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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	297.670	60.394	72.772	115.396	-	115.396	113.651	74.060	63.189	28.538	Continuing	Continuing
3232: <i>Multi-Mission Signal Processor</i>	170.954	2.931	2.626	2.577	-	2.577	3.347	3.206	3.124	3.151	Continuing	Continuing
3243: <i>Shipboard Passive Electro-Optical Infrared Development</i>	42.921	46.705	61.912	103.084	-	103.084	96.221	58.255	47.851	13.002	Continuing	Continuing
3301: <i>Improved Capabilities SPY-1 Radar</i>	63.391	9.802	8.234	9.735	-	9.735	14.083	12.599	12.214	12.385	Continuing	Continuing
3408: <i>AN/SPS-49 Technical Refresh</i>	20.404	0.956	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.360

A. Mission Description and Budget Item Justification

Multi-Mission Signal Processor (MMSP): The development of MMSP provides simultaneous Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) multi-mission capability for DDG 51 class ships as part of the Aegis Modernization Program. This capability is utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1D transmitters to enable dual beam for reduced frame times and better reaction time, provides stability for all D(V) waveforms, and avoids operational degradation. The SPY-1 radar system detects, tracks, and supports engagements of a broader range of threats. MMSP improves performance in littoral, ducted clutter, electronic attack (EA), and chaff environments and provides greater commonality in computer programs and equipment. This effort also provides for the development of MMSP on Destroyers Commercial Off The Shelf (COTS) refresh and MMSP technology refresh. MMSP/AEGIS Linear Processing System (ALPS) integration provides adjunct processing for data collection. The FY24 budget request supports development of MMSP including the commencement of technology refresh to support Aegis Modernization due to Diminishing Manufacturing Sources and Material Shortages (DMSMS) and obsolescence issues. MMSP-Restoration (MMSP-R) includes software updates required on new computer platforms. Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include system security requirements. Additionally, funding is required for technology development to support integration of ALPS into MMSP-R, continuation of MMSP-R development to support AEGIS modernization and AEGIS Capability Build (ACB) 16 MMSP improvements, and MMSP-R Engineering Change Proposal (ECP)/Software updates.

Shipboard Passive Electro-Optical Infrared (SPEIR) Block I will be an open architecture system that addresses near-term capability requirements and associated gaps identified in the 2019 SPEIR Capability Development Document (CDD). This program answers an urgent counter unmanned aircraft system operational need for the Fleet to provide an initial capability by FY26. The SPEIR acquisition leverages technology developed under the Office of Naval Research's (ONR's) Combined EO/IR Surveillance and Response System (CESARS) Science and Technology (S&T) effort, specifically related to the Shipboard Panoramic EO/IR Cueing and Surveillance System (SPECSS). SPEIR Block I will provide a common 360-degree EO/IR Electronic Support (ES) capability to surface ships that will passively find, fix, track, and target current / emerging threats in support of the following warfare missions: Anti-Ship Cruise Missile (ASCM) Defense, Counter-Unmanned Aircraft Systems (UAS), Counter-Fast Attack Craft / Fast In-shore Attack Craft (FAC/FIAC), and Mobility. SPEIR Block I will consist of a passive Wide Field of View (WFOV) capability

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<p>with a 360-degree field-of-view optical sensors for autonomous detection and tracking for 24/7 day/night shipboard situational awareness. SPEIR Block I will also include an enhanced, high resolution Narrow-Medium Field of View (NFOV) and laser range-finding capability that will provide 3D target tracking, identification, and threat assessment. SPEIR Block I will have limited integration with shipboard combat systems to exchange target track data and disseminate motion imagery. This program includes risk reduction initiatives for modeling and simulation, sensor protection counter-countermeasures, Sensor Fusion Algorithms and combat system track publishing to enable limited Combat System Integration (CSI). SPEIR Block II will be a future program that will build on the modular open system architecture of Block I to address longer-term capability requirements to include an expanded spatial coverage envelope, Periscope Detection and Discrimination (PDD) and Mine Like Object (MLO) avoidance. SPEIR Block II will also provide full combat system integration and will include a government software development and integration effort for Soft-Kill Coordination System (SKCS) to manage ES engagements. The FY24 budget request supports detailed hardware and software design of the SPEIR Block I system, completion of core software builds and associated integration effort, and procurement of material for Engineering Development Models (EDMs). Scope includes execution of Critical Design Review (CDR), continued test planning, training curriculum development, and Modeling and Simulation (M&S) development and maturation. Increases from FY22-FY25 are consistent with expected ramp up of developmental activities of a new Acquisition Category II program during the Engineering and Manufacturing Development (E&MD) phase. The FY24 budget request also includes funding to support E&MD contract execution, including a major System Engineering Technical Review (SETR) event (CDR) and will also support integration activities to ensure compatibility with the Combat System. Additional funds have been received in FY24-FY27 to align with the program MS B Service Cost Position (SCP), including additional funding for SPEIR Combat System Integration tasking not previously included in this funding line. RDT&E costs are anticipated to ramp down starting in FY25 as Integration & Development Test planning is complete, EDM material procurements are completed, and all three (3) EDMs are assembled and integrated to support the execution of developmental test events prior to program transition to the Production phase.</p> <p>Improved Capabilities for SPY-1 Radar: These Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions are intended to reduce cascading failures, mitigate obsolescence issues, and improve reliability in support of Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) missions while still providing AN/ SPY-1 Radar Total Ownership Cost Reductions. Improvements, such as Solid State Insertion to address Diminishing Manufacturing Sources and Material Shortages (DMSMS), will yield reductions in annual fleet maintenance costs and is a top fleet requirement as part of the AEGIS Wholeness initiative. In addition to RM&A improvements, warfighting improvements funded in this line includes the following: Transmitter Noise Cancellation (TNC) development includes hardware/software to counter low radar cross section, low altitude threats. Side Lobe Blanking (SLB) addresses shortfalls in mixed electronic attack environment while in an Integrated Air and Missile Defense (IAMD) mode. The Ship-Based Non-Cooperative Target Recognition (SBNCTR) program Phases 2A and 3 will develop algorithms to provide classification for targets. Advanced Calibration Experiment (ACE) Phase 2 is being incorporated into Baseline 9. Elevated Radar Advanced Calibration Experiment (ERACE) Phases 1/2 and 3 incorporate into Baseline 9. Electronic Attack (EA) and Rapid Radar Capability Improvement Program (R2CIP) develop solutions for evolving EA threats. The FY24 budget request continues the development efforts of SBNCTR Phase 2A, TNC Phase 1/2, EA improvements, Digital Receiver Upgrade (DRU) (formerly digital Low Noise Amplifier (dLNA)) Requirements and Specification Analysis, and SLB Technology Development, completes Elevated Radar Advanced Calibration Experiment (ERACE) Phase 1/2, and commences ERACE Phase 3 development.</p> <p>AN/SPS-49 Technology Refresh: FY22 was the last year of funding for this program. AN/SPS-49 is the only Air Surveillance Radar on the LSD 41/49 class ships. Continued degradation and increasingly low radar availability of the AN/SPS-49 Radar is greatly impacting deployed missions, impacting safety of flight and affecting LSD Air Warfare capability and operations and as a result, AN/SPS-49 Technology Refresh is required. This AN/SPS-49 Technology Refresh will include Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions which will reduce cascading failures and mitigate obsolescence issues. In</p>		

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addition, this effort replaces key components to include: transmitter, receiver, exciter, antenna elevation servo control, radar system control, display and signal data processor (SDP). A digital receiver/exciter (DREX) with high-performance computing technology will be a key component in the new system. The current SPS-49 radar has no software so new software is being developed to mimic the current radar functions to maintain compatibility with internal and external interfaces. This effort will improve SPS-49 electronic protection, have increased surveillance range and increased slow moving small target detection, as well as reduce total ownership cost with lower unit cost and smaller size/weight/power requirements. Funding is also to complete development, test and evaluation, validation and integration of a technology refresh of the below deck hardware for the AN/ SPS-49A(V)1 Long Range Air Surveillance Radar.

B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	62.028	81.254	101.618	-	101.618
Current President's Budget	60.394	72.772	115.396	-	115.396
Total Adjustments	-1.634	-8.482	13.778	-	13.778
• Congressional General Reductions	-	-0.145			
• Congressional Directed Reductions	-	-8.337			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.634	0.000			
• Program Adjustments	0.000	0.000	12.803	-	12.803
• Rate/Misc Adjustments	0.000	0.000	0.975	-	0.975

Change Summary Explanation

- FY23 funding decrease is due to under-execution realignments (\$8.337M) and FFRDC reductions (\$.145M) for the SPEIR and SPY-1 programs.
- FY24 funding increase of \$13.778M is due to receipt of additional funding for the SPEIR program for Block 1 Milestone B Compliance with the Service Cost Position (SCP).

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy										Date: March 2023		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>				Project (Number/Name) 3232 / <i>Multi-Mission Signal Processor</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3232: <i>Multi-Mission Signal Processor</i>	170.954	2.931	2.626	2.577	-	2.577	3.347	3.206	3.124	3.151	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Multi-Mission Signal Processor (MMSP): The development of MMSP provides simultaneous Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) multi-mission capability for DDG 51 class ships as part of the Aegis Modernization Program. This capability is utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1D transmitters to enable dual beam for reduced frame times and better reaction time, provides stability for all D(V) waveforms, and avoids operational degradation. The SPY-1 radar system detects, tracks, and supports engagements of a broader range of threats. MMSP improves performance in littoral, ducted clutter, electronic attack (EA), and chaff environments and provides greater commonality in computer programs and equipment. This effort also provides for the development of MMSP on Destroyers Commercial Off The Shelf (COTS) refresh and MMSP technology refresh. MMSP/AEGIS Linear Processing System (ALPS) integration provides adjunct processing for data collection.

The FY24 budget request supports development of MMSP including the commencement of technology refresh to support Aegis Modernization due to Diminishing Manufacturing Sources and Material Shortages (DMSMS) and obsolescence issues. MMSP-Restoration (MMSP-R) includes software updates required on new computer platforms. Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include system security requirements. Additionally, funding is required for technology development to support integration of ALPS into MMSP-R, continuation of MMSP-R development to support AEGIS modernization and AEGIS Capability Build (ACB) 16 MMSP improvements, and MMSP-R Engineering Change Proposal (ECP)/Software updates.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: SYSTEMS ENGINEERING	2.931	2.626	2.577	0.000	2.577
Articles:	-	-	-	-	-
FY 2023 Plans:					
- Continue ACB16 Commercial Off The Shelf (COTS) Refresh ECPs					
- Complete Radar Integrated Product Team (IPT) support of Capability Package 22 (CP-22) Certification					
- Continue MMSP-R development to support AEGIS Modernization due to DMSMS and obsolescence issues					
- Continue to maintain alignment with the BMD Program and the associated BMD Signal Processor (BSP) adjunct to incorporate BMD capability within MMSP during AEGIS Modernization					
- Continue MMSP-R ECP/software updates					
- Continue to support ACB16 MMSP improvements					
- Complete MMSP/ALPS requirements analysis and specification update					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>	Project (Number/Name) 3232 / <i>Multi-Mission Signal Processor</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
- Commence MMSP-R/ALPS technology development					
<i>FY 2024 Base Plans:</i>					
- Continue ACB16 Commercial Off The Shelf (COTS) Refresh ECPs					
- Continue MMSP-R development to support AEGIS Modernization due to DMSMS and obsolescence issues					
- Continue to maintain alignment with the BMD Program and the associated BSP adjunct to incorporate BMD capability within MMSP during AEGIS Modernization					
- Continue to support ACB16 MMSP improvements					
- Continue MMSP-R ECP/software updates					
- Continue MMSP-R/ALPS technology development					
<i>FY 2024 OCO Plans:</i>					
N/A					
<i>FY 2023 to FY 2024 Increase/Decrease Statement:</i>					
Decrease in FY24 funding aligns with planned technology refresh development efforts.					
Accomplishments/Planned Programs Subtotals	2.931	2.626	2.577	0.000	2.577

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• OPN/0900: <i>BLI 0900/OPN DDG Modernization</i>	535.667	744.341	628.532	-	628.532	927.280	855.780	942.398	958.412	9,631.876	19,383.298

Remarks

D. Acquisition Strategy

Multi-Mission Signal Processor (MMSP) provides simultaneous AAW/BMD Multi-mission capability for AEGIS Modernization Program and leverages BMD 4.0.1 and SPY-1D (V) designs. Lockheed Martin (Moorestown, New Jersey) is awarded a sole source, cost-plus-fixed-fee, level-of-effort job order under a Basic Ordering Agreement (BOA) via NSWC Crane in support of the AEGIS weapons system, AN/SPY-1 radar. Efforts include engineering services and incidental supplies for radar readiness enhancements and improvements. Work will be performed in Moorestown, New Jersey. MMSP development efforts support integration of BMD 5.0 signal processing, and will lead to the OPN/SCN procurement for shore sites and shipsets. MMSP technology refresh will be incorporated into Baseline 9 and follow. MMSP/ALPS integration provides adjunct processing for data collection.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>	Project (Number/Name) 3232 / <i>Multi-Mission Signal Processor</i>
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
SYSTEM ENGINEERING	SS/CPFF	Lockheed Martin : Moorestown, NJ	118.086	0.063	Aug 2022	0.000		0.000		-		0.000	0.000	118.149	-
SYSTEM ENGINEERING	C/CPFF	AEGIS Techrep : Moorestown, NJ	5.904	0.037	Mar 2022	0.088	Mar 2023	0.116	Feb 2024	-		0.116	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/FP	APL/JHU : Laurel, MD	5.161	0.000		0.000		0.000		-		0.000	0.000	5.161	-
SYSTEM ENGINEERING	WR	SCSTC : Dahlgren, VA	1.815	0.068	Oct 2021	0.080	Oct 2022	0.074	Oct 2023	-		0.074	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NRL : Washington, DC	3.491	0.114	Dec 2021	0.130	Nov 2022	0.148	Nov 2023	-		0.148	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	MIPR	MIT/LL : Lexington, MA	1.453	0.000		0.000		0.000		-		0.000	0.000	1.453	-
SYSTEM ENGINEERING	WR	NSWC/DD : Dahlgren, VA	11.005	0.352	Mar 2022	0.363	Oct 2022	0.399	Oct 2023	-		0.399	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	SCSC : Wallops Island, VA	0.019	0.000		0.000		0.000		-		0.000	0.000	0.019	-
SYSTEM ENGINEERING	WR	NSWC/CR : Crane, IN	8.275	1.500	Oct 2021	1.164	Nov 2022	0.995	Oct 2023	-		0.995	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/PHD : Port Hueneme, CA	5.016	0.437	Oct 2021	0.441	Nov 2022	0.485	Oct 2023	-		0.485	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	Office of Naval Research : Arlington, VA	5.779	0.000		0.000		0.000		-		0.000	0.000	5.779	-
Subtotal			166.004	2.571		2.266		2.217		-		2.217	Continuing	Continuing	N/A

Remarks
1. Since the FY23 budget request, added LM FY22 requirement to fund MMSP-R Power Supply Test Sets.

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>	Project (Number/Name) 3232 / <i>Multi-Mission Signal Processor</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3232				
ACB16 COTS Refresh (ECPs)	1	2022	4	2028
MMSP Technology Refresh to Support AEGIS Modernization	1	2022	4	2028
MMSP ECP and Software Updates	1	2022	4	2028
MMSP/ALPS Requirements Analysis and Specifications Update	1	2022	2	2023
CP-22 Certification Support	2	2023	2	2023
MMSP/ALPS Technology Development	3	2023	1	2026
MMSP/ALPS Integration and Test	2	2026	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy										Date: March 2023		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>				Project (Number/Name) 3243 / <i>Shipboard Passive Electro-Optical Infrared Development</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3243: <i>Shipboard Passive Electro-Optical Infrared Development</i>	42.921	46.705	61.912	103.084	-	103.084	96.221	58.255	47.851	13.002	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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SPEIR Block I will consist of a passive Wide Field of View (WFOV) capability with a 360-degree field-of-view optical sensors for autonomous detection and tracking for 24/7 day/night shipboard situational awareness. SPEIR Block I will also include an enhanced, high resolution Narrow-Medium Field of View (NFOV) and laser range-finding capability that will provide 3D target tracking, identification, and threat assessment. SPEIR Block I will have limited integration with shipboard combat systems to exchange target track data and disseminate motion imagery.

This program includes risk reduction initiatives for modeling and simulation, sensor protection counter-countermeasures, Sensor Fusion Algorithms and combat system track publishing to enable limited Combat System Integration (CSI). SPEIR Block II will be a future program that will build on the modular open system architecture of Block I to address longer-term capability requirements to include an expanded spatial coverage envelope, Periscope Detection and Discrimination (PDD) and Mine Like Object (MLO) avoidance. SPEIR Block II will also provide full combat system integration and will include a government software development and integration effort for Soft-Kill Coordination System (SKCS) to manage ES engagements.

The FY24 budget request supports detailed hardware and software design of the SPEIR Block I system, completion of core software builds and associated integration effort, and procurement of material for Engineering Development Models (EDMs). Scope includes execution of Critical Design Review (CDR), continued test planning, training curriculum development, and Modeling and Simulation (M&S) development and maturation. Increases from FY22-FY25 are consistent with expected ramp up of developmental activities of a new Acquisition Category II program during the Engineering and Manufacturing Development (E&MD) phase. The FY24 budget request also includes funding to support E&MD contract execution, including a major System Engineering Technical Review (SETR) event (CDR) and will also support integration activities to ensure compatibility with the Combat System. Additional funds have been received in FY24-FY27 to align with the program MS B Service Cost

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Position (SCP), including additional funding for SPEIR Combat System Integration tasking not previously included in this funding line. RDT&E costs are anticipated to ramp down starting in FY25 as Integration & Development Test planning is complete, EDM material procurements are completed, and all three (3) EDMs are assembled and integrated to support the execution of developmental test events prior to program transition to the Production phase.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
Title: SPEIR Block I Systems Engineering		FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
	Articles:	14.813	15.147	15.449	0.000	15.449
		-	-	-	-	-
FY 2023 Plans:						
- Continue support of Engineering Development Model (EDM) hardware and software development and integration						
- Continue review and assessment of contract deliverables						
- Prepare for and conduct Preliminary Design Review (PDR)						
- Continue development of training curriculum						
- Continue test planning for Design Verification Testing (DVT) and Environmental Qualification Testing (EQT)						
- Continue test program Modeling and Simulation (M&S) development and maturation						
- Commence integrated topside design activities for large deck ship classes						
FY 2024 Base Plans:						
- Continue to support and oversee Engineering Development Model (EDM) hardware and software development and integration						
- Continue review and assessment of contract deliverables						
- Continue systems engineering activities for detailed design						
- Prepare and conduct Critical Design Review (CDR)						
- Continue test program Modeling and Simulation (M&S) development and maturation						
- Continue integrated topside design activities for large deck ship classes						
- Support integration activities to ensure compatibility with Combat System						
- Perform test planning for Formal Qualification Testing (FQT)						
FY 2024 OCO Plans:						
N/A						
FY 2023 to FY 2024 Increase/Decrease Statement:						
Increase in FY24 aligns with planned development efforts.						
Title: SPEIR Block I Development		FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
	Articles:	31.892	46.765	87.635	0.000	87.635
		-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p><i>FY 2023 Plans:</i></p> <ul style="list-style-type: none"> - Commence purchase of Long Lead Material items for up to three (3) Engineering Development Model (EDM) builds - Continue Engineering & Manufacturing Development (E&MD) design activities - Commence development of end item software builds - Complete Release 1 Software Build - Prepare for and conduct Preliminary Design Review (PDR) - Development and initial delivery of Interface Control Documents - Development and initial delivery of Logistics Products Data - Completion of risk management framework Step 3: Implement Security Controls - Continue integrated topside design activities for DDG 51 class <p><i>FY 2024 Base Plans:</i></p> <ul style="list-style-type: none"> - Continue Engineering & Manufacturing Development (E&MD) design activities - Continue development of end item software builds - Complete Release 2 and Release 3 software builds - Prepare for and conduct Critical Design Review (CDR) - Purchase all remaining material for three (3) EDM builds - Perform test planning for FQT and Operational Assessment (OA) - Execute engineering testing at component and subsystem level - Commence integration of EDM units - Commence integrated topside design activities for large deck ship classes - Commence Combat System Integration engineering efforts <p><i>FY 2024 OCO Plans:</i> N/A</p> <p><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> Increase in FY24 is required to support Critical Design Review (CDR), additional software build deliveries, the procurement of all materials for three (3) EDMs, execution of component and subsystem-level engineering testing, and awarding the contract for Combat System Integration engineering efforts. Additional funds have been received in FY24 to align with the program MS B Service Cost Position (SCP), including additional funding for SPEIR Combat System Integration tasking not previously included in this funding line.</p>					
Accomplishments/Planned Programs Subtotals	46.705	61.912	103.084	0.000	103.084

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3243 / <i>Shipboard Passive Electro-Optical Infrared Development</i>

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

<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>			<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• OPN/2981: <i>SPEIR BLOCK 1</i>	0.000	0.000	37.784	37.784	75.568	27.872	28.590	29.146	29.730	Continuing	Continuing

Remarks

D. Acquisition Strategy

SPEIR will develop initial capability and required upgrades based on integrating technology advances and adding functional capabilities in an evolutionary fashion. Each Block acquisition program will be developed and contracted in an individual yet coordinated and overlapping fashion. Specifically, SPEIR involves the work performed under the CESARS program sponsored by ONR and transitioning the passive EO/IR component (SPECSS) which focuses on designing/architecting an advanced, integrated, EO/IR WFOV surveillance capability system for Naval Surface Platforms. The SPEIR program awarded a cost-plus fixed fee contract for Engineering and Manufacturing Development (E&MD) in April 2022. This contract includes fixed price incentive fee options for future procurement of Low Rate Initial Production (LRIP) units following Milestone C planned for FY25. The initial E&MD contract includes the procurement of a production-level Technical Data Package (TDP) to support full and open competition for future procurement of additional LRIP and Full Rate Production (FRP) units.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>	Project (Number/Name) 3243 / <i>Shipboard Passive Electro-Optical Infrared Development</i>
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
SPEIR Block 1 Development	C/CPIF	L3 Harris : Mason, OH	13.842	31.892	Apr 2022	46.765	Nov 2022	77.429	Oct 2023	-		77.429	Continuing	Continuing	Continuing
SPEIR Block 1 Combat System Integration	C/CPIF	TBD : TBD	0.000	0.000		0.000		10.206	Oct 2023	-		10.206	Continuing	Continuing	Continuing
Subtotal			13.842	31.892		46.765		87.635		-		87.635	Continuing	Continuing	N/A

Remarks

1) Increase from FY23 to FY24 is required to support completion of detailed design work, execution of Critical Design Review, procurement of all material for Engineering Development Models, delivery of tactical software builds, initial integration of EDM units, and initial efforts for Combat System Integration. Additional funds have been received in FY24 since PB23 to align with the program MS B Service Cost Position (SCP), including additional funding for SPEIR Combat System Integration tasking not previously included in this funding line.

2) Decrease in FY23 since the FY23 budget request is due to funding reduction resulting in less development effort than previously planned.

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
SPEIR Block I Integrated Logistics Support	WR	NSWC Crane : Crane, IN	1.077	0.750	Oct 2021	0.765	Nov 2022	0.780	Nov 2023	-		0.780	Continuing	Continuing	Continuing
SPEIR Block I Integrated Logistics Support	WR	NAVSUP (ILA) : Mechanicburg, PA	0.007	0.000		0.000		0.000		-		0.000	0.000	0.007	-
SPEIR Block I Systems Engineering Support	WR	NSWC Crane : Crane, IN	2.634	2.478	Oct 2021	2.508	Nov 2022	2.560	Nov 2023	-		2.560	Continuing	Continuing	Continuing
SPEIR Block I Systems Engineering Support	WR	NSWC Dahlgren : Dahlgren, VA	0.574	0.900	Jan 2022	0.612	Nov 2022	0.624	Nov 2023	-		0.624	Continuing	Continuing	Continuing
SPEIR Block I Systems Engineering Support	WR	NRL : Washington, DC	1.324	1.230	Mar 2022	1.255	Mar 2023	1.280	Nov 2023	-		1.280	Continuing	Continuing	Continuing
SPEIR Block I Systems Engineering Support	SS/CPFF	APL : Laurel, MD	1.713	1.800	Dec 2021	1.815	Nov 2022	1.851	Nov 2023	-		1.851	Continuing	Continuing	Continuing
SPEIR Block I Systems Engineering Support	MIPR	MIT-LL : Cambridge, MA	0.897	0.523	Mar 2022	0.612	Nov 2022	0.624	Nov 2023	-		0.624	Continuing	Continuing	Continuing
SPEIR Block I Systems Engineering Support	SS/CPFF	DLA : Washington, DC	6.865	0.000		0.000		0.000		-		0.000	0.000	6.865	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy												Date: March 2023			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 5				PE 0604501N / Advanced Above Water Sensors				3243 / Shipboard Passive Electro-Optical Infrared Development							
Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
SPEIR Block I Systems Engineering Support	SS/CPFF	DTIC : Fort Belvoir, VA	2.501	0.000		0.000		0.000		-		0.000	0.000	2.501	-
SPEIR Block I Systems Engineering Support	SS/CPFF	PEO STRI : Orlando, FL	1.248	0.000		0.000		0.000		-		0.000	0.000	1.248	-
SPEIR Block I Platform Integration Studies	C/BA	BIW : Bath, ME	0.000	0.000		0.306	Mar 2023	0.312	Nov 2023	-		0.312	Continuing	Continuing	Continuing
SPEIR Sensor Fusion	MIPR	GTRI : Atlanta, GA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
SPEIR Sensor Fusion	WR	NSWC Dahlgren : Dahlgren, VA	0.238	0.480	Jan 2022	0.235	Mar 2023	0.240	Nov 2023	-		0.240	Continuing	Continuing	Continuing
SPEIR Sensor Fusion	SS/CPFF	APL : Laurel, MD	0.788	0.500	Dec 2021	0.510	Mar 2023	0.520	Nov 2023	-		0.520	Continuing	Continuing	Continuing
SPEIR Sensor Fusion	WR	NSWC Crane : Crane, IN	1.101	0.900	Oct 2021	1.173	Mar 2023	1.196	Nov 2023	-		1.196	Continuing	Continuing	Continuing
SPEIR Track Publishing	WR	NSWC Dahlgren : Dahlgren, VA	0.872	0.500	Jan 2022	0.510	Nov 2022	0.520	Nov 2023	-		0.520	Continuing	Continuing	Continuing
SPEIR Track Publishing	SS/CPFF	APL : Laurel, MD	0.338	0.500	Dec 2021	0.510	Nov 2022	0.520	Nov 2023	-		0.520	Continuing	Continuing	Continuing
Subtotal			22.177	10.561		10.811		11.027		-		11.027	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
Developmental Test & Evaluation (DT&E)	WR	NSWC Crane : Crane, IN	1.670	1.300	Jan 2022	1.326	Nov 2022	1.353	Nov 2023	-		1.353	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NRL : Washington, DC	2.486	0.900	Mar 2022	0.918	Nov 2022	0.937	Nov 2023	-		0.937	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	SS/CPFF	APL : Laurel, MD	1.070	0.600	Dec 2021	0.612	Nov 2022	0.624	Nov 2023	-		0.624	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	COMOPTEVFOR : Norfolk, VA	0.326	0.152	Sep 2022	0.155	Dec 2022	0.158	Dec 2023	-		0.158	Continuing	Continuing	Continuing
Subtotal			5.552	2.952		3.011		3.072		-		3.072	Continuing	Continuing	N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3243 / <i>Shipboard Passive Electro-Optical Infrared Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3243				
Sensor Fusion Maturation	1	2022	1	2027
Track Publishing Maturation	1	2022	2	2027
Test Planning, Modeling & Simulation	1	2022	3	2027
Milestone B	3	2022	3	2022
E&MD Contract Award	3	2022	3	2022
Engineering & Manufacturing Development (E&MD)	3	2022	2	2026
Integrated Baseline Review (IBR)	4	2022	4	2022
System Requirements Review/System Functional Review (SRR/SFR)	4	2022	4	2022
Preliminary Design Review (PDR)	3	2023	3	2023
Combat System Integration	1	2024	2	2027
Critical Design Review (CDR)	3	2024	3	2024
Test and Certification	3	2024	3	2027
LRIP Long Lead Material (LLM) Authorization	4	2024	4	2024
LRIP LLM Option Award	4	2024	4	2024
Formal Qualification Test (FQT) / Environmental Qualification Test (EQT) Integrated Testing (IT)	2	2025	1	2026
Milestone C	4	2025	4	2025
LRIP Option Award	4	2025	4	2025
Software Upgrades	4	2025	4	2028
Operational Assessment (OA)	4	2025	4	2025
Land Based Test (LBT)	1	2026	1	2027

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3243 / <i>Shipboard Passive Electro-Optical Infrared Development</i>

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LRIP Delivery	3	2026	3	2026
Test Ship Availability (DDG TBD)	4	2026	2	2027
Tech Eval/Initial Operational Test & Evaluation (IOT&E)	2	2027	3	2027
Initial Operational Capability (IOC)	4	2027	4	2027
Full Rate Production (FRP)	4	2027	4	2027
FRP Contract Award	4	2027	4	2027

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy										Date: March 2023		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>				Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3301: <i>Improved Capabilities SPY-1 Radar</i>	63.391	9.802	8.234	9.735	-	9.735	14.083	12.599	12.214	12.385	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Improved Capabilities for SPY-1 Radar: These Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions are intended to reduce cascading failures, mitigate obsolescence issues, and improve reliability in support of Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) missions while still providing AN/ SPY-1 Radar Total Ownership Cost Reductions. Improvements, such as Solid State Insertion to address Diminishing Manufacturing Sources and Material Shortages (DMSMS), will yield reductions in annual fleet maintenance costs and is a top fleet requirement as part of the AEGIS Wholeness initiative. In addition to RM&A improvements, warfighting improvements funded in this line includes the following: Transmitter Noise Cancellation (TNC) development includes hardware/software to counter low radar cross section, low altitude threats. Side Lobe Blanking (SLB) addresses shortfalls in mixed electronic attack environment while in an Integrated Air and Missile Defense (IAMD) mode. The Ship-Based Non-Cooperative Target Recognition (SBNCTR) program Phases 2A and 3 will develop algorithms to provide classification for targets. Advanced Calibration Experiment (ACE) Phase 2 is being incorporated into Baseline 9. Elevated Radar Advanced Calibration Experiment (ERACE) Phases 1/2 and 3 incorporate into Baseline 9. Electronic Attack (EA) and Rapid Radar Capability Improvement Program (R2CIP) develop solutions for evolving EA threats.

The FY24 budget request continues the development efforts of SBNCTR Phase 2A, TNC Phase 1/2, EA improvements, Digital Receiver Upgrade (DRU) (formerly digital Low Noise Amplifier (dLNA)) Requirements and Specification Analysis, and SLB Technology Development, completes Elevated Radar Advanced Calibration Experiment (ERACE) Phase 1/2, and commences ERACE Phase 3 development.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Improved Capabilities SPY-1 Radar	9.802	8.234	9.735	0.000	9.735
Articles:	-	-	-	-	-
FY 2023 Plans:					
- Continue SBNCTR Phase 2A development to include integration of other sensors and threats					
- Merge TNC Phase 1 with Phase 2 and continue development					
- Complete Side Lobe Blanking (SLB) requirement analysis & specification and commence Technology Development					
- Continue EA improvements technology development, integration and test					
- Continue Radar Improvements Analysis					
- Continue DRU requirements and specification analysis					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>	Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
- Continue ERACE Phase 1/2 development and conduct ERACE Phase 1/2 FLEX Event to test multiple sensors in an at-sea operational environment					
<i>FY 2024 Base Plans:</i>					
- Continue SBNCTR Phase 2A development to include integration of other sensors, and complete Integration & Test					
- Continue TNC Phase 1/2 development and complete In Process Review (IPR) #1					
- Continue SLB technology development					
- Continue EA improvements technology development, integration and test					
- Continue Radar Improvements Analysis					
- Continue DRU requirements and specification analysis					
- Complete ERACE Phase 1/2 development and complete CP 24 certification					
- Commence ERACE Phase 3 development and complete requirements definition					
<i>FY 2024 OCO Plans:</i>					
N/A					
<i>FY 2023 to FY 2024 Increase/Decrease Statement:</i>					
Increase in FY24 supports the start of ERACE Phase 3 development.					
Accomplishments/Planned Programs Subtotals	9.802	8.234	9.735	0.000	9.735

C. Other Program Funding Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Line Item											
• O&MN/1C1C/0702228N: <i>O&M,N AEGIS Wholeness SPY Transmitter Reliability</i>	4.027	4.488	4.533	-	4.533	4.608	5.537	5.650	5.731	Continuing	Continuing
• OPN/2980: <i>OPN SPY-1 RM&A IMPROVEMENTS</i>	15.682	8.576	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,123.055
• OPN/2981: <i>OPN SPY-1 RM&A IMPROVEMENTS</i>	0.000	0.000	48.150	-	48.150	45.981	46.352	56.711	57.865	266.147	521.206

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>

D. Acquisition Strategy

Improved Capabilities SPY-1 Reliability, Maintainability, and Availability (RM&A) will design and develop an Ordnance Alterations (ORDALT) Package for fixes and modifications to known transmitter, signal processor, microwave tube (MWT), and logistic shortcomings. Lockheed Martin Corporation (Moorestown, New Jersey) was awarded a sole source, cost-plus-fixed-fee, level-of-effort job order under a Basic Ordering Agreement (BOA) via NSWC Crane. The contract supports the development and fielding of AN/SPY-1 Radar capability upgrades and reliability improvements in support of AEGIS combat system. The current period of performance on the BOA is through August 2023 and will continue under a follow-on BOA. Investment in development of SPY-1 RM&A improvements to address failure mechanisms and improve reliability is planned to continue beyond the FYDP. Radar capability upgrades (SBNCTR, TNC, ACE, ERACE and SLB) and reliability improvements will be incorporated into Baseline 9 and follow.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>
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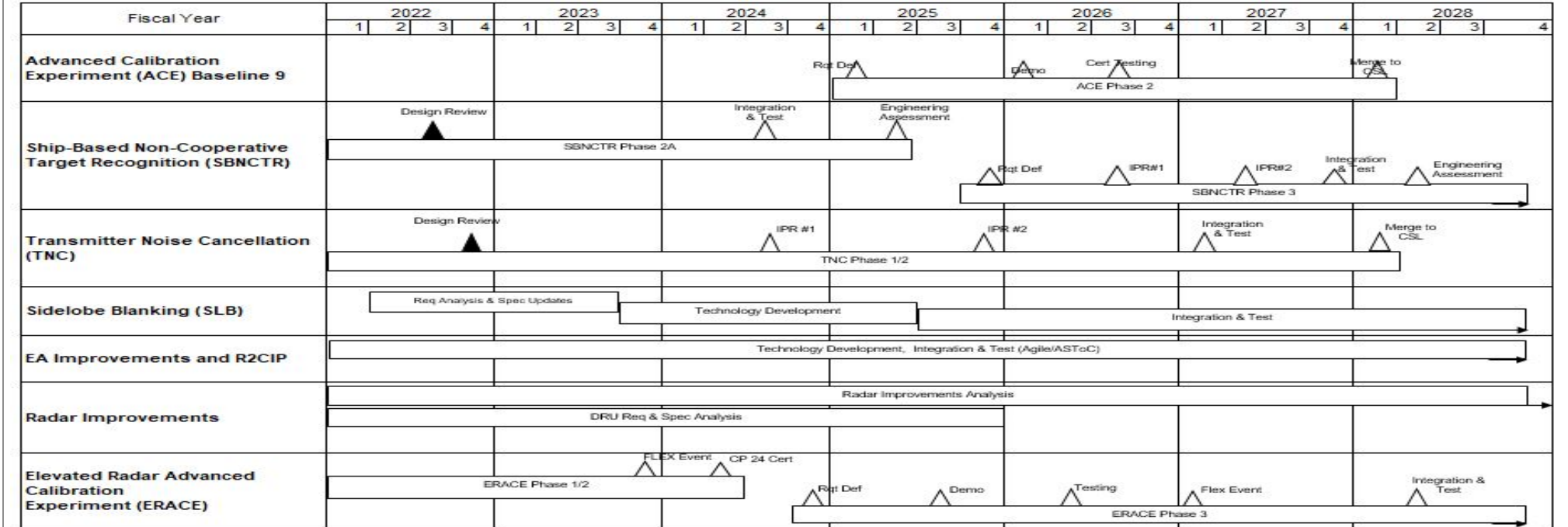
Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	MIPR	Office of Naval Research : Arlington, VA	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
SYSTEM ENGINEERING	C/CPFF	Raytheon : Sudbury, MA	1.941	0.000		0.000		0.000		-		0.000	0.000	1.941	-
SYSTEM ENGINEERING	WR	NSWC/Crane, IN : Crane, IN	23.957	5.211	Oct 2021	2.892	Oct 2022	4.494	Oct 2023	-		4.494	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/CPFF	Lockheed Martin : Moorestown, NJ	18.234	0.000		0.000		0.000		-		0.000	0.000	18.234	-
SYSTEM ENGINEERING	SS/CPFF	AEGIS Techrep : Moorestown, NJ	1.366	0.071	Sep 2022	0.234	Mar 2023	0.217	Feb 2024	-		0.217	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/FP	APL/JHU : Laurel, MD	2.273	0.518	Jan 2022	0.445	Nov 2022	0.455	Nov 2023	-		0.455	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	SCSTC : Dahlgren, VA	0.826	0.122	Oct 2021	0.079	Nov 2022	0.074	Nov 2023	-		0.074	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NRL : Washington, DC	1.674	0.520	Dec 2021	0.472	Nov 2022	0.695	Nov 2023	-		0.695	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	MIPR	MIT/LL : Lexington, MA	1.734	0.625	Feb 2022	0.611	Jan 2023	0.625	Feb 2024	-		0.625	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC DD : Dahlgren, VA	7.278	1.943	Oct 2021	2.857	Oct 2022	2.366	Oct 2023	-		2.366	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/PHD : Port Hueneme, CA	0.898	0.177	Jan 2022	0.234	Nov 2022	0.339	Nov 2023	-		0.339	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	MIPR	DTIC : Fort Belvoir, VA	0.284	0.000		0.000		0.000		-		0.000	0.000	0.284	-
SYSTEM ENGINEERING	WR	SCSC Wallops : Wallops Island, VA	0.032	0.000		0.000		0.000		-		0.000	0.000	0.032	-
SYSTEM ENGINEERING	C/FFP	Raytheon : Waltham, MA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			61.497	9.187		7.824		9.265		-		9.265	Continuing	Continuing	N/A

Remarks
1. Since the FY23 budget request, FY23 funding to Field Activities were reduced due to funding reduction in FY23.

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sensors</i>	Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>
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SBNCTR PHASE 3, SLB, EA Improvements and R2CIP, Radar Improvements and ERACE Phase 3 continue beyond the FYDP.
 ACE Phase 2 start slipped from Q1FY24 to Q1FY25 due to funding reduction in FY24.
 Since FY23 budget request, SBNCTR Phase 2A Design Review held in lieu of IPR#3 3QFY22. Phase 2A Integration & Test and Engineering Assessment delayed 2 QTRs and Phase 3 slipped from Q2FY24 to Q4FY25 due to funding reduction in FY24.
 Since FY23 budget request, TNC Phase 1 merged with Phase 2 to become Phase 1/2. All milestones shifted to support the merge with CSL in FY28. TNC Phase 1/2 Design Review held in 4QFY22. IPR#1 is now planned for Q3FY24 and IPR#2 is planned for Q4FY25.
 Since FY23 budget request, the end of SLB Requirements Analysis & Specification, and the start of Technology Development each delayed 2 Qtrs due to FY23 funding reduction. Subsequently, the end of Technology Development and the start of Integration & Test slipped 2 Qtrs to Q2 and Q3FY25 respectively.
 Since FY23 budget request, DRU Requirements & Specification Analysis extended 10 QTRs to support POM Issue and FY25 Missile Defense Agency (MDA) Demo.
 Since FY23 budget request, ERACE Phase 1/2 FLEX Event and CP 24 Cert delayed 4 QTRs to align and integrate into CP 24.
 ERACE Phase 3, all milestones, slipped 3 Qtrs due to funding reduction in FY24.
 Historically, Radar Improvement efforts focused on transmitter upgrades. Scope has expanded to include Signal Processor and Antenna groups as well as transmitter group.

Acronyms:

- | | | |
|----------------------------------|---------------------------|---------------------------------------------------|
| ASToC: AEGIS Speed to Capability | EA: Electronic Attack | I&T: Integration & Test |
| CP: Capability Package | ERACE: Elevated Radar ACE | IPR: In-Process Review |
| CSL: Common Source Library | FLEX: Fleet Exercise | R2CIP: Rapid Radar Capability Improvement Program |
| DRU: Digital Receiver Upgrade | | |

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3301				
EA Improvements and R2CIP Technology Development, Integration & Test	1	2022	4	2028
Radar Improvements Analysis	1	2022	4	2028
DRU Requirements & Specification Analysis	1	2022	4	2025
SLB Requirements Analysis and Specification	2	2022	3	2023
SBNCTR Phase 2A Design Review	3	2022	3	2022
TNC Phase 1/2 Design Review	4	2022	4	2022
SLB Technology Development	4	2023	2	2025
ERACE Phase 1/2 Flex Event	4	2023	4	2023
SBNCTR Phase 2A Integration & Test	3	2024	3	2024
ERACE Phase 1/2 CP24-1 Certification	2	2024	2	2024
TNC Phase 1/2 IPR #1	3	2024	3	2024
ERACE Phase 3 Requirements Definition	4	2024	4	2024
SBNCTR Phase 2A Engineering Assessment	2	2025	2	2025
ERACE Phase 3 Demo	3	2025	3	2025
ACE Phase 2 Requirements Definition	1	2025	1	2025
SLB Integration and Test	3	2025	4	2028
ERACE Phase 3 Testing	2	2026	2	2026
SBNCTR Phase 3 Requirements Definition	4	2025	4	2025
TNC Phase 1/2 IPR #2	4	2025	4	2025
ACE Phase 2 Demo	1	2026	1	2026
ERACE Phase 3 Flex Event	1	2027	1	2027

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3301 / <i>Improved Capabilities SPY-1 Radar</i>

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
ACE Phase 2 Certification Testing	3	2026	3	2026
SBNCTR Phase 3 IPR #1	3	2026	3	2026
TNC Phase 1/2 Integration and Test	1	2027	1	2027
SBNCTR Phase 3 IPR #2	2	2027	2	2027
SBNCTR Phase 3 Integration and Test	4	2027	4	2027
ACE Phase 2 Merge to CSL	1	2028	1	2028
TNC Phase 1/2 Merge to CSL	1	2028	1	2028
SBNCTR Phase 3 Engineering Assessment	2	2028	2	2028
ERACE Phase 3 Integration and Test	2	2028	2	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy										Date: March 2023		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>			Project (Number/Name) 3408 / <i>AN/SPS-49 Technical Refresh</i>				
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3408: <i>AN/SPS-49 Technical Refresh</i>	20.404	0.956	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.360
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

AN/SPS-49 Technology Refresh: AN/SPS-49 is the only Air Surveillance Radar on the LSD 41/49 class ships. Continued degradation and increasingly low radar availability of the AN/SPS-49 Radar is greatly impacting deployed missions, impacting safety of flight and affecting LSD Air Warfare capability and operations and as a result, AN/SPS-49 Technology Refresh is required. This AN/SPS-49 Technology Refresh will include Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions which will reduce cascading failures and mitigate obsolescence issues. In addition, this effort replaces key components to include: transmitter, receiver, exciter, antenna elevation servo control, radar system control, display and signal data processor (SDP). A digital receiver/exciter (DREX) with high-performance computing technology will be a key component in the new system. The current SPS-49 radar has no software so new software is being developed to mimic the current radar functions to maintain compatibility with internal and external interfaces. This effort will improve SPS-49 electronic protection, have increased surveillance range and increased slow moving small target detection, as well as reduce total ownership cost with lower unit cost and smaller size/weight/power requirements. Funding is also to complete development, test and evaluation, validation and integration of a technology refresh of the below deck hardware for the AN/SPS-49A(V)1 Long Range Air Surveillance Radar. FY22 was the last year of funding for this program.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: AN/SPS-49 Technology Refresh	0.956	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2023 Plans: - Prepare for receipt of prototype					
FY 2024 Base Plans: N/A					
FY 2024 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.956	0.000	0.000	0.000	0.000

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

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3408 / <i>AN/SPS-49 Technical Refresh</i>

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

Remarks

D. Acquisition Strategy

To accomplish the SPS-49 Tech Refresh, the Navy is leveraging an Other Transactional Authority (OTA) contract for Industrial Base Analysis and Sustainment Program (IBAS) Radar Systems Should Cost Model/Prototypes for Defense Affordability and Industrial Base Resiliency awarded by OSD in Q4 FY18.

Early start development of technologies funded using Small Business Innovative Research (SBIR), Rapid Insertion Funds (RIF), Technology Insertion Funds (TIF) and OSD's Industrial Base Analysis and Sustainment (IBAS) programs will be integrated to provide a below deck technology refresh of the AN/SPS-49 Long Range Air Surveillance Radar. Funds will be used to perform Initial Technical Review, Analysis of Alternatives, System Requirements Review, System Functional Review, Preliminary Design Review and Critical Design Review.

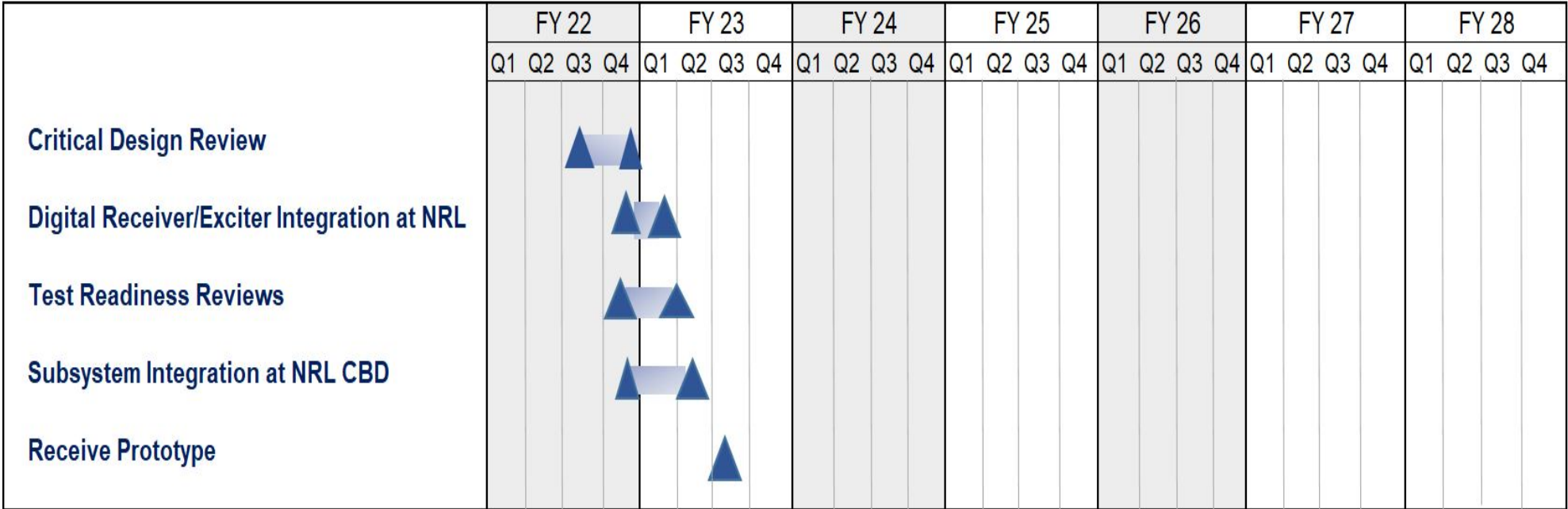
Funding for the OTA contract is required to complete subsystem development to include transmitter, receiver/exciter, processor and antenna control unit, integration of the subsystems, and integration with the legacy radar including the antenna, conduct test readiness reviews, full system test and evaluation for factory acceptance, and delivery of two Engineering Development Models (EDMs).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy												Date: March 2023				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
1319 / 5				PE 0604501N / Advanced Above Water Sen sors				3408 / AN/SPS-49 Technical Refresh								
Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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	
System Engineering	MIPR	Army : Picatinny, NJ	18.323	0.000		0.000		0.000		-		0.000	0.000	18.323	-	
Subtotal			18.323	0.000		0.000		0.000		-		0.000	0.000	18.323	N/A	
Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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	
Government Engineering	WR	NRL : Washington, DC	0.300	0.150	Oct 2021	0.000		0.000		-		0.000	0.000	0.450	-	
Government Engineering	WR	NSWC/Crane : Crane. IN	0.292	0.205	Oct 2021	0.000		0.000		-		0.000	0.000	0.497	-	
Government Engineering	WR	NSWC/PHD : Port Hueneme, CA	0.045	0.050	Oct 2021	0.000		0.000		-		0.000	0.000	0.095	-	
Government Engineering	WR	NSWC/CD : Bethesda, MD	0.060	0.030	Oct 2021	0.000		0.000		-		0.000	0.000	0.090	-	
Subtotal			0.697	0.435		0.000		0.000		-		0.000	0.000	1.132	N/A	
Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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	
Developmental Test & Evaluation (DT&E)	WR	NRL : Washington, DC	0.680	0.156	Oct 2021	0.000		0.000		-		0.000	0.000	0.836	-	
Developmental Test & Evaluation (DT&E)	WR	NSWC/Crane : Crane. IN	0.522	0.265	Oct 2021	0.000		0.000		-		0.000	0.000	0.787	-	
Developmental Test & Evaluation (DT&E)	WR	NSWC/PHD : Port Hueneme, CA	0.100	0.050	Oct 2021	0.000		0.000		-		0.000	0.000	0.150	-	
Subtotal			1.302	0.471		0.000		0.000		-		0.000	0.000	1.773	N/A	

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen</i> <i>sors</i>	Project (Number/Name) 3408 / <i>AN/SPS-49 Technical Refresh</i>



Contract Period of Performance (PoP) ends AUG 2023

Budget profile capitalizes on early development contracts funded by Small Business Innovation Research (SBIR), Rapid Innovation Funds (RIF), OSD Industrial Base Analysis and Sustainment (IBAS) Programs.

Since DoN24, schedule has slipped up to 30 days due to delays in receiving materials to integrate the prototype.

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / <i>Advanced Above Water Sen sors</i>	Project (Number/Name) 3408 / <i>AN/SPS-49 Technical Refresh</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3408				
Critical Design Review (CDR)	1	2022	1	2022
Digital Receiver/Exciter Integration/Test at NRL	2	2022	4	2022
Test Readiness Reviews (TRR)	2	2022	4	2022
System/Subsystem Integration Testing at NSWC Crane	3	2022	4	2022
Receive Prototype	1	2023	1	2023