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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy **Date:** April 2022

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	93.770	12.333	11.631	11.160	-	11.160	11.105	11.035	11.207	11.318	Continuing	Continuing
3094: <i>USW Decision Support</i>	76.764	10.011	10.198	9.913	-	9.913	10.260	10.277	10.456	10.583	Continuing	Continuing
3439: <i>Project NAUTICA: Integrated Theater ASW C4I</i>	17.006	2.322	1.433	1.247	-	1.247	0.845	0.758	0.751	0.735	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses the development and integration of new and improved technologies into the Anti-Submarine Warfare (ASW) and Theater Undersea Warfare (TUSW) Command & Control (C2) systems supporting the warfighter.

PROJECT 3094: Undersea Warfare Decision Support System (USW-DSS) is the Navy Program of Record ASW C2 Net-Centric system supporting the warfighter. USW-DSS continues to develop and test the software changes and perform the certification testing necessary to address end of life (EOL) support issues impacting USW-DSS Build 3 as well as address emerging mandated cybersecurity requirements. As a result of the Chief of Naval Operations (CNO) direction to implement a Compile to Combat in 24 Hours (C2C24) software development process, USW-DSS has shifted to a Continuous Improvement / Continuous Deployment (CI/CD) model leveraging multiple Development and Secure cloud Operational environments (DevSecOps) which will produce baseline software upgrades twice annually. Within this CI/CD process, this project will develop, design, integrate, and test additional tools/capabilities for USW-DSS Build 3 including, but not limited to: Waterspace Management (WSM) and Prevention of Mutual Interference (PMI), Common Track Manager, Link 16 Connectivity, Common Tactical Picture (CTP), Platform Data Fusion Integration, Cross-Platform Data Fusion, Automated Asset Allocation, Asset/Threat State Information, Vulnerability Analysis enhancement, ASW Track Management, Automated Re-planning, Engagement Target Pairing, improved TASW capabilities, Data-Focused Navy Tactical Cloud Integration, and virtualization of the electronic Master Tactical Plot (eMTP) visualization/display service as 'Web USW-DSS' on which to render the CTP/Common Operational Picture (COP). These improvements address requirements from the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017).

USW-DSS Build 3 Fleet Capability Release (FCR) 2 and FCR 3 schedules have been revised to reflect required system re-architecture efforts, which necessitated shifting of the Integration/Test, and Certification Test phases. USW-DSS Build 3 FCR 2 and FCR 3 schedules have also been revised to reflect a push for commonality between afloat and ashore USW-DSS systems and continuous development improvements impacting both shipboard and Theater Undersea Warfare Command Headquarters (TUSWCHQ) watch floors instead of a staggered FCR 2 (afloat) and FCR 3 (ashore) improvement plan previously envisioned. This schedule revision will drive the acquisition of cutting-edge ASW tools to local and theater ASW commanders faster and with more interoperability.

PROJECT 3439: The Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA) Project provides Theater Anti-Submarine Warfare (TASW) architecture development, systems engineering, and design, and continues the system engineering effort required to design, develop and deliver an integrated TASW battle management suite in accordance with the 2007 ASW Initial Capabilities Document (ICD). The plan prioritizes NAUTICA investments in accordance with the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017) and Center for Security Forces (CSF) letter "Criticality of Sustaining PMI and WSM Capability and Meeting Emerging Requirements for Great Competition" submitted to OPNAV N2N6. The design of the integrated

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TASW battle management suite will include a system of systems TASW architecture to enable the existing programs of record under development from the Program Executive Office (PEO) for Integrated Warfare Systems (IWS), PEO Command, Controls, Communications, Computers and Intelligence (C4I), PEO AIR, PEO SUB, and N9SP to exploit a common framework. The common architecture will define the key data exchanges, common displays and processing, data models, cross domain interfaces, and multi-level security software that will enable multiple systems, including, but not limited to, USW-DSS and the Distributed Common Ground System - Navy (DCGS-N) to exchange, display, and exploit information at the appropriate classifications.

B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	12.661	11.631	0.000	-	0.000
Current President's Budget	12.333	11.631	11.160	-	11.160
Total Adjustments	-0.328	0.000	11.160	-	11.160
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.328	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	11.160	-	11.160

Change Summary Explanation

FUNDING CHANGES SINCE THE PREVIOUS PRESIDENT'S BUDGET AT THE OVERALL PE LEVEL:

- FY 2021 decrease (\$-0.328M) is the result of the Small Business Innovative Research (SBIR) transfer.

PROJECT 3094 - SCHEDULE CHANGES SINCE THE PREVIOUS PRESIDENT'S BUDGET:

- USW-DSS Fleet Capability Release (FCR) Design/Development efforts (for all FCRs) was updated to reflect the Continuous Development/Continuous Deployment (CI/CD) approach; design/development efforts for individual FCRs is no longer represented.

- USW-DSS Build 3 Fleet Capability Release (FCR) 1 Waterspace Management for Prevention of Mutual Interference (PMI) Certification Test expanded from 3Q21-1Q22 to 3Q21-4Q22 to include General Service (GENSER) Secret and GENSER Top Secret network connectivity to be in compliance with the National Security Agency's Cybersecurity standards, and to include PMI Software Certification by COMSUBFOR following installations at COMSUBGRU 2/7/8/9/10 and COMSUBPAC ensuring USW-DSS can safely coordinate submerged USW assets (including U.S. and allied submarines, surface ship sensors, and Oceanographic research vessels).

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Appropriation/Budget Activity
1319: *Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)*

R-1 Program Element (Number/Name)
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- USW-DSS Build 3 FCR 2 Integration/Test shifted from 4Q21-1Q24 to 4Q22-3Q24, FCR 2 Certification Test shifted from 3Q23-1Q24 to 3Q24-4Q24, FCR 3 Integration/Test shifted from 1Q24-3Q26 to 4Q24-1Q27, and FCR 3 Certification Test shifted from 2Q26-4Q26 to 1Q27-2Q27. These shifts reflect the implementation of a Development and Secure Cloud Operational environments (DevSecOps) methodology to achieve rapid integration of ASW capabilities on afloat platforms as well as maintaining commonality between afloat and ashore system architectures, and to ensure the Certification Test of an individual FCR comprehensively evaluates the operational effectiveness and informs the next FCR.

PROJECT 3439 - SCHEDULE CHANGES SINCE THE PREVIOUS PRESIDENT'S BUDGET:

- Theater ASW (TASW) Advancement Phase I - Federation of Systems portion of the schedule, the Integration/Test effort for 3Q21-4Q22 that was previously depicted has been replaced with a System-of-Systems Model / Cybersecurity Monitoring effort for 4Q21-4Q25 to reflect the program supporting a continuous Cybersecurity function.
- For the Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion portion of the schedule, the following efforts were extended: Requirements Definition (from 1Q21-3Q21 to 1Q21-3Q22), Systems Engineering (from 3Q21-3Q22 to 3Q21-3Q23), and Development (from 4Q21-3Q23 to 2Q23-4Q25).
- References to efforts previously depicted for Theater ASW (TASW) Advancement Phase III - TASW as a Service and for Theater ASW (TASW) Advancement Phase IV - TASW Continuous Improvements were removed due to the extension of Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion effort.

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy										Date: April 2022		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>				Project (Number/Name) 3094 / <i>USW Decision Support</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
3094: <i>USW Decision Support</i>	76.764	10.011	10.198	9.913	-	9.913	10.260	10.277	10.456	10.583	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Undersea Warfare Decision Support System (USW-DSS) is the Navy Program of Record Anti-Submarine Warfare (ASW) Command and Control (C2) Net-Centric system supporting the warfighter. USW-DSS provides an integrated, near-real time, net-centric ASW Common Tactical Picture (CTP) and Common Operational Picture (COP) for the Carrier Strike Groups (CSGs). USW-DSS is a C2 capability identified in the ASW Initial Capabilities Document (ICD), for the Sea Combat Commander (SCC) and Theater USW Commander (TUSWC). USW-DSS enables effective planning and execution of USW operations, optimizes placement of sensors for exploitation of the environment, manages available resources, balances operations versus risk, and provides a clear vulnerability assessment of the operational environment. USW-DSS ensures safe operational and tactical C2 of submerged U.S. and allied submarines via Prevention of Mutual Interference (PMI) capability, and protects from blue-on-blue engagement with a Waterspace Management planning and execution tool. USW-DSS shortens C2 decision processes for detection-to-engagement across multiple platforms, including those with low-bandwidth communications or intermittent connectivity. Tactical data such as tracks, environmental, and sensor processing data is ingested into USW-DSS through platform specific interfaces such as the AN/SQQ-89A(V)15 Surface Ship ASW Combat System, the Global Command and Control System - Maritime (GCCS-M), and the AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC). USW-DSS processes this and other tactical data and supports intelligent dissemination of the data to unit and theater level platforms in support of an enhanced USW tactical picture. USW-DSS provides USW Commanders with an expanded, net-centric USW collaborative capability across CSG platforms (CVNs, CGs, DDGs) as well as supporting shore nodes to include Commander Task Force (CTF), the Naval Oceanographic Processing Facility (NOPF), and Tactical Operations Center (TOC) and Maritime Operations Center (MOC). On afloat platforms, USW-DSS processing software is virtualized for portability and is hosted on the Consolidated Afloat Networks and Enterprise Services (CANES) system and implements a Service-Oriented Architecture (SOA) with display generation and operator interfaces provided via USW-DSS hardware. For support and ashore nodes, USW-DSS processing software is hosted on Commercial-Off-The-Shelf (COTS) hardware.

Future USW-DSS capability is phased to deliver timely and cost-effective software improvements to the warfighter via the Fleet Capability Release (FCR) process. USW-DSS Build 3 FCR incremental developments implement cost-effective cyber security and Theater ASW (TASW) functionality by integrating inputs from data sources and platforms such as the P8-A Poseidon aircraft and associated Air ASW sensors, provide improved and additional functionality, and improve stability and reliability. USW-DSS Build 3 provides common and improved visualization, integrated USW platform sensor data sharing, reduced data entry, improved sensor performance predictions, data fusion, and reduced redundancy across USW Tactical Decision Aids (TDAs). The project provides a greater understanding of the undersea battle space by allowing the entire force (carrier and expeditionary strike group, theater, or other) to have a common and thorough understanding of the battle space with characterized uncertainties. The Navy continues to modernize and add sensor capabilities to existing programs of record that are significant data sources of information for USW-DSS. These include, but are not limited to the AN/SQQ-89A(V)15 Surface Ship ASW Combat System, AN/SQQ-34 CV-TSC, GCCS-M, and the Distributed Common Ground System - Navy (DCGS-N). As the sensor capabilities and systems mature, the tactical data valuable to USW-DSS is incorporated as part of a future FCR. Through targeted architectural improvements, follow-on FCRs will facilitate the migration of select components of USW-DSS to a DoD commercial cloud computing environment, thus improving software performance and scalability while keeping future hardware costs in check. Additionally, follow-on FCRs are targeted to support operations across different security enclaves and additional platform tactical data interfaces such as those associated with P-8A Poseidon aircraft, submarine, and

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Integrated Undersea Surveillance System (IUSS) fixed sensors. Additionally, USW-DSS is adopting agile Information Technology (IT) developments to align with the Compile to Combat in 24 Hours (C2C24) initiative.

USW-DSS will continue to address end of life (EOL) support issues impacting USW-DSS Build 3 as well as address emerging mandated cybersecurity requirements. Funding will be used to continue to develop, design, integrate, and test additional USW-DSS tools/capabilities for Build 3 including, but not limited to: Waterspace Management and PMI, Common Track Manager, Link 16 Connectivity, CTP, Platform Data Fusion Integration, Cross-Platform Data Fusion, Automated Asset Allocation, Asset/Threat State Information, Vulnerability Analysis enhancement, ASW Track Management, Automated Re-planning, Area Planning, improved TASW capabilities, Data-Focused Navy Tactical Cloud Integration, and virtualization of the electronic Master Tactical Plot (eMTP) visualization/display service as 'Web USW-DSS' on which to render the CTP/COP. These improvements address requirements from the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017).

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: USW-DSS Capability Improvements	10.011	10.198	9.913	0.000	9.913
Articles:	-	-	-	-	-
<p>Description: Design, develop, integrate, and test additional USW-DSS tools/capabilities for Build 3 including Common Tactical Picture (CTP), Platform Data Fusion integration, Cross-Platform Data Fusion, Theater Level Mission Planning, Automated Asset Allocation, Asset/Threat State Information, Vulnerability Analysis enhancement, Anti-Submarine Warfare (ASW) Track Management, Automated Re-planning, Engagement Target Pairing, improved Theater Undersea Warfare (TUSW) capabilities, Data-Focused Navy Tactical Cloud Integration, and virtualization of the Electronic Master Tactical Plot (eMTP) visualization/display service as 'Web USW-DSS', and cyber security protection requirements.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Complete USW-DSS Build 3 Fleet Capability Release 1 (FCR 1) Waterspace Management and Prevention of Mutual Interference (PMI) Certification Test efforts. - Begin USW-DSS Build 3 FCR 2 Integration/Test efforts. - Transition two (2) capability drops at Theater Undersea Warfare Headquarters (TUSWCHQ) to include General Service (GENSER) Secret and GENSER Top Secret instances and implementation of Cross Domain Solution (CDS) at each TUSWCHQ to facilitate communication link therein. - Strengthen software stability and expand memory and interconnectivity to allow for Continuity of Operations (COOP) between TUSWCHQ sites via interconnected USW-DSS nodes and remote access. - Continue development and transition of Adaptive Anti-Submarine Warfare (AASW) improved submarine search and sensor analysis toolsets. 					

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> - Initiate development and transition of Office of Naval Research (ONR) Battle Management Tactical Decision Aid (BAM TDA) within USW-DSS. - Continue to develop and test interfaces to the AN/SQQ-89A(V)15 Surface ASW Combat System and various Consolidated Afloat Network and Enterprises System (CANES) configurations. - Initiate virtualization of key software architecture components and build cybersecure container infrastructure to support USW-DSS FCR 2. - Initiate releasability and allied/coalition interoperability requirements for USW-DSS. <p>FY 2023 Base Plans:</p> <ul style="list-style-type: none"> - Continue USW-DSS Build 3 FCR 2 Integration/Test efforts. - Integrate USW-DSS Build 3 FCR 2 into CANES for afloat systems. - Continue development and transition of AASW improved submarine search and sensor analysis toolsets. - Improve Continuous Integration, Continuous Delivery (CI/CD), and software development processes for USW-DSS Build 3 via agile integration and rapid delivery through Development, Security, and Operations (DevSecOps). - Continue development and transition of ONR BAM TDA within USW-DSS. - Continue to develop and test interfaces to the AN/SQQ-89A(V)15 Surface ASW Combat System. - Continue to support USW-DSS allied/coalition interoperability requirements. <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: The FY 2022 (\$10.198M) to FY 2023 (\$9.9133M) decrease (\$-0.285M) was driven by the application of a program adjustment to the FY 2023 budget control.</p>					
Accomplishments/Planned Programs Subtotals	10.011	10.198	9.913	0.000	9.913

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

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• OPN/2176: <i>USW Support Equipment (N2N6/USW-DSS only)</i>	6.508	8.668	12.216	-	12.216	12.221	12.486	12.790	13.033	Continuing	Continuing
Remarks											

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D. Acquisition Strategy

- Hardware/Software development and integration via Navy Warfare Centers and Small Business contractors.
- Utilize Small Business Innovative Research (SBIR) funding and development efforts for open competition on capability improvements to reach Technology Readiness Level (TRL) 5/6.
- Utilize Other Transaction Authority (OTA) to expedite prototype development.
- Invest in maturing SBIR developed technologies beyond TRL 5/6 for integration into USW-DSS and Theater Anti-Submarine Warfare (TASW) systems via SBIR Phase III contracts.
- Integrate technically-mature Office of Naval Research Technology Candidates and Future Naval Capabilities that meet technology gaps identified by NAUTICA into USW-DSS baseline.
- Pursue future software-only architecture through virtualization and DevSecOps to allow for rapid system upgrades and cybersecurity accreditation.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy **Date:** April 2022

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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
USW-DSS Capability Enhancements - Development	C/CPFF	Adaptive Methods : VA	6.751	1.245	Feb 2021	1.250	Mar 2022	1.240	Dec 2022	-		1.240	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	C/CPFF	DH Wagner : PA	0.808	0.400	Mar 2021	0.375	Mar 2022	0.370	Dec 2022	-		0.370	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	WR	NIWC/Pacific : CA	0.000	1.200	Mar 2021	1.500	Jan 2022	1.450	Dec 2022	-		1.450	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	WR	NSWC/Carderock : MD	4.406	0.477	Mar 2021	0.500	Mar 2022	0.475	Nov 2022	-		0.475	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	WR	NSWC/Dahlgren : VA	0.150	0.000		0.000		0.000		-		0.000	0.000	0.150	-
USW-DSS Capability Enhancements - Development	WR	NUWC/Keyport : WA	3.039	0.515	Nov 2020	0.550	Oct 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	WR	NUWC/Newport : RI	1.921	3.417	Nov 2020	3.400	Oct 2021	3.145	Nov 2022	-		3.145	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	C/CPFF	Progeny : VA	6.026	0.604	Mar 2021	0.600	Nov 2021	0.580	Dec 2022	-		0.580	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Development	C/CPFF	UT/ARL : TX	0.266	0.000		0.000		0.000		-		0.000	0.000	0.266	-
USW-DSS Capability Enhancements - Development	Various	Var : Var*	50.052	1.758	Nov 2020	1.593	Mar 2022	1.663	Dec 2022	-		1.663	Continuing	Continuing	Continuing
Subtotal			73.419	9.616		9.768		9.423		-		9.423	Continuing	Continuing	N/A

Remarks
*Consists of multiple performing activities with funding for each not greater than \$1M per year.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy												Date: April 2022			
Appropriation/Budget Activity						R-1 Program Element (Number/Name)				Project (Number/Name)					
1319 / 5						PE 0604518N / Combat Information Center Conv				3094 / USW Decision Support					
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
USW-DSS Capability Enhancements - Integration/Certification/ Test	C/CPFF	Adaptive Methods : VA	0.862	0.110	Dec 2020	0.115	Mar 2022	0.115	Dec 2022	-		0.115	Continuing	Continuing	Continuing
USW-DSS Capability Enhancements - Integration/Certification/ Test	C/CPFF	Progeny : VA	1.762	0.135	Dec 2020	0.150	Nov 2021	0.150	Dec 2022	-		0.150	Continuing	Continuing	Continuing
Subtotal			2.624	0.245		0.265		0.265		-		0.265	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Program Management Support - Acquisition, Business & Finance	C/CPFF	CACI : VA	0.313	0.000		0.000		0.000		-		0.000	0.000	0.313	-
Program Management Support - Acquisition, Business & Finance	C/CPFF	Booz Allen Hamilton : VA	0.000	0.088	Mar 2021	0.090	Mar 2022	0.100	Dec 2022	-		0.100	Continuing	Continuing	Continuing
Program Management Support - Sytems Engineering and Technical Assistance (SETA)	C/CPFF	CGI Federal : VA	0.368	0.000		0.000		0.000		-		0.000	0.000	0.368	-
Program Management Support - Sytems Engineering and Technical Assistance (SETA)	C/CPFF	KMS Solutions* : VA	0.000	0.042	Feb 2021	0.050	Feb 2022	0.100	Dec 2022	-		0.100	Continuing	Continuing	Continuing
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	0.040	0.020	Dec 2020	0.025	Oct 2021	0.025	Oct 2022	-		0.025	Continuing	Continuing	Continuing
Subtotal			0.721	0.150		0.165		0.225		-		0.225	Continuing	Continuing	N/A

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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			

Remarks
*In addition to program office support, KMS Solutions provide technical planning, systems engineering, and test support.

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	76.764	10.011	10.198	9.913	-	9.913	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy **Date:** April 2022

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Project 3094	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
USW-DSS Build 3 Fleet Capability Release Design/Development Pipeline	USW-DSS FCR Continuous Improvement Design/Development																											
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1)	Waterspace PMI Integ/Test				Waterspace PMI Certification Test																							
USW-DSS Build 3 Fleet Capability Release 2 (FCR 2)									Integration/Test								Certification Test											
USW-DSS Build 3 Fleet Capability Release 3 (FCR 3)																	Integration/Test				Certification Test							
USW-DSS Build 3 Fleet Capability Release 4 (FCR 4)																					Integration/Test							

Notes:
 1. The Certification Test period will evaluate the operational effectiveness of each FCR and inform/influence the design/development of the next FCR.
 2. During the Integration/Test period, each FCR prototype developed in the DEVSECOPS environment will be matured, capabilities will be added, and software bugs will be fixed. Up to four (4) capability drop deliveries will be incrementally tested and delivered to the Fleet providing improved USW/ASW toolsets to the theater.

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>	Project (Number/Name) 3094 / <i>USW Decision Support</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>USW-DSS Build 3 Fleet Capability Release (FCR)</i>				
Continuous Improvement Design/Development	1	2021	4	2027
<i>USW-DSS Build 3 Fleet Capability Release 1 (FCR 1)</i>				
Waterspace Management and PMI Integration/Test	1	2021	3	2021
Waterspace Management and PMI Certification Test	3	2021	4	2022
<i>USW-DSS Build 3 Fleet Capability Release 2 (FCR 2)</i>				
Integration/Test	4	2022	3	2024
Certification Test	3	2024	4	2024
<i>USW-DSS Build 3 Fleet Capability Release 3 (FCR 3)</i>				
Integration/Test	4	2024	1	2027
Certification Test	1	2027	2	2027
<i>USW-DSS Build 3 Fleet Capability Release 4 (FCR 4)</i>				
Integration/Test	2	2027	4	2027

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy										Date: April 2022		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>				Project (Number/Name) 3439 / <i>Project NAUTICA: Integrated Theater ASW C4I</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
3439: <i>Project NAUTICA: Integrated Theater ASW C4I</i>	17.006	2.322	1.433	1.247	-	1.247	0.845	0.758	0.751	0.735	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA) Project provides Theater Anti-Submarine Warfare (TASW) architecture development, systems engineering, and design. NAUTICA will identify requirements to integrate intelligence (operational and tactical) and sensor (national and organic) systems to provide a fully informed Naval Integrated Fires - Counter Undersea (N2CX) Common Operational Picture (COP) of enemy undersea forces, maximizing decision superiority and theater level planning, and address TASW C2. Using Model-Based Systems Engineering (MBSE), NAUTICA will decompose warfighting requirements into system requirements allocated to existing Programs of Record or identified as new program requirements. Theater Undersea Warfare Operations Center's (TUSWOC) systems today are not integrated to support performance requirements during all threat levels. This results in failure to most effectively employ Theater USW assets. Near term, the Project will continue to accelerate development by rapidly prototyping the framework for existing legacy systems to be federated, to exchange key information and significantly improve existing TASW capability. NAUTICA will also establish a transition path for new USW technologies such as the Operational Planning Tool (OPT), Water Space Planner (WASP), Battlespace Management Tactical Decision Aid (BAM TDA), and other Future Naval Capabilities (FNCs) that will start to transition Technology Readiness Level (TRL) 5/6 enabling technologies into the USW-DSS Program of Record.

FY 2023 continues the effort required to deliver an integrated TASW battle management suite. NAUTICA investments are prioritized in accordance with the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017) and Center for Security Forces (CSF) letter "Criticality of Sustaining Prevention of Mutual Interference (PMI) and Water Space Management (WSM) Capability and Meeting Emerging Requirements for Great Competition" submitted to OPNAV N2N6. The design of the integrated TASW battle management suite will include a system of systems TASW architecture to enable the existing programs of record under development from the Program Executive Office (PEO) for Integrated Warfare Systems (IWS), PEO Command, Controls, Communications, Computers and intelligence (C4I), PEO AIR, PEO SUB, and N9SP to exploit a common framework. The common architecture will define the key data exchanges, common displays and processing, data models, cross domain interfaces, and multi-level security software that will enable systems such as USW-DSS to exchange, display, and exploit information at the appropriate classifications.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: NAUTICA - Theater Architecture Development and System Integration	2.322	1.433	1.247	0.000	1.247
Articles:	-	-	-	-	-
Description: This project is responsible for the analysis of the Theater Anti-Submarine Warfare (TASW) Command Center System of Systems (SoS), design, and planning. The effort will make specific recommendations for the design and development of the interfaces and test procedures for the systems being					

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>	Project (Number/Name) 3439 / <i>Project NAUTICA: Integrated Theater ASW C4I</i>

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>developed under separate Programs of Record. Specifically, the Global Command and Control System - Maritime (GCCS-M), Undersea Warfare Decision Support System (USW-DSS), Distributed Common Ground System - Navy (DCGS-N), and Maritime Tactical Command & Control-2 (MTC-2) systems have evolved on separate timelines. This project will develop near term solutions and propose a long range plan for these systems. The investment will design the interfaces that will federate the systems to close the gaps. The objective is to replace the manpower-intense operations with machine-to-machine interfaces, and then assess the warfighting benefit of integration to inform future decisions. This investment addresses TASW Command and Control (C2) needs identified in the ASW Initial Capabilities Document (ICD).</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue TASW Advancement Phase I Systems-of-Systems Model and Cybersecurity Modeling efforts. - Continue Theater ASW (TASW) Phase II High Side Sensor and Data Fusion requirements definition and systems engineering efforts - Update Model-Based Systems Engineering (MBSE) analysis and track progress of 399 multi-system requirements addressed by twenty-three (23) programs of record across three (3) system commands. - Orchestrate collaboration for multi-program development effort and develop solutions for seams issues between platforms and networks. - Continue development and modernization of DoD Government cloud environment for Theater USW (TUSW) capability testing and analysis. <p>FY 2023 Base Plans:</p> <ul style="list-style-type: none"> - Continue TASW Advancement Phase I Systems-of-Systems Model and Cybersecurity Modeling efforts. - Continue TASW Advancement Phase II High Side Sensor Fusion systems engineering efforts. - Begin TASW Advancement Phase II High Side Sensor Fusion development efforts. - Continue to orchestrate collaboration for multi-program development efforts and develop solutions for seams issues between platforms and networks. - Continue development and modernization of DoD Government cloud environment for Theater USW capability testing and analysis. - Manage MBSE living model addressing requirements across Programs of Record and projects. - Evaluate Science and Technology (S&T) developments to fill TUSW requirement gaps and recommend integration within TUSW programs of record. 					

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>	Project (Number/Name) 3439 / <i>Project NAUTICA: Integrated Theater ASW C4I</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Complete and deliver Cross Domain Solution (CDS) update to meet DoD Raise the Bar (RTB) requirements and begin supporting USW-DSS Prevention of Mutual Interference (PMI) data flows. FY 2023 OCO Plans: N/A FY 2022 to FY 2023 Increase/Decrease Statement: The FY 2022 (\$1.433M) to FY 2023 (\$1.247M) decrease (\$-0.186M) was driven by the application of a program adjustment to the FY 2023 budget control.					
Accomplishments/Planned Programs Subtotals	2.322	1.433	1.247	0.000	1.247

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

N/A

Remarks

D. Acquisition Strategy

- Theater architecture development and system integration initiative that provides the transition funding for Office of Naval Research (ONR) Future Naval Capabilities (FNC) investments for Water Space Management (WSM) and Battlespace Management Tactical Decision Aids (BAM TDAs).
- Capabilities developed under Small Business Innovative Research (SBIR) and FNC investments are incorporated into Theater ASW (TASW) Programs of Record, such as USW-DSS, through incremental Fleet Capability Releases (FCRs).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 5				PE 0604518N / Combat Information Center Conv				3439 / Project NAUTICA: Integrated Theater ASW C4I							
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
NAUTICA - Theater Architecture Development and System Integration	C/CPFF	Adaptive Methods : VA	1.488	0.262	Dec 2020	0.000		0.000		-		0.000	0.000	1.750	-
NAUTICA - Theater Architecture Development and System Integration	WR	COMNAVAIRPAC : CA	0.368	0.070	Nov 2020	0.000		0.000		-		0.000	0.000	0.438	-
NAUTICA - Theater Architecture Development and System Integration	C/CPFF	DH Wagner : PA	0.175	0.033	Dec 2020	0.000		0.000		-		0.000	0.000	0.208	-
NAUTICA - Theater Architecture Development and System Integration	WR	NSWC/Carderock : MD	1.313	0.249	Nov 2020	0.000		0.000		-		0.000	0.000	1.562	-
NAUTICA - Theater Architecture Development and System Integration	WR	NSWC/Dahlgren : VA	0.779	0.148	Nov 2020	0.075	Dec 2021	0.075	Nov 2022	-		0.075	Continuing	Continuing	Continuing
NAUTICA - Theater Architecture Development and System Integration	WR	NUWC/Keyport : WA	2.228	0.212	Nov 2020	0.015	Nov 2021	0.050	Nov 2022	-		0.050	Continuing	Continuing	Continuing
NAUTICA - Theater Architecture Development and System Integration	WR	NUWC/Newport : RI	1.554	0.150	Nov 2020	0.025	Nov 2021	0.075	Nov 2022	-		0.075	Continuing	Continuing	Continuing
NAUTICA - Theater Architecture Development and System Integration	WR	NIWC : CA	0.490	0.093	Dec 2020	0.350	Nov 2021	0.300	Nov 2022	-		0.300	Continuing	Continuing	Continuing
NAUTICA - Theater Architecture Development and System Integration	C/CPFF	Progeny : VA	0.000	0.000		0.419	Feb 2022	0.269	Dec 2022	-		0.269	Continuing	Continuing	Continuing
NAUTICA - Theater Architecture Development and System Integration	C/CPFF	UT/ARL : TX	3.105	0.295	Dec 2020	0.280	Nov 2021	0.225	Nov 2022	-		0.225	Continuing	Continuing	Continuing
NAUTICA - Theater Architecture Development and System Integration	C/CPFF	Various : Var*	3.395	0.469	Feb 2021	0.069	Mar 2022	0.048	Dec 2022	-		0.048	Continuing	Continuing	Continuing
Subtotal			14.895	1.981		1.233		1.042		-		1.042	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy **Date:** April 2022

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>	Project (Number/Name) 3439 / <i>Project NAUTICA: Integrated Theater ASW C4I</i>
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			

Remarks
*Consists of multiple performing activities with funding for each not greater than \$1M per year.

Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Program Management Support - Acquisition, Business & Finance	C/CPFF	CACI : VA	0.192	0.000		0.000		0.000		-		0.000	0.000	0.192	-
Program Management Support - Acquisition, Business & Finance	C/CPFF	Booz Allen Hamilton : VA	0.000	0.080	Dec 2020	0.075	Dec 2021	0.075	Dec 2022	-		0.075	Continuing	Continuing	Continuing
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	CGI Federal* : VA	1.859	0.000		0.000		0.000		-		0.000	0.000	1.859	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	KMS Solutions* : VA	0.000	0.230	Dec 2020	0.100	Dec 2021	0.105	Dec 2022	-		0.105	Continuing	Continuing	Continuing
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	0.060	0.031	Dec 2020	0.025	Oct 2021	0.025	Oct 2022	-		0.025	Continuing	Continuing	Continuing
Subtotal			2.111	0.341		0.200		0.205		-		0.205	Continuing	Continuing	N/A

Remarks
*In addition to program office support, KMS Solutions provide technical planning, systems engineering, and test support.

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.006	2.322	1.433	1.247	-	1.247	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy **Date:** April 2022

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>	Project (Number/Name) 3439 / <i>Project NAUTICA: Integrated Theater ASW C4I</i>
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Project 3439	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Theater ASW (TASW) Advancement Phase I - Federation of Systems	Development				Rapid Prototyping				System-of-Systems Model / Cybersecurity Monitoring																			
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion	Requirements Definition				Systems Engineering				Development				System-of-Systems Integration / Cybersecurity Updates															

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / <i>Combat Information Center Conv</i>	Project (Number/Name) 3439 / <i>Project NAUTICA: Integrated Theater ASW C4I</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Theater ASW (TASW) Advancement Phase I - Federation of Systems</i>				
Development	1	2021	3	2021
Rapid Prototyping	1	2021	3	2021
System-of-Systems Model / Cybersecurity Monitoring	4	2021	4	2025
<i>Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion</i>				
Requirements Definition	1	2021	3	2022
Systems Engineering	3	2021	3	2023
Development	2	2023	4	2025
System-of-Systems Integration / Cybersecurity Updates	2	2025	4	2027