing of FCLIP Phase 2 improved fire control loop improvements</p> <p>- Continue software development for IFF Mode 5 integration with Combat System.</p> <p>- Continue designing and developing TFCA Cyber-security improvements to secure the combat system enclave.</p> <p>For SSDS MK2 ACB-20/EASR/ERS/TI-16</p> <p>-Continue systems engineering / analysis to establish the Concept of Integration and initiate the definition and functional allocation of the Combat System requirements to support the full scale development of system</p>					

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
and software changes to the Ship Self Defense System (SSDS) ICS for CVN 79/80 and L-Class ships ICS variants in order to integrate the SEWIP Block 2/Block 3 Softkill Coordinator, Airborne Off-board Electronic Warfare (AOEW), SEWIP Blk 3EA, RAM Block 2B, Cyber-security improvements and interoperability standard enhancements, to close critical fire control loop and interoperability gaps. The overall scope of the multi-year development will include Systems Engineering/Analysis, M&S, Hardware and Software development, Cyber-Security Capabilities, Factory System Integration Test (FSIT) and Wrap Around Simulation, and Wallops Island System Integration Test for Fire Control Loop elements. - Conduct source selection for planned FY19 Q2 award of the competitive CSEA/SDA contract for the SSDS MK2 ICS development including the SSDS MK2 ACB-20 baseline development with the integration of EASR/ERS/TI-16.					
<b>FY 2018 OCO Plans:</b> N/A					
<b>Title:</b> SSDS MK2 Development Test & Evaluation	25.265	26.940	27.479	0.000	27.479
<b>Articles:</b>	-	-	-	-	-
<b>FY 2016 Accomplishments:</b> The T&E/Certification/Land -Based Engineering Test (LBET) efforts include four new SSDS integrated combat system baselines, LSD SSDS MK2 Mod5C, CVN78 SSDS MK 2 Mod 6C, CVN72 SSDS MK2 Mod 1C, and LHD2 SSDS MK2 Mod 3C.  For LSD SSDS MK2 Mod 5C configuration with the Phalanx CIWS Block 1B Baseline 2, RAM Block 2 and CPS/CDS equipment - Completed Live Fire At Sea Testing for LSD MOD 5C on SDTS - Enterprise Test 12 - Completed CSSQT on LSD50 and LSD 45 - Conducted CST at WI for LSD 49 and LSD 51 for certification OQE  For LHA6 SSDS MK 2 Mod 4B with ESSM Block 1, RAM Block 2, and OACE equipment - Conducted MSLEX ET 05J on SDTS. - Conducted Cyber Penetration Vulnerability assessment (CPVA), DT/OT-IIIH Phase 3 on LHA6. For CVN78 SSDS MK2 Mod 6C configuration - Continued Land Based system integration and engineering tests for CVN78 SSDS MK2 Engineering Software Releases at WI for the fire control loop including DBR, CEC, UPX-29, ESSM, MK-29 launcher, RAM Block					

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
--	-----------------------

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>2, and new capabilities for SSDS MK2 / SEWIP Block 2 integration. This included live DBR TRKEXs for the integrated Combat System and the TPX-42 Air Traffic Control System. The testing will also include integration test with HSG, TDL with AMIIP and Air Control.</p> <p>For CVN72 SSDS MK2 ACB-12/TI-12 configuration with SPS-48G, SPS-49A, SPQ-9B, CEC, PL STM, UPX-29, ESSM, NSSMS MK57 MOD13, RAM Block2, SLQ-32(v)4, NULKA, CV-TSC (with MH-60R link) and BFTT -Conducted CSA at WI to provide authorization for the ICS software package for CSLO during RCOH.</p> <p>For LHD2 SSDS MK2 ACB-12/TI-12 configuration with SPS-48G, SPS-49A, SPQ-9B, CEC, PL STM, UPX-29, ESSM,NSSMS MK57 MOD14 (Objective Configuration Phase 2), RAM Block2, SLQ-32(V)3, and BFTT -Conducted CSA at WI to provide authorization for the ICS software package for CSLO</p> <p>For LHD1 SSDS MK 2 Mod 3B - Conducted engineering testing of FTIIP Digital Air Control (Phase) capability at Wallops Island.</p> <p><b>FY 2017 Plans:</b> For LSD SSDS MK2 Mod 5C configuration with the Phalanx CIWS Block 1B Baseline 2, RAM Block 2 and CPS/ CDS - Complete CSSQT on LSD 52</p> <p>For CVN78 SSDS MK2 Mod6C - Continue Land-Based integration and engineering testing at WI and aboard ship for ICS software changes/ corrections for CVN78 PSA/CSSQT software deliveries, including testing of embedded training capabilities with DBR simulation software. For the CVN 78, FY 17-FY18 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. - Initiate Shipboard DT (DT-III J Phase 3 / ET-10) during post-delivery period - Conduct CST#1 at WI for authorization OQE for ICS software package for PSA/CSSQT</p> <p>For CVN72 SSDS MK2 ACB-12/TI-12 configuration with SPS-48G, SPS-49A, SPQ-9B, CEC, PL STM, UPX-29, ESSM, NSSMS MK57 MOD13, RAM Block2, SLQ-32(v)4, NULKA, CV-TSC (with MH-60R link) and BFTT - Conduct CST at WI to provide certification OQE to deliver ICS software package for CIA and deployment.</p>					

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
For LHD2 SSDS MK2 ACB-12/TI-12 configuration with SPS-48G, SPS-49A, SPQ-9B, CEC, PL STM, UPX-29, ESSM,NSSMS MK57 MOD14 (Objective Configuration Phase 2), RAM Block2, SLQ-32(V)3, and BFTT -Conduct CST to provide certification OQE to deliver ICS software package for deployment.					
For LHD6/CVN73 SSDS MK2 MOD 3C/1E ACB-12/TI-12H/TI-16 - Initiate Land-Based integration and engineering testing at WI for LHD6 SSDS MK 2 Mod 3C ACB-12/TI-12H configuration.					
For SSDS MK2 FCLIP Phase 2 / FTIIP / TFCA BDC -Develop Test and Evaluation Plan					
<b>FY 2018 Base Plans:</b> For LSD SSDS MK 2 Mod 5C - Complete CSSQT on LSD49 For CVN78 SSDS MK2 Mod6C - 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-FY18 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. - 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/ET-09 MSLEX on SDTS - Conduct CST#2 at WI for authorization OQE for ICS software package for CSSQT Phase 2					
For LHD6/CVN73 SSDS MK2 MOD 3C/1E ACB-12/TI-12H/TI-16 - 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					
<b>FY 2018 OCO Plans:</b>					

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	133.299	127.578	148.982	0.000	148.982

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPN/ BLI 5231 (SSDS): <i>SSDS</i>	61.409	54.919	73.086	-	73.086	87.286	89.379	92.234	91.056	Continuing	Continuing
• RDTEN/0603658N: <i>Cooperative Engagement</i>	72.472	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	599.936
• RDTEN/0607658N: <i>Cooperative Engagement Capability</i>	0.000	84.501	92.571	-	92.571	103.279	111.178	111.616	112.306	Continuing	Continuing

**Remarks**

Cooperative Engagement Capability (CEC) budget will realign from PE 0603658N to 0607658N starting in FY17.

**D. Acquisition Strategy**

The first SSDS MK 2 system procurements took place under a Cost Plus Award Fee (CPAF) contract in FY99 for the CVN 76, LPD 17, LPD 18 and CVN 69. Follow-on equipment procurements for additional ships of the CVN, LPD and LHD classes were awarded on Firm Fixed Price (FFP) contracts. For those ships that will be receive P3I OACE COTS tech Refresh hardware suites, the initial system Tech Refresh Development occurred under a CPAF type contract, with ship COTS conversion equipment/kits procured on FFP contracts.

A system engineering/design agent and Life Cycle Maintenance Cost Plus Fixed Fee (CPFF) contract was awarded in FY05 and a follow-on CPFF/CPAF contract, N00024-08-C-5122, was awarded on 30 Sept 2008, to support SSDS MK 2 system/software maintenance and system upgrades through FY13 including the TI-12 COTS Tech Insertion.

A follow on CPIF LOE contract, N00024-14-C-5128, was awarded 18 December, 2013 on a sole source basis for FY14-FY17 for the development, test, certification of SSDS MK2 (ACB12/TI12) for CVN78, CVN72, LHD2, and the software migration of ACB12 to TI-12H/TI16 for CVN68, LHD1, LPD17 ship classes. This contract was extended to December 2018 and an additional extension through June 2020 is planned to complete the Test, Analyze and Fix (TAAF) phase associated with Combat System Integration and Certification of ACB12. For SSDS MK2 TI-12H/TI-16 equipment, the SSDS program will use competitive build to specification production contracts, and leverage common enterprise COTS Open Architecture Computing Environment (OACE) products for computing, storage, display, network, conversion, and cyber-security.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
--	-----------------------

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

A competitive Combat System Engineering Agent (CSEA)/SSDS MK2 Software Design Agent (SDA) contract is planned to be awarded in FY2019 with a ten (10)-year period of performance from FY2019-FY2028 with RFP preparation efforts currently underway. The CSEA/SDA competitive procurement is in support of Carrier (CVN) and Amphibious Ship Classes. It will provide support for the SSDS Integrated Combat System (ICS) element and any future surface combatant designated for the SSDS MK 2 ICS post-ACB-12/TI-12/TI-12H/TI-16/TI-16 Tech Refresh and for ACB-20 and follow-on SW and HW technology upgrades. The primary deliverables will be SSDS tactical computer programs, program updates and associated engineering, development, and logistics products. The CSEA will support the in-service SSDS configurations as well as adapt and integrate new or upgraded war-fighting capabilities into the CVN and Amphibious ICS.

A sole source CPAF/CPIF delivery order, N00178-04-D-4112-0004, was awarded in FY05 to acquire a Systems Engineering & Integration (SE&I) agent to support SSDS MK2 (ACB12) development, integration and testing for the CVN78 Class Warfare System. A follow-on competitive CPIF contract was awarded in March 2017 for FY17 through FY22 to provide ICS Systems Engineering, Integration and Test (SEI&T) engineering support in support of SSDS MK2 ICS development and integration for both in-service and future CVN and Amphibious Ship Classes, including ACB-20.

**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 B, 5 Mar 2008. Revision C is in route and will be signed out in FY17. During the approval cycle, DOT&E requested a major updated 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 SSDS MK 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,



**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
<p>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 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.</p> <p>Status</p> <ul style="list-style-type: none"> <li>- The Director, Operational Test and Evaluation (DOT&amp;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.</li> <li>- 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.</li> <li>- 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.</li> <li>- OPNAV N96 is working with PEO IWS, DASN, and COTF to address the shortfalls in performance testing with the following initiatives:             <ul style="list-style-type: none"> <li>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.</li> <li>b. Integrate, test, and field SEWIP Block 2, and NULKA improvements.</li> <li>c. Expand the use of Modeling and Simulation.</li> <li>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.</li> <li>e. Consider follow on high return self-defense improvements with FCLIP and Advanced Capability Builds (ACB).</li> </ul> </li> </ul> <ul style="list-style-type: none"> <li>- Additional T&amp;E and certification initiatives include:             <ul style="list-style-type: none"> <li>a. Conduct element and platform level cyber-security testing using land based test site (LBTS) facilities.</li> <li>b. Move away from platform centric certification testing towards baseline configuration centric testing for combat systems certification testing.</li> </ul> </li> </ul>		

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

<b>Product Development (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PD - ACB12/TI12 / LSD - PSEA / SW Dev't	SS/CPIF	RSC IDS (5128) : San Diego, CA	62.438	34.302	Feb 2016	24.178	Dec 2016	8.006	Dec 2017	-		8.006	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD / AMIIP - PSEA / SW Dev't	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	66.887	4.145	Feb 2016	2.112	Dec 2016	1.250	Dec 2017	-		1.250	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	69.731	6.019	Jan 2016	6.169	Nov 2016	1.150	Dec 2017	-		1.150	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - SE / ILS	WR	CDSA DN : Dam Neck, VA	22.284	0.643	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - SE&I/Force Pt	C/CPIF	RSC (IIS) : Suffolk, VA	0.361	0.615	Dec 2016	0.000		0.000		-		0.000	0.000	0.976	-
PD - ACB12/TI12 / LSD - LBET/TrainingI	WR	NSWC PHD : Pt Hueneme, CA	25.676	4.347	Jan 2016	1.751	Nov 2016	0.975	Dec 2017	-		0.975	Continuing	Continuing	Continuing
PD - ACB12/TI12 / LSD - CVN78 LBET/Metrics/On-site Support	WR	NSWC Corona : Corona, CA	0.000	0.412	Jan 2016	0.736	Nov 2016	0.125	Nov 2017	-		0.125	0.000	1.273	-
PD - ACB12/TI12 / LSD - Navy Link Cert/Cross-Domain Sprt	WR	SPAWAR : San Diego, CA	0.000	0.225	Feb 2016	0.210	Nov 2016	0.000		-		0.000	0.000	0.435	-
PD - ACB12/TI12 / LSD - Moriah Integration	WR	NAVAIR : Lakehurst, NJ	0.000	0.309	Feb 2016	0.000		0.000		-		0.000	0.000	0.309	-
PD - ACB12/ CVN78 LBET w/DBR/RES	SS/CPIF	RSC IDS : Sudbury, MA	0.000	0.000		5.080	Jan 2017	0.000		-		0.000	0.000	5.080	-
PD - ACB12/ CVN78 LBET w/CEC	SS/CPIF	RSC IDS : St. Petersburg, FL	0.000	0.000		1.275	Jan 2017	0.000		-		0.000	0.000	1.275	-
PD - ACB12/ CVN78 LBET w/TPX-42	WR	NAVAIR : St. Inigoes, MD	0.000	0.000		0.111	Mar 2017	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	6.306	5.145	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

<b>Product Development (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PD - ACB12/TI-16/TI12H - HW Engr	WR	NSWC DD : Dalhgren, VA	0.325	2.093	Jan 2016	7.765	Nov 2016	2.480	Dec 2017	-		2.480	Continuing	Continuing	Continuing
PD - ACB12/TI-16/TI12H - SW Migration PSEA	SS/CPIF	RSC IDS (5128) : San Diego, CA	1.864	9.935	Feb 2016	12.572	Dec 2016	27.566	Dec 2017	-		27.566	Continuing	Continuing	Continuing
PD - ACB12/TI-16/TI12H - SE	SS/CPFF	JHU/APL : Laurel, MD	0.000	0.461	Jan 2016	1.025	Dec 2016	2.000	Dec 2017	-		2.000	0.000	3.486	-
PD - ACB12/TI-16/TI12H - LBET/Training Course Development	WR	NSWC-PHD : Pt Hueneme, CA	0.000	0.000		0.575	Nov 2016	2.000	Nov 2017	-		2.000	Continuing	Continuing	Continuing
PD - ACB12/TI-16/TI12H - Metrics/On-Site Sprt	WR	NSWC Corona : Corona, CA	0.000	0.251	Jan 2016	0.418	Nov 2016	0.418	Nov 2017	-		0.418	0.000	1.087	-
PD - ACB12/TI-16/TI12H - CPS Engr	C/DIQ	GTS : Virginia Beach, VA	0.000	0.042	Apr 2016	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	0.000		0.000		0.326	Nov 2017	-		0.326	0.000	0.326	-
PD - TFCA - BDC PSEA SW DEV'T	SS/CPIF	RSC IDS (5128) : San Diego, CA	0.000	1.785	Feb 2016	4.346	Dec 2016	5.223	Dec 2017	-		5.223	Continuing	Continuing	Continuing
PD - TFCA - BDC SE	SS/CPFF	JHU/APL : Laurel, MD	0.000	0.462	Feb 2016	0.775	Dec 2016	0.791	Dec 2017	-		0.791	Continuing	Continuing	Continuing
PD - TFCA - BDC SE	WR	NSWC-DD : Dalhgren, VA	0.000	0.708	Jan 2016	2.016	Nov 2016	1.610	Nov 2017	-		1.610	Continuing	Continuing	Continuing
PD - TFCA - BDC SE	WR	CDSA DN : Dam Neck, VA	0.000	0.864	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
PD - TFCA - BDC Cyber Products	C/CPIF	Progeny Systems Corp : Manasas, Va	0.000	0.181	Feb 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
PD - TFCA - BDC SE	WR	NRL/Delta/G2OPS : Washington DC	0.000	0.000		0.207	Apr 2017	0.211	Nov 2017	-		0.211	0.000	0.418	-
PD - TFCA - BDC SE	C/BA	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.657	Nov 2016	0.670	Nov 2017	-		0.670	0.000	1.327	-
PD - TI-16TR/TI22 - HW Engineering	WR	CDSA DN : Dam Neck, VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy** **Date: May 2017**

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

<b>Product Development (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PD - TI-16TR/TI22 -HW Engineering	WR	NSWC-DD : Dalhgren, VA	0.000	0.000		0.100	Nov 2016	0.920	Nov 2017	-		0.920	0.000	1.020	-
PD - HQ Travel	Various	PEO IWS : Washington DC	0.150	0.100	Jan 2016	0.120	Dec 2016	0.150	Nov 2017	-		0.150	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 - Misc - Prior Year Cum Cost	C/BA	Misc : Washington DC	278.994	0.000		0.000		0.000		-		0.000	0.000	278.994	-
PD - PM Prod Development	C/CPIF	various : various	28.431	2.552	Feb 2016	2.603	Dec 2016	2.943	Dec 2017	-		2.943	0.000	36.529	-
CSI - ACB20 (Less EASR) - SE	WR	NSWC DD : Dalhgren, VA	0.000	0.000		0.000		5.520	Nov 2017	-		5.520	0.000	5.520	-
CSI - ACB20 (Less EASR) - SE	WR	NSWC PHD : Port Huneme, CA	0.000	0.000		0.000		0.323	Nov 2017	-		0.323	0.000	0.323	-
CSI - ACB20 (Less EASR) - SE	WR	NUWC KP : Keyport, WA	0.000	0.000		0.000		0.161	Nov 2017	-		0.161	0.000	0.161	-
CSI - ACB20 (Less EASR) - SE	SS/CPAF	Rayth (RIDS) : Portsmouth, RI	0.000	0.000		0.000		1.075	Dec 2017	-		1.075	0.000	1.075	-
CSI - ACB20 (Less EASR) - SEI&T	C/CPIF	Gryphon/Delta : Washington DC	0.000	0.000		0.000		4.375	Dec 2017	-		4.375	0.000	4.375	-
CSI - ACB20 (Less EASR) - SE	SS/CPFF	JHU/APL : Laurel, MD	0.000	0.000		0.000		5.458	Dec 2017	-		5.458	0.000	5.458	-
CSI - FCLIP Phase 2 - PSEA	SS/CPIF	RSC IDS (5128) : San Diego, CA	0.593	6.574	Feb 2016	5.030	Dec 2016	7.527	Dec 2017	-		7.527	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	SS/CPFF	JHU/APL : Laurel, MD	1.530	5.580	Feb 2016	2.350	Dec 2016	2.258	Dec 2017	-		2.258	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	NSWC-DD : Dalhgren, VA	0.432	0.986	Jan 2016	0.279	Nov 2016	0.724	Nov 2017	-		0.724	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	CDSA DN : Dam Neck, VA	0.000	0.125	Jan 2016	0.000		0.000		-		0.000	0.000	0.125	-
CSI - FCLIP Phase 2 - SE	WR	NSWC PHD : Pt Hueneme, CA	0.206	0.200	Jan 2016	0.000		0.452	Nov 2017	-		0.452	Continuing	Continuing	Continuing

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy** **Date: May 2017**

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 2178 / QRCC
--	--	---

<b>Product Development (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CSI - FCLIP Phase 2 - SE / Planning	C/CPIF	Delta Resources : Virginia Beach, VA	0.000	0.339	Feb 2016	0.000		0.000		-		0.000	0.000	0.339	-
CSI - FCLIP Phase 2 - SE & I	C/CPIF	RSC IIS (4112) : Suffolk, VA	0.103	2.033	Feb 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SEI&T	C/CPIF	Gryphon/Delta : Washington DC	0.000	0.000		0.527	Dec 2016	1.151	Dec 2017	-		1.151	0.000	1.678	-
CSI - FCLIP Phase 2 - SE Multi-Link Antenna	TBD	IWS 5 : TBD	0.000	0.250	Jan 2016	0.000		0.000		-		0.000	0.000	0.250	-
CSI - FCLIP Phase 2 - SE RAM/ESSM	WR	NAWC : China Lake	0.000	1.340	Feb 2016	0.557	Nov 2016	0.591	Nov 2017	-		0.591	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE RAM/CIWS	SS/CPFF	RSC(5432/5410) : Tuscon, AZ	0.000	1.080	Feb 2016	0.000		1.882	Dec 2017	-		1.882	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE	WR	NSWC : Crane, IN	0.000	0.250	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FCLIP Phase 2 - SE / SW Dev't	SS/CPAF	Rayth (RIDS) : Portsmouth, RI	0.000	2.792	Feb 2016	5.760	Dec 2016	2.903	Dec 2017	-		2.903	0.000	11.455	-
CSI - FCLIP Phase 2 - SE	WR	NUWC KP : Keyport, WA	0.000	0.200	Feb 2016	0.000		0.269	Nov 2017	-		0.269	0.000	0.469	-
CSI - FTIIP - PSEA - SW Dev't	SS/CPIF	RSC IDS (5128) : San Diego, CA	0.000	1.413	Feb 2016	1.631	Dec 2016	7.429	Dec 2017	-		7.429	Continuing	Continuing	Continuing
CSI - FTIIP - SE	C/BA	JHU/APL : Laurel, MD	0.000	0.151	Feb 2016	0.000		0.300	Nov 2017	-		0.300	0.000	0.451	-
CSI - FTIIP - SE	WR	NSWC-DD : Dahlgren, VA	0.000	0.425	Jan 2016	0.652	Nov 2016	3.602	Nov 2017	-		3.602	Continuing	Continuing	Continuing
CSI - FTIIP - SE	WR	CDSA DN : Dam Neck, VA	0.000	0.616	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FTIIP - SE&I	C/CPIF	RSC IIS (4112) : Suffolk, VA	0.000	0.495	Feb 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - FTIIP - SE	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		0.215	Nov 2017	-		0.215	0.000	0.215	-
CSI - FTIIP - SEI&T	C/CPIF	Gryphon/Delta : Washington DC	0.000	0.000		0.731	Nov 2016	1.034	Dec 2017	-		1.034	0.000	1.765	-

**UNCLASSIFIED**

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 5				PE 0604755N / Ship Self Def (Detect & Cntrl)				2178 / QRCC							
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
CSI - FTIIP - SE	WR	NUWC KP : Keyport, WA	0.000	0.000		0.186	Nov 2016	0.000		-		0.000	0.000	0.186	-
CSI - ICS SE - PSEA SE	SS/CPIF	RSC IDS (5128) : San Diego, CA	0.508	0.300	Feb 2016	0.331	Dec 2016	0.215	Dec 2017	-		0.215	0.000	1.354	-
CSI - ICS SE - SE&I	C/CPIF	RSC (IIS) : Suffolk, VA	1.626	0.778	Feb 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - ICS SE - SEA 05C	C/BA	SEA 05C : Washington DC	0.000	0.237	Feb 2016	0.165	Dec 2016	0.215	Nov 2017	-		0.215	0.000	0.617	-
CSI - ICS SE - SEI&T	C/CPIF	Gryphon/Delta : Washington DC	0.000	0.000		1.427	Dec 2016	1.622	Nov 2017	-		1.622	0.000	3.049	-
CSI - ICS SE	SS/CPFF	JHU/APL : Laurel, MD	0.986	1.469	Feb 2016	1.819	Dec 2016	1.450	Dec 2017	-		1.450	Continuing	Continuing	Continuing
CSI - ICS SE	WR	NSWC DD : Dalhgren, VA	1.868	1.200	Jan 2016	0.839	Nov 2016	1.669	Nov 2017	-		1.669	Continuing	Continuing	Continuing
CSI - ICS SE	WR	CDSA DN : Dam Neck, VA	0.215	0.300	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CSI - ICS SE	WR	NUWC KP : Keyport, WA	0.000	0.300	Feb 2016	0.103	Nov 2016	0.269	Nov 2017	-		0.269	0.000	0.672	-
CSI - ICS SE	C/CPIF	Delta Resources : Virginia Beach, VA	0.000	0.205	Feb 2016	0.000		0.000		-		0.000	0.000	0.205	-
CSI - ICS SE	FFRDC	MITRE : McClean, VA	0.000	0.300	Feb 2016	0.000		0.000		-		0.000	0.000	0.300	-
CSI - EASR / ESS SE	SS/CPFF	JHU/APL : Laurel, MD	0.000	1.067	Feb 2016	0.750	Dec 2016	3.575	Dec 2017	-		3.575	Continuing	Continuing	Continuing
CSI - EASR / ESS SE	WR	NSWC DD : Dalhgren, VA	0.000	0.274	Jan 2016	1.444	Nov 2016	2.970	Nov 2017	-		2.970	Continuing	Continuing	Continuing
CSI - EASR / ESS / SEI&T	C/CPIF	Gryphon/Delta : Washington DC	0.000	0.640	Feb 2016	1.256	Dec 2016	2.344	Nov 2017	-		2.344	0.000	4.240	-
CSI - EASR / ESS SE	WR	CDSA DN : Dam Neck, VA	0.000	0.273	Jan 2016	0.000		0.000		-		0.000	0.000	0.273	-
CSI - EASR / ESS SE	C/CPAF	RSC (5202) : St. Pete, FL	0.000	0.246	Jan 2016	0.000		0.788	Nov 2017	-		0.788	0.000	1.034	-

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

<b>Product Development (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CSI - EASR / ERS SE	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		0.323	Nov 2017	-		0.323	0.000	0.323	-
<b>Subtotal</b>			697.009	108.034		100.638		121.503		-		121.503	-	-	-

**Remarks**  
 - The funding increase of \$20.758M from FY 2017 to FY 2018 for PU 2178 supports commencing SSDS MK2 ACB20 system engineering/analysis supporting the development of system and software changes for the SSDS ICS in order to integrate the SEWIP Block 3 capabilities; ESSM Block 2 missile system; and Cyber-Security improvements, in future and in-service CVN and Amphibious Class ship CS variants as well as continuing SSDS MK2 integration, test and evaluation and certification testing for the SSDS MK2 ACB-12/TI-12 integrated CS. For the CVN 78, FY17-FY18 includes major, collaborative CS efforts to support DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group Interoperability through extensive integrated testing and software updates.  
 For FY16-FY18, new contracts have been established on a competitive basis with Tech Marine for financial management support, with CACI for Acquisition/Logistics support, and with Strategic Insight for Program Management Support.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DT&E (PHD)	WR	NSWC PHD : Port Hueneme, CA	94.481	3.848	Jan 2016	6.671	Nov 2016	5.286	Nov 2017	-		5.286	Continuing	Continuing	Continuing
DT&E (SCSC-WI)	WR	SCSC-WI : Wallops Is, VA	61.384	6.926	Jan 2016	5.200	Nov 2016	6.954	Nov 2017	-		6.954	Continuing	Continuing	Continuing
DT&E (JHU/APL)	SS/CPFF	JHU/APL : Laurel, MD	19.819	2.303	Feb 2016	3.165	Dec 2016	2.929	Dec 2017	-		2.929	Continuing	Continuing	Continuing
DT&E (Corona)	WR	NSWC Corona : Corona, CA	8.626	2.992	Jan 2016	2.870	Nov 2016	2.959	Nov 2017	-		2.959	Continuing	Continuing	Continuing
DT&E (RAM/CIWS//ESSM) (RSC)	SS/CPFF	RSC(5432/5410) : Tucson, AZ	3.153	0.535	Feb 2016	0.412	Nov 2016	0.424	Nov 2017	-		0.424	Continuing	Continuing	Continuing
DT&E/CST (DD - CST)	WR	NSWC DD : Dahlgren, VA	14.670	5.434	Jan 2016	6.211	Nov 2016	6.404	Nov 2017	-		6.404	Continuing	Continuing	Continuing
DT&E (COTF)	WR	OPTEVFOR : Norfolk, VA	3.812	0.828	Jan 2016	1.194	Nov 2016	1.231	Nov 2017	-		1.231	Continuing	Continuing	Continuing
DT&E (CDSA-DN)	WR	CDSA DN : Dam Neck, VA	4.077	0.579	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy** **Date: May 2017**

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 2178 / QRCC
--	--	---

<b>Test and Evaluation (\$ in Millions)</b>				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DT&E (engility)	C/CPIF	Engility : Virginia Beach, VA	0.000	1.820	Feb 2016	1.217	Dec 2016	1.292	Dec 2017	-		1.292	0.000	4.329	-
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 : Norfolk, 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
<b>Subtotal</b>			224.581	25.265		26.940		27.479		-		27.479	-	-	-

**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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	921.590	133.299	127.578	148.982	-	148.982	-	-	-

**Remarks**



**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: FY 2018 Navy</b>		<b>Date: May 2017</b>
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 2178 / QRCC

FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
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

<b>Proj 2178</b>																												
SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 9) TAAF																												
SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 10) S/W DCT1																												
SSDS MK 2 MOD 5C (LSD) - FSIT / FQT																												
SSDS MK 2 MOD 5C (LSD) - TAAF																												
SSDS MK 2 MOD 5C (LSD) - T&E - ENG TEST/DT/DT ASSIST "I" PHASE 1/Combat System Test (CST) @WI																												
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 50 CSSQT DT PHASE 2																												
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 45 CSSQT																												
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 52 CSSQT																												
SSDS MK2 MOD 5C (LSD) - T&E - CST @ WI																												
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 51 CSSQT																												
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 49 CSSQT																												
SSDS MK 2 MOD 5C (LSD) - T&E - (SDTS) - DT/OT III I/PHASE 3/ET12 /TRKEX																												
SSDS MK 2 MOD 4B - LHA6 -T&E - DT/OTIII PHASE 3 IA TEST (CVPA)																												

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
SSDS MK 2 MOD 4B - LHA6 -T&E - DT/0TIII PHASE 3 IA TEST (AA)							■																					
SSDS MK 2 MOD 4B - LHA6 -T&E - DT/0TIII PHASE 3 SURFACE / LOW-SLOW GUNEX							■																					
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - FSIT 3 / FQT 1/2	■	■	■	■																								
SSDS MK 2 MOD 3C / 1C - LHD2 / CVN 72 ACB12 / TI12 - T&E - CSA @ WI			■																									
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - CST @ WALLEOPS											■	■																
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - LHD 2 CSSQT																												
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - CVN 72 CSSQT																												
SSDS MK2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - SIT/ET/TRKEX @ WI	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - / SW DCTI 4			■	■	■	■	■	■																				
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 4 / FQT 3				■																								
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - T&E - DT III J PHASE 2 / ET10 @ CVN 78																												
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 5 / FQT 4																												
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - T&E CST #1 @ WI																												
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - TEST ANALYZE & FIX (TAAF)																												

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 2178 / QRCC
--	--	---

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
SDTS - SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FCL RISK REDUCTION TRKEX / MSLEX																												
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 6 / FQT 5																												
SDTS - SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - T&E - DT/OT III J/PHASE 3/ ET09																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CST #2 @ WI																												
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 7 / FQT 6																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E CSSQT																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CST #3 @ WI																												
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 8 / FQT 7																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CST #4 @WI																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - DT/OT III J PHASE 2/ ET10																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - C2X																												
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - JTFX																												
SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - HW PDR																												

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - SRR / SFR	■																											
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 1				■																								
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 2							■																					
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 4											■																	
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 5													■															
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E - SIT / ET @ WI																												
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - FSIT / FQT																												
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 3																												
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E - T&E CST @ WI																												
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - TAAF																												
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - FSIT / FQT																												
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - TAAF																												
"SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - STUDIES/ANALYSIS/Top Level Requirements																												
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E - SIT / ET @ WI																												

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E CST @ WI																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - SoS SRR																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - SoS SFR																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - IPR 1 - Rel 1 / Rel 2																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - IPR 2																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC-FSIT/FQT REL 1																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC-FSIT/FQT REL 2																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 1 / 2 SIT / ET @ WI																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 1 CST																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - TAAF																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 2 CST																												
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 2 CST -																												
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - ANALYSIS / TOP LEVEL REQ'T / CPP /COI																												
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - COMBAT SYSTEM REQUIREMENTS/ INTERFACE DOC (CSRD)																												

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 2178 / QRCC
--	--	---

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - DRAFT RFP							■																					
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - FINAL RFP								■																				
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - SoS SRR / SFR 1											■																	
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - SoS SRR / SFR 2												■																
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - CSEA CONTRACT AWARD															■													
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - ELEMENT SRR / SFR															■													
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 1 SSR/PDR																■												
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - ELEMENT SRR / SFR -																■												
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 1 T&E SIT/ET @WI																■												
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - SS ECP CONTRACT AWARD																			■									
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 1 FSIT / FQT																				■								
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 2 SSR/PDR																								■				
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - IPR 1																											■	
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - IPR 2																											■	

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy** **Date: May 2017**

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 2178 / QRCC
--	--	---

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022							
	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				
SSDS MK 2 ACB 20 / EASR/ ERS / TI-22 - TAAF																																
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 2 T&E SIT/ET @WI																																
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 2 FSIT / FQT																																
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - TAAF																																

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details: FY 2018 Navy</b>		<b>Date: May 2017</b>
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 2178</b>				
SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 9) TAAF	1	2016	4	2017
SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 10) S/W DCT1	2	2017	2	2018
SSDS MK 2 MOD 5C (LSD) - FSIT / FQT	2	2018	3	2018
SSDS MK 2 MOD 5C (LSD) - TAAF	3	2018	4	2018
SSDS MK 2 MOD 5C (LSD) - T&E - ENG TEST/DT/DT ASSIST "I" PHASE 1/Combat System Test (CST) @WI	1	2016	2	2016
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 50 CSSQT DT PHASE 2	1	2016	2	2016
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 45 CSSQT	2	2016	3	2016
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 52 CSSQT	4	2016	2	2017
SSDS MK2 MOD 5C (LSD) - T&E - CST @ WI	2	2016	2	2016
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 51 CSSQT	3	2017	4	2017
SSDS MK 2 MOD 5C (LSD) - T&E - LSD 49 CSSQT	2	2018	3	2018
SSDS MK 2 MOD 5C (LSD) - T&E - (SDTS) - DT/OT III I/PHASE 3/ET12 /TRKEX	3	2016	3	2016
SSDS MK 2 MOD 4B - LHA6 -T&E - DT/0TIII PHASE 3 IA TEST (CVPA)	4	2016	1	2017
SSDS MK 2 MOD 4B - LHA6 -T&E - DT/0TIII PHASE 3 IA TEST (AA)	2	2017	2	2017
SSDS MK 2 MOD 4B - LHA6 -T&E - DT/0TIII PHASE 3 SURFACE / LOW-SLOW GUNEX	2	2017	2	2017
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - FSIT 3 / FQT 1/2	1	2016	3	2016
SSDS MK 2 MOD 3C / 1C - LHD2 / CVN 72 ACB12 / TI12 - T&E - CSA @ WI	3	2016	3	2016
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - CST @ WALLEOPS	4	2016	3	2017
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - LHD 2 CSSQT	3	2017	4	2017
SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - CVN 72 CSSQT	4	2017	1	2018



**UNCLASSIFIED**

**Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy** **Date: May 2017**

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
SSDS MK2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - SIT/ET/TRKEX @ WI	1	2016	3	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - / SW DCTI 4	3	2016	2	2017
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 4 / FQT 3	4	2016	4	2016
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 -T&E - DT III J PHASE 2 / ET10 @ CVN 78	3	2017	2	2018
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 5 / FQT 4	3	2017	4	2017
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 -T&E CST #1 @ WI	4	2017	1	2018
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - TEST ANALYZE & FIX (TAAF)	4	2017	2	2020
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	4	2018	2	2019
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CST #2 @ WI	4	2018	4	2018
SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 7 / FQT 6	2	2019	3	2019
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E CSSQT	3	2019	4	2019
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CST #3 @ WI	3	2019	3	2019
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 - T&E - CST #4 @WI	3	2020	3	2020
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - DT/OT III J PHASE 2/ ET10	3	2021	4	2021
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - C2X	1	2022	2	2022
SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - JTFX	2	2022	2	2022
SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - HW PDR	2	2016	2	2016
SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - SRR / SFR	2	2016	2	2016
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 1	4	2016	4	2016
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 2	2	2017	2	2017

**UNCLASSIFIED**

**Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 4	2	2018	2	2018
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 5	4	2018	4	2018
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E - SIT / ET @ WI	3	2017	4	2017
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - FSIT / FQT	3	2017	4	2017
SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H / TI-16 - IPR 3	4	2017	4	2017
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E - T&E CST @ WI	1	2018	2	2018
SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - TAAF	1	2018	4	2018
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - FSIT / FQT	1	2019	2	2019
SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - TAAF	3	2019	4	2019
"SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - STUDIES/ANALYSIS/Top Level Requirements	1	2016	3	2016
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 / TFCA BDC - SoS SRR	2	2016	3	2016
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - SoS SFR	4	2016	1	2017
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - IPR 1 - Rel 1 / Rel 2	2	2017	3	2017
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - IPR 2	4	2017	4	2017
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC-FSIT/FQT REL 1	3	2018	4	2018
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC-FSIT/FQT REL 2	4	2018	1	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 1 / 2 SIT / ET @ WI	4	2018	1	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 1 CST	2	2019	2	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - TAAF	1	2019	3	2020
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 2 CST	4	2019	4	2019
SSDS MK 2 FCLIP PHASE 2 / FTIIP / TFCA BDC - T&E - REL 2 CST -	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - ANALYSIS / TOP LEVEL REQ'T / CPP / COI	1	2016	1	2016

**UNCLASSIFIED**

**Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy** **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 2178 / QRCC
--	---	---

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - COMBAT SYSTEM REQUIREMENTS/ INTERFACE DOC (CSR D)	2	2016	2	2017
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - DRAFT RFP	3	2017	3	2017
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - FINAL RFP	4	2017	4	2017
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - SoS SRR / SFR 1	1	2018	1	2018
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - SoS SRR / SFR 2	4	2018	4	2018
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - CSEA CONTRACT AWARD	2	2019	2	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - ELEMENT SRR / SFR	2	2019	2	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 1 SSR/PDR	3	2019	3	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - ELEMENT SRR / SFR -	4	2019	4	2019
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 1 T&E SIT/ET @WI	4	2019	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - SS ECP CONTRACT AWARD	1	2020	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 1 FSIT / FQT	1	2020	1	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 2 SSR/PDR	4	2020	4	2020
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - IPR 1	2	2021	2	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - IPR 2	2	2021	2	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - TAAF	2	2020	4	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 2 T&E SIT/ET @WI	4	2021	4	2021
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - REL 2 FSIT / FQT	1	2022	2	2022
SSDS MK 2 ACB 20 / EASR / ERS / TI-22 - TAAF	3	2022	4	2022

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification: FY 2018 Navy</b>										<b>Date: May 2017</b>		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>				<b>Project (Number/Name)</b> 3172 / <i>Joint Non-Lethal Weapons</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3172: <i>Joint Non-Lethal Weapons</i>	35.621	4.806	4.177	5.177	-	5.177	2.990	3.056	3.122	3.185	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, ship entanglement systems, and audible 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). 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 assessing the intent of personnel and controlling the potential threat as early as possible.

HALLTS is a single-operator, man-portable, hailing and warning system developed to enhance the ability of security forces to effectively execute escalation of force procedures. HALLTS integrates three COTs, Navy-fielded non-lethal devices, consisting of an acoustic loud-hailing device, a high intensity white light and a dazzling green beam laser, using a common system controller and common mounting options. HALLTS reduces the manpower requirements for operation of multiple non-lethal devices and enhance the execution of escalation of force procedures.

MVS technologies are means of defending against small, attacking vessels while utilizing methodologies designed to incapacitate personnel or materiel while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment. MVS technologies are being studied with consideration for the defense of U.S. Navy personnel, material, and operations.

Develop Visual Augmentation Systems (VAS) in support of expeditionary / anti-terrorism / force protection missions. Technologies include, but are not limited to: image intensification devices, thermal imaging systems, and laser systems. Current efforts are focused on the M2HB/M2A1 Weapon Sight (M2WS), VAS Integration within the Advanced Bomb Suit Helmet, Visible and Infrared Portable Imager and Recorder (VIPIR), and AN/PVS-31B (White Phosphor) Wide Field of View Goggle. 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.

Integration of VAS within the bomb suit helmet will allow EOD technicians freedom of movement to operate in low light level conditions with a modular sensor/display and will provide increased capability to clearly detect, locate, and identify explosive ordnance.

The VIPIR 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 can assess nearby craft and engage appropriately. The VIPIR contains an integrated recording (video/audio) capability which is used to document the incident.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
--	-----------------------

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)	<b>Project (Number/Name)</b> 3172 / Joint Non-Lethal Weapons
--	--	---

The AN/PVS-31B (White Phosphor) Wide Field of View Goggle (WFOV) provides the user with a lightweight/white phosphor goggle with an increased field of view (FOV) from 40 degrees to 80 degrees. The increase in FOV provides the user with an additional 30% tactical advantage and improved situational awareness. The AN/PVS-31B WFOV enhances the user's capability during Close Quarters Combat (CQC) and Counter-IED threat identification/defeat missions.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<b>Title:</b> Joint Non-Lethal Weapons Development	4.806	4.177	5.177	0.000	5.177
<b>Articles:</b>	-	-	-	-	-
<b>FY 2016 Accomplishments:</b>					
Produce 8 LROI systems and complete developmental Technical Data Package (TDP). Performed a Military Utility Assessment (MUA) with NECC for LROI and HALLTS. Perform LROI engineering updates identified during NECC MUA. Initiate LROI program of record documentation and begin approval process. Receive HALLTS feedback from NECC fleet users and incorporate their input via ECPs. Complete MVS CDD and begin JCIDS process.					
<b>FY 2017 Plans:</b>					
Continue performing HALLTS engineering updates identified during fleet user feedback and assessment; and conduct test and evaluation. Complete the LROI program of record transition strategy. Continue to refine design requirements for LROI and HALLTS based on feedback from the MUA. Begin development effort of other emerging non-lethal technologies for Maritime Vessel Stopping and refine requirements and requirements documentation.					
<b>FY 2018 Base Plans:</b>					
Development of next generation LROI baseline and any additional engineering updates and issue RFP. Development of Maritime Vessel Stopping technologies. Issue RFP for HALLTS production contract to fully meet the fielding requirement of units to NECC.					
Additional Systems Engineering/Operational Test and Evaluation of M2WS production demonstration models (Phase II). Development of VIPIR system to replace the Long Range Thermal Video System due to obsolescence.					
<b>FY 2018 OCO Plans:</b>					
N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	4.806	4.177	5.177	0.000	5.177

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 3172 / <i>Joint Non-Lethal Weapons</i>

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2016	FY 2017	FY 2018	FY 2018	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Cost To	
			Base	OCO	Total					Complete	Total Cost
• OPN/8128: <i>NCW Forces Active</i>	0.000	5.744	6.235	-	6.235	7.805	7.805	7.961	0.000	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The initial LROI systems are being designed, developed, and deployed as a Rapid Acquisition and will be transitioned to a Program of Record (PoR). A developmental Technical Data Package (TDP) will be developed as part of the Rapid Acquisition effort. The developmental TDP will be included in the Request for Proposal (RFP) to the industry to be further refined for a production-level TDP to be used for PoR. The RFP including the production-level TDP will be provided to the industry to solicit offers for the LRIP production and subsequently for full rate production for a total of 100 LROI systems to be fielded to NECC.

In FY16, initial HALLTS systems were developed and tested. 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 117 HALLTS systems to be fielded to NECC.

The development of the M2WS will occur through two separately funded phases. Phase I was funded in FY 2016/2017 and consists of developing Production 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.

Initial VIPIR 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 VIPIR systems to be fielded to NECC.

**E. Performance Metrics**

Successfully produce LROI systems, conduct Military Utility Assessment (MUA) with Navy Expeditionary Combat Command (NECC) sailors, and transition to a PoR.

Successfully conduct HALLTS testing and fielding to fleet users.

Successfully produce M2WS and VIPIR systems to support NECC mission requirements and transition to FRP within the VAS PoR. Successfully conduct testing and fielding to fleet users.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification: FY 2018 Navy</b>										<b>Date: May 2017</b>		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604755N / Ship Self Def (Detect & Cntrl)				<b>Project (Number/Name)</b> 3358 / SSDS Training Improvement Program			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3358: SSDS Training Improvement Program	1.854	7.124	2.864	7.554	-	7.554	7.473	7.498	8.867	9.045	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The SSDS Total Ship Training Capability (TSTC) provides enhancements and upgrades to the training components within the combat system 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.

PU 3358 funds the development and/or integration of TSTC improvements into the SSDS MK2 ACB-12, FCLIP Phase 2/FTIIP / TFCA BDC, and ACB-20 / EASR / ERS (Enterprise Air Search Radar/Enterprise Radar Suite) baselines and TI-12/TI-16/TI-22 configurations. The integrated SSDS MK2 TSTC improvements will be included in the SSDS MK2 baseline documentation, testing and certification. The planning schedule for the SSDS MK2 baselines are documented in QRCC Project (PU 2178). The TSTC improvements encompass physical and functional upgrades to the existing SSDS MK2 onboard training capabilities and configuration implemented with Battle Force Tactical Trainer (BFTT). Planned TSTC improvements include integration with the SSDS MK2 TI-12/TI-16/TI-22 Open Architecture Computing Environment (OACE) for TSTC implementation.

TSTC provides realistic joint warfare training across the spectrum of armed conflict, realistic unit level team training in all warfare areas. 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 Fleet Synthetic Trainers (FSTs)/Live Virtual Constructive (LVC) exercises.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
<b>Title:</b> SSDS Total Ship Training Capability	7.124	2.864	7.554	0.000	7.554
<b>Articles:</b>	-	-	-	-	-
<b>FY 2016 Accomplishments:</b>					

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
--	-----------------------

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 3358 / <i>SSDS Training Improvement Program</i>
--	---	---

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>-Completed adaptation, integration, test and delivery of DBR simulation software (Phase 1) as part of SSDS MK2 ACB-12 / TI-12 for CVN78 in-port fire control loop training capability in support of CVN78 ship delivery to the Navy.</p> <p>- Initiated additional software modifications for integration of DBR simulation software (Phase 2) to support CVN78 underway training as part of the CVN78 SSDS MK2 ACB-12 / TI-12 baseline.</p> <p>- Started the incorporation of TSTC functional requirements into SSDS Integrated Combat System Requirements Documentation for the first FCLIP Phase 2 / FTIIP / TFCA BDC baseline with the initiation of system engineering and development of documentation to support System of Systems Requirements Review / Functional Review (SoS SRR/SFR), and Combat System element SRRs/SFRs.</p> <p>- Initiated development of requirements to support TSTC capability improvements to support tactical training requirements of SSDS ACB-20 / EASR / ERS. Investigate options to integrate of Full Motion Video capability to provide required realism/fidelity for Surface Warfare Training.</p> <p>-Initiated development of the requirements to support re-hosting Battle Force Tactical Training (BFTT) / Advanced Training Domain (ATD) capability into SSDS MK2 TI-16 Hardware. Developed a Concept of Integration (COI) paper that documents the system interface impacts for this re-host.</p> <p>- Continued supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training (FST). Supported analysis of test results and documenting the System of System performance for SSDS baselines.</p> <p>- Completed the development of a Tactical Data Link (TDL) Gateway software component for utilization within the Battle Force Tactical Training (BFTT) Family of Systems in support of Integrated Training with the MH-60R simulation capability provided with CV-TSC for CVN-78 and CVN-72.</p> <p>- FY16 includes additional funds to develop ESSM BLK 2 and Electronic Warfare shipboard integrated training systems upgrades, that are commensurate with the tactical upgrades.</p> <p><b><i>FY 2017 Plans:</i></b></p>					



**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy	<b>Date:</b> May 2017
--	-----------------------

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 3358 / <i>SSDS Training Improvement Program</i>
--	---	---

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>- Continue development of TSTC requirements into SSDS Integrated Combat System (ICS) for the first FCLIP Phase 2 / FTIIP / TFCA BDC baselines with the completion of the SSDS MK2 software specifications and development (Design, code, and integration test) and conduct of associated system / software design reviews.</p> <p>- Complete SoS requirements, functional allocation and interface requirements to support the TSTC capability improvements for tactical training requirements for the SSDS ACB 20 / EASR / ERS baselines.</p> <p>- Initiate requirements to support simulating real world environments within SSDS MK2 shipboard sensors for Anti-Access / Area Denial (A2AD) training.</p> <p>- Complete software modification, integration, test and delivery of DBR simulation as part of CVN 78 SSDS MK2 ACB-12 / TI-12 baseline for CVN78 in-port and underway fire control loop training capabilities in support of CVN78 CSSQT and deployment.</p> <p>- Continue development of re-hosting Battle Force Tactical Training (BFTT) / Advanced Training Domain (ATD) capability into SSDS MK2 TI-16 Hardware. Develop functional requirements and preliminary design in support of installation on CVN-73 and future baselines.</p> <p>- Continue supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training (FST). Support phase 2 (Surface CU's) CEC Interim Training Capability (CIT).</p> <p>-Develop ESSM BLK 2 and Electronic Warfare shipboard integrated training systems upgrades, that are commensurate with the tactical upgrades.</p> <p><b>FY 2018 Base Plans:</b></p> <p>- For the SSDS MK2 ACB-20 Baseline, initiate 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.</p> <p>- For the SSDS MK2 ACB-20 Baseline, initiate the development of the requirements to provide training for integrated and optimized employment of decoys, Electronic Attack (EA), and hard kill and soft kill weapons</p>					

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** FY 2018 Navy **Date:** May 2017

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 3358 / <i>SSDS Training Improvement Program</i>
--	---	---

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
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. Develop final design and begin implementation in support of installation on CVN-73 and future baselines.					
- Continue supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training (FST). Support phase 3 (CEC Tactical Software Full Training Support) CEC Interim Training Capability (CIT).					
- Continue requirements to support simulating real world environments within SSDS MK2 shipboard sensors for Anti-Access / Area Denial (A2AD) training.					
<b>FY 2018 OCO Plans:</b> N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	7.124	2.864	7.554	0.000	7.554

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE/0204571N/1427: <i>Surface Tactical Team Trainer (PU 1427)</i>	9.857	12.289	15.274	-	15.274	15.387	15.454	13.541	11.153	Continuing	Continuing
• RDTE/0604307N/3357: <i>AEGIS Training Improv. Prog. (PU 3357)</i>	14.624	10.458	7.856	-	7.856	6.609	5.130	5.249	5.355	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.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> FY 2018 Navy		<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604755N / <i>Ship Self Def (Detect &amp; Cntrl)</i>	<b>Project (Number/Name)</b> 3358 / <i>SSDS Training Improvement Program</i>

**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 / TFCA BDC, and ACB-20 / EASR / ERS baselines in QRCC Project (PU 2178) apply and are listed in the R-4A exhibits for PU 3358.