Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604518N *I Combat Information Center Conv*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	55.372	4.294	19.263	16.094	-	16.094	13.637	11.615	11.428	11.656	Continuing	Continuing
3094: *USW Decision Support*	55.372	4.294	9.063	8.594	-	8.594	10.237	10.615	10.328	10.534	Continuing	Continuing
3439: *Project NAUTICA: Integrated Theater ASW C4I*	0.000	0.000	10.200	7.500	-	7.500	3.400	1.000	1.100	1.122	Continuing	Continuing

A. Mission Description and Budget Item Justification

The FY 2020 funding request was reduced by $1.0 million to account for the availability of prior year execution balances.

PROJECT 3094: Undersea Warfare Decision Support System (USW-DSS) is the Navy Program of Record (PoR) Anti-Submarine Warfare (ASW) Command & Control (C2) Net-Centric system supporting warfighters. 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 undersea warfare (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. 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 sonar system, the Global Command and Control System - Maritime (GCCS-M), and Aircraft Carrier Tactical Support Center (CV-TSC). USW-DSS processes this and other tactical data and supports intelligent dissemination of the data to unit level 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 Carrier Strike Group (CSG) platforms (CVNs, CGs, DDGs) as well as supporting shore nodes to include Commander Task Force (CTF), Naval Oceanographic Processing Facility (NOPF), and Tactical Operations Center (TOC), Mobile Tactical Operations Centers (M-TOC).

Future USW-DSS capability is phased to deliver timely and cost-effective software improvements to the warfighter via the Build / Fleet Capability Release (FCR) process. USW-DSS Build 3/FCR 1 continues the development of the integrated, near-real time, net-centric ASW Common Tactical Picture (CTP) / Common Operational Picture (COP) on an electronic Master Tactical Plot (eMTP) for the TUSWC and critical shore command sites. Through targeted architectural improvements, Build 3/ FCR 1 and 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, Build 3/FCR 1 and beyond are targeted to support operations across different security enclaves, and additional platform tactical data interfaces such as the P-8A Poseidon, submarines, and Integrated Undersea Surveillance System (IUSS) fixed sensors. On afloat platforms, USW-DSS processing software is virtualized for portability and is hosted on the Consolidated Afloat Networks and Enterprise Services (CANES) and implements a Service-Oriented Architecture (SOA). The current software version, Build 2 Release 3 (B2R3), will continue to field until the follow-on Build 3/FCR 2 (the next planned release to afloat assets) is ready for Initial Operational Capability (IOC) certification in FY 2022. For support nodes and ashore nodes USW-DSS processing software is hosted on Commercial Off The Shelf (COTS) hardware.

PROJECT 3439: Effective FY 2019, a new initiative titled Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA) was established for Theater Undersea Warfare (TUSW) architecture development, systems engineering, and design. NAUTICA integrates intelligence (operational and tactical) and sensor

(national and organic) systems to provide a fully informed Common Operational Picture (COP) of enemy undersea forces, maximizing decision superiority and theater level planning, and address TUSW Command and Control (C2).

The Navy plan for NAUTICA was approved by the June 2017 Flag Oversight Board and subsequently a roadmap was developed in FY 2018. The 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, FY 2019 accelerates development by rapid prototyping the framework for existing legacy systems to be federated to be exchange key information and significantly improve existing TUSW capability.

FY 2019 initiates the system engineering effort required to design, develop and deliver an integrated TUSW battle management suite in accordance with the 2007 Anti-Submarine Warfare (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). The design of the integrated TUSW battle management suite will include a system of systems TUSW architecture to enable the existing programs of record under development from PEO IWS, PEO C4I, PEO AIR, 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 Distributed Common on Ground System-Navy (DCGS-N) and USW-DSS to exchange, display and exploit information at the appropriate classifications.

Funding under this project will also establish a transition path for new technologies such as the Operational Planning Tool (OPT), Water Space Planner (WASP), Battle Management TDA, and other Future Naval Capabilities (FNCs) that will start to transition Technology Readiness Level (TRL) 5/6 enabling technologies into the USW-DSS and DCGS-N Programs of Record (PORs).

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	8.062	19.303	17.217	-	17.217
Current President's Budget	4.294	19.263	16.094	-	16.094
Total Adjustments	-3.768	-0.040	-1.123	-	-1.123
• Congressional General Reductions	-	-0.040			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.103	0.000			
• Program Adjustments	0.000	0.000	-1.059	-	-1.059
• Rate/Misc Adjustments	0.000	0.000	-0.064	-	-0.064
• Congressional Directed Reductions Adjustments	-3.665	-	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604518N *I Combat Information Center Conv*

Change Summary Explanation

FUNDING CHANGES AT THE OVERALL PE LEVEL:

- FY 2018 decrease of -$3.768M included: -$3.665M for a Congressionally directed reduction and -$0.103M for Small Business Innovative Research (SBIR) transfer.
- FY 2019 decrease of -$0.040M reflects a Congressionally directed general reduction for Federally Funded Research and Development Centers (FFRDCs).
- FY 2020 decrease of -$1.123M included: -$1.000M reduction to account for the availability of prior year execution balances, -$0.059M for Contractor Services Reform reduction, and -$0.064M for various rate adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / *Combat Information Center Conv*	Project (Number/Name) 3094 / *USW Decision Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3094: *USW Decision Support*	55.372	4.294	9.063	8.594	-	8.594	10.237	10.615	10.328	10.534	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

USW-DSS B2R3 (development completed in FY 2013) provides integrated, near-real time, net-centric ASW CTP/COP for the carrier strike groups (CSGs). USW-DSS is a C2 capability, identified in the ASW ICD, for the Sea Combat, TUSW, and ASW Commanders, and enables warfighters to plan and conduct USW operations, align sensors for exploitation of the environment, allocate resources, optimize operations and risk, and perform vulnerability assessments. USW-DSS provides USW Commanders with an expanded net-centric USW capability across CSG platforms (CVNs, CG/DDGs, and SURTASS) as well as supporting shore nodes to include TOCs, M-TOCs, Training, NOPF, and CTF.

USW-DSS shortens C2 decision processes for detection-to-engagement across multiple platforms, including those with low-bandwidth communications or intermittent connectivity. For at-sea nodes, USW-DSS software processing requirements are hosted on CANES and implement a SOA while display generation and operator interfaces are provided via USW-DSS hardware. Ashore nodes host USW-DSS software on COTS hardware.

Starting in FY 2017, funding was restored to commence development of USW-DSS for TUSW (designated USW-DSS Build 3/FCR 1) and to re-architect B2R3 into a Modular Oriented System Architecture (MOSA), implement an electronic Master Tactical Plot (eMTP), modernize the tactical data interfaces and displays, and implement new mandated cyber security changes across all afloat platforms and shore nodes. Build 3 Fleet Capability Release (FCR) incremental developments will implement cost effective cyber security and 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/reliability.

USW-DSS Build 3 will provide 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 program will provide a greater understanding of the undersea battle space by allowing the entire force (carrier/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 PORs that are significant data sources of information for USW-DSS. These include, but are not limited to the AN/SQQ-89 Surface ASW Combat System, the AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC), Global Command and Control System - Maritime (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.

USW-DSS Build 3 capability will a be a phased evolutionary acquisition approach to provide cost-effective capability improvements to the warfighter. The current software version, B2R3 (development completed in FY 2013), will continue to field on afloat platforms until the follow-on Build 3/FCR 2 is certified for Fleet deployment.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3094 / *USW Decision Support*

In FY 2020, USW-DSS will continue to develop and test the software changes and perform the certification testing necessary to address end of life (EOL) support issues impacting B2R3 as well as address emerging mandated cybersecurity requirements.

Additionally in FY 2020, funding will be used to develop, design, integrate, and test additional USW-DSS tools/capabilities for B3 including, but not limited to: 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 incorporating the electronic Master Tactical Plot (eMTP) visualization/display service 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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: USW-DSS Capability Improvements	4.294	9.063	8.594	0.000	8.594
Articles:	-	-	-	-	-
Description: Design, develop, integrate, and test additional USW-DSS tools/capabilities for Build 3 including CTP, Platform Data Fusion integration, Cross-Platform Data Fusion, Theater Level Mission Planning, Automated Asset Allocation, Asset/Threat State Information, Vulnerability Analysis enhancement, ASW Track Management, Automated Re-planning, Engagement Target Pairing, improved TUSW capabilities, Data-Focused Navy Tactical Cloud Integration, and incorporation of the eMTP visualization/display service, and cyber security protection requirements.					
FY 2019 Plans: - Begin systems engineering bottoms-up product realization for USW-DSS Build 3/FCR 1. - Conduct formal System Engineering Technical Reviews (SETR) to assess the technical and programmatic maturity of the development efforts to include Software Incremental Reviews (SWIR) and Test Readiness Reviews (TRR), working towards an Element Certification Review (ECR) in FY 2020, ahead of formal fielding of Build 3/FCR 1. - Complete plans supporting early introduction of Build 3/FCR 1 capability through a series of capability drops. - Develop the Cyber Security strategy for USW-DSS Build 3. - Begin up-front systems engineering activities on Build/FCR 2, including development of a Build 3/FCR 2 Requirements Decision Package (RDP). - Begin analysis and trade studies for the migration of USW-DSS Build 3 FCR-1 to a cloud-based development environment.					
FY 2020 Base Plans: - Complete software development, integration and test activities for additional capability drops and the final Build 3 / FCR-1 system.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3094 / *USW Decision Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Close-out the formal development cycle of FCR-1, culminating in and Element Certification of FCR-1. - Through capability drops and demonstrations at CTF sites, gather feedback and develop system employment manuals for effective use of the system for each CTF. - Begin development activities of Build 3 / FCR-2 to include software development, integration and test activities and associated SETRs to monitor progress. - Begin prototype efforts necessary to begin hosting USW-DSS shore-based applications in a DoD commercial cloud computing environment to meet emerging cyber requirements. Effort will support required software changes, integration with a new host computing environment, and testing in the new computing environment. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 to FY 2020 decrease ($-0.469M) was primarily driven by the re-phasing of funding from FY 2020 to FY 2021-2022 to account for the availability of prior year execution balances, and also reflects the culmination of USW-DSS Build 3 FCR-1 integration/test efforts in FY 2019.					
Accomplishments/Planned Programs Subtotals	4.294	9.063	8.594	0.000	8.594

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPN/2176: *USW Support Equipment (N2N6/USW-DSS only)*	10.784	7.305	6.017	-	6.017	7.262	8.736	11.786	12.022	Continuing	Continuing

Remarks

D. Acquisition Strategy

- Hardware/Software development and integration via Navy Warfare Centers and Small Business contractors.
- Utilize SBIR funding and development efforts for open competition on capability improvements to reach TRL 5/6.
- Invest Program of Record (POR) funding into maturing Small Business and Innovative Research (SBIR) developed technologies beyond TRL 5/6 for integration into USW-DSS and TASW systems via Phase III funding.

E. Performance Metrics

- Deliver incremental FCRs with capabilities in high interest areas that impact Fleet metrics, such as Detect to Engage (DTE) and Fleet readiness.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3094 / *USW Decision Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USW-DSS H/W & S/W Development	C/CPFF	Adaptive Methods : VA	1.592	0.717	Dec 2017	2.416	Dec 2018	2.126	Dec 2019	-		2.126	Continuing	Continuing	Continuing
USW-DSS H/W & S/W Development	C/CPFF	DH Wagner : PA	0.000	0.000		0.400	Jan 2019	0.408	Dec 2019	-		0.408	Continuing	Continuing	Continuing
UISW-DSS H/W & S/W Development	WR	NSWC/Carderock : MD	0.800	0.708	Oct 2017	1.484	Nov 2018	1.514	Nov 2019	-		1.514	Continuing	Continuing	Continuing
USW-DSS H/W & S/W Development	WR	NSWC/Dahlgren : VA	0.000	0.150	Jan 2018	0.000		0.000		-		0.000	0.000	0.150	-
USW-DSS H/W & S/W Development	WR	NUWC/Keyport : WA	0.300	0.438	Oct 2017	1.139	Nov 2018	1.162	Nov 2019	-		1.162	Continuing	Continuing	Continuing
USW-DSS H/W & S/W Development	WR	NUWC/Newport : RI	0.510	0.530	Oct 2017	0.436	Nov 2018	0.445	Nov 2019	-		0.445	Continuing	Continuing	Continuing
USW-DSS H/W & S/W Development	C/CPFF	Progeny : VA	1.340	0.781	Feb 2018	1.964	Dec 2018	1.941	Dec 2019	-		1.941	Continuing	Continuing	Continuing
USW-DSS H/W & S/W Development	C/CPFF	UT/ARL : TX	0.000	0.266	Dec 2017	0.000		0.000		-		0.000	0.000	0.266	-
USW-DSS H/W & S/W Development	Various	Var : Var*	49.280	0.125	Dec 2017	0.622	Dec 2018	0.384	Dec 2019	-		0.384	Continuing	Continuing	Continuing
		Subtotal	53.822	3.715		8.461		7.980		-		7.980	Continuing	Continuing	N/A

Remarks

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

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USW-DSS Integration and Test	C/CPFF	Adaptive Methods : VA	0.250	0.200	Dec 2017	0.204	Dec 2018	0.208	Dec 2019	-		0.208	Continuing	Continuing	Continuing
USW-DSS Integration and Test	C/CPFF	Progeny : VA	1.000	0.249	Feb 2018	0.254	Dec 2018	0.259	Dec 2019	-		0.259	Continuing	Continuing	Continuing
		Subtotal	1.250	0.449		0.458		0.467		-		0.467	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3094 / *USW Decision Support*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USW-DSS Program Management Support	C/CPFF	CACI : VA	0.100	0.043	Jan 2018	0.084	Dec 2018	0.086	Dec 2019	-		0.086	Continuing	Continuing	Continuing
USW-DSS Program Management Support	C/CPFF	CGI Federal : VA	0.200	0.087	Nov 2017	0.040	Nov 2018	0.041	Dec 2019	-		0.041	Continuing	Continuing	Continuing
USW-DSS Travel	Allot	NAVSEA PEO IWS5 : DC	0.000	0.000		0.020	Jan 2019	0.020	Dec 2019	-		0.020	Continuing	Continuing	Continuing
		Subtotal	0.300	0.130		0.144		0.147		-		0.147	Continuing	Continuing	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	55.372	4.294		9.063		8.594		-		8.594	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3094 / *USW Decision Support*

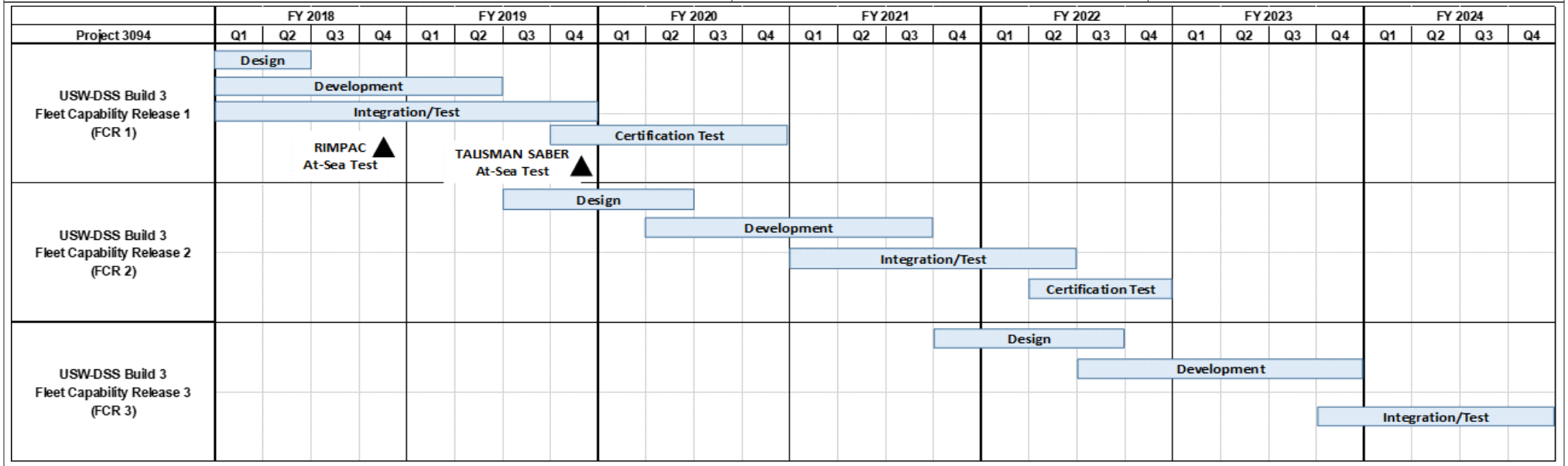

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3094 / *USW Decision Support*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3094				
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Design	1	2018	2	2018
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Development	1	2018	2	2019
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Integration/Test	1	2018	4	2019
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): RIMPAC At-Sea Test	4	2018	4	2018
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Certification Test	4	2019	4	2020
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): TALISMAN SABER At-Sea Test	4	2019	4	2019
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Design	3	2019	2	2020
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Development	2	2020	3	2021
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Integration/Test	1	2021	2	2022
USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Certification Test	2	2022	4	2022
USW-DSS Build 3 / Fleet Capability Release 3 (FCR 3): Design	4	2021	3	2022
USW-DSS Build 3 / Fleet Capability Release 3 (FCR 3): Development	3	2022	4	2023
USW-DSS Build 3 / Fleet Capability Release 3 (FCR 3): Integration/Test	4	2023	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / *Combat Information Center Conv*	Project (Number/Name) 3439 / *Project NAUTICA: Integrated Theater ASW C4I*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3439: *Project NAUTICA: Integrated Theater ASW C4I*	0.000	0.000	10.200	7.500	-	7.500	3.400	1.000	1.100	1.122	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Effective FY 2019, a new initiative titled Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA) was established for TUSW architecture development, systems engineering, and design. NAUTICA integrates intelligence (operational and tactical) and sensor (national and organic) systems to provide a fully informed COP of enemy undersea forces, maximizing decision superiority and theater level planning, and address TUSW C2.

The Navy plan for NAUTICA was approved by the June 2017 Flag Oversight Board and subsequently a roadmap was developed in FY 2018. The TUSWOC's 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, FY 2019 accelerates development by rapid prototyping the framework for existing legacy systems to be federated to be exchange key information and significantly improve existing TUSW capability.

FY 2019 initiates the system engineering effort required to design, develop and deliver an integrated TUSW battle management suite in accordance with the 2007 ASW 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). The design of the integrated TUSW battle management suite will include a system of systems TUSW architecture to enable the existing programs of record under development from PEO IWS, PEO C4I, PEO AIR, and N9SP to exploit a common framework in the FYDP. 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 DCGS-N and USW-DSS to exchange, display and exploit information at the appropriate classifications.

Funding under this project will also establish a transition path for new technologies such as the Operational Planning Tool (OPT), Water Space Planner (WASP), Battle Management TDA, and other Future Naval Capabilities (FNCs) that will start to transition Technology Readiness Level (TRL) 5/6 enabling technologies into the USW-DSS and DCGS-N Programs of Record (PORs).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAUTICA - Theater Architecture Development and System Integration	0.000	10.200	7.500	0.000	7.500
Articles:	-	-	-	-	-
Description: FY 2019 initiates the analysis of the TASW Command Center system of systems design and planning. The effort will make specific recommendations for the design and development of the interfaces and test procedures for the systems being developed under separate Programs of Record. Specifically, the					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3439 / *Project NAUTICA: Integrated Theater ASW C4I*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
GCCS-M, USW DSS, DCGS-N, Maritime Tactical Command & Control-2 (MTC-2) systems have evolved on separate timelines. The funding will develop near term solutions and propose a long range plan for the systems. The investment will, as a first step, 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 C2 needs identified in the ASW ICD. ***FY 2019 Plans:*** - Complete Systems Engineering Top-Down Design for NAUTICA. - Complete requirements definition, requirements analysis, and architecture design. - Develop Requirements Definition Package (RDP). - Develop and approve Systems Engineering Plan (SEP) in accordance with the Defense Acquisition Guidebook (DAG). - Development the battle management suite architecture. - Establish a transition plan for Office of Naval Research (ONR) Future Naval Capabilities (FNCs) such as Water Space Management and Battlespace Awareness Tactical Decision Aids. - Utilize TASW Tactical Advancements for the Next Generation (TANG) recommendations to develop prototypes form the TANG concepts for evaluation by the Fleet such as the CASEBOOK concept. - Design and develop the data exchanges necessary between systems to support early incorporation of P-8 data onto the TASW Command Center. - Define and/or design the common framework of displays, processing & storage, boundary defense, network, communication systems, and cyber security that will allow federation of existing systems and insertion of new capabilities to enable more effective employment of Theater USW assets. - Deliver an Advanced Engineering Development model of the common framework to a CTF. - Develop the software development kit for applications be developed to run on the battle management suite. - Define the System of System testing and validation environment for applications to be rapidly approved and fielded. ***FY 2020 Base Plans:*** - Develop a multi-nation security release data marking and exchange plan. - Design data extensions to support multi-national data display and protection. - Conduct a cloud storage assessment and establish a prototype capability for testing. - Conduct a cloud computing assessment and establish a prototype capability for prototyping.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3439 / *Project NAUTICA: Integrated Theater ASW C4I*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Select additional TANG concepts for evaluation by the Fleet such as the SEGA concept. - Incorporate additional functionality from the Theater ASW Capability Requirements" letter (dated 24 February 2017) into the Master tactical plot such as red Courses of Action. - Design and develop applications to reduce track clutter such as enabling association, correlation and fusion of different POR tracks to support a master track file. - Design and develop the data exchanges necessary between systems to support blue force management such as incorporation of water space management and prevention of mutual interference tools. - Design and develop the data exchanges necessary between systems to support for early incorporation of Theater USW platforms such as submarines and IUSS. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 to FY 2020 decrease ($-2.700M) reflects planned reduced systems engineering scope.					
Accomplishments/Planned Programs Subtotals	0.000	10.200	7.500	0.000	7.500

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPN/2176: *USW Support Equipment (N2N6/USW-DSS only)*	10.784	7.305	6.017	-	6.017	7.262	8.736	11.786	12.022	Continuing	Continuing

Remarks

D. Acquisition Strategy

- New Theater Architecture Development and System Integration initiative provides the transition funding for the ONR FNC investments, for Water Space Management and including Battlespace Management TDA.
- Capabilities developed under SBIRs and FNCs are incorporated into TASW PoRs, such as USW-DSS, through incremental FCRs.

E. Performance Metrics

- Measure system performance and improvement through System Qualification Testing (SQT) and evaluate the fielded system performance against approved TASW metrics derived from Systems Engineering efforts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3439 / *Project NAUTICA: Integrated Theater ASW C4I*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development/Engineering	C/CPFF	Adaptive Methods : VA	0.000	0.000		0.850	Dec 2018	0.638	Dec 2019	-		0.638	Continuing	Continuing	Continuing
Development/Engineering	WR	COMNAVAIRPAC : CA	0.000	0.000		0.210	Jan 2019	0.158	Nov 2019	-		0.158	Continuing	Continuing	Continuing
Development/Engineering	C/CPFF	DH Wagner : PA	0.000	0.000		0.100	Jan 2019	0.075	Dec 2019	-		0.075	Continuing	Continuing	Continuing
Development/Engineering	WR	NSWC/Carderock : MD	0.000	0.000		0.750	Dec 2018	0.563	Nov 2019	-		0.563	Continuing	Continuing	Continuing
Development/Engineering	WR	NSWC/Dahlgren : VA	0.000	0.000		0.445	Dec 2018	0.334	Nov 2019	-		0.334	Continuing	Continuing	Continuing
Development/Engineering	WR	NUWC/Keyport : WA	0.000	0.000		1.273	Dec 2018	0.955	Nov 2019	-		0.955	Continuing	Continuing	Continuing
Development/Engineering	WR	NUWC/Newport : RI	0.000	0.000		0.888	Dec 2018	0.666	Nov 2019	-		0.666	Continuing	Continuing	Continuing
Development/Engineering	WR	SSC : CA	0.000	0.000		0.280	Jan 2019	0.210	Nov 2019	-		0.210	Continuing	Continuing	Continuing
Development/Engineering	C/CPFF	UT/ARL : TX	0.000	0.000		1.774	Dec 2018	1.331	Dec 2019	-		1.331	Continuing	Continuing	Continuing
Development/Engineering	C/CPFF	Various : Var*	0.000	0.000		2.590	Jan 2019	1.499	Dec 2019	-		1.499	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		9.160		6.429		-		6.429	Continuing	Continuing	N/A

Remarks

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

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	CACI : VA	0.000	0.000		0.095	Dec 2018	0.097	Dec 2019	-		0.097	Continuing	Continuing	Continuing
Program Management Support	C/CPFF	CGI Federal : VA	0.000	0.000		0.915	Dec 2018	0.944	Dec 2019	-		0.944	Continuing	Continuing	Continuing
Travel	Allot	NAVSEA PEO IWS5 : DC	0.000	0.000		0.030	Jan 2019	0.030	Dec 2019	-		0.030	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		1.040		1.071		-		1.071	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604518N / *Combat Information Center Conv*	Project (Number/Name) 3439 / *Project NAUTICA: Integrated Theater ASW C4I*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		10.200		7.500		-		7.500	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3439 / *Project NAUTICA: Integrated Theater ASW C4I*

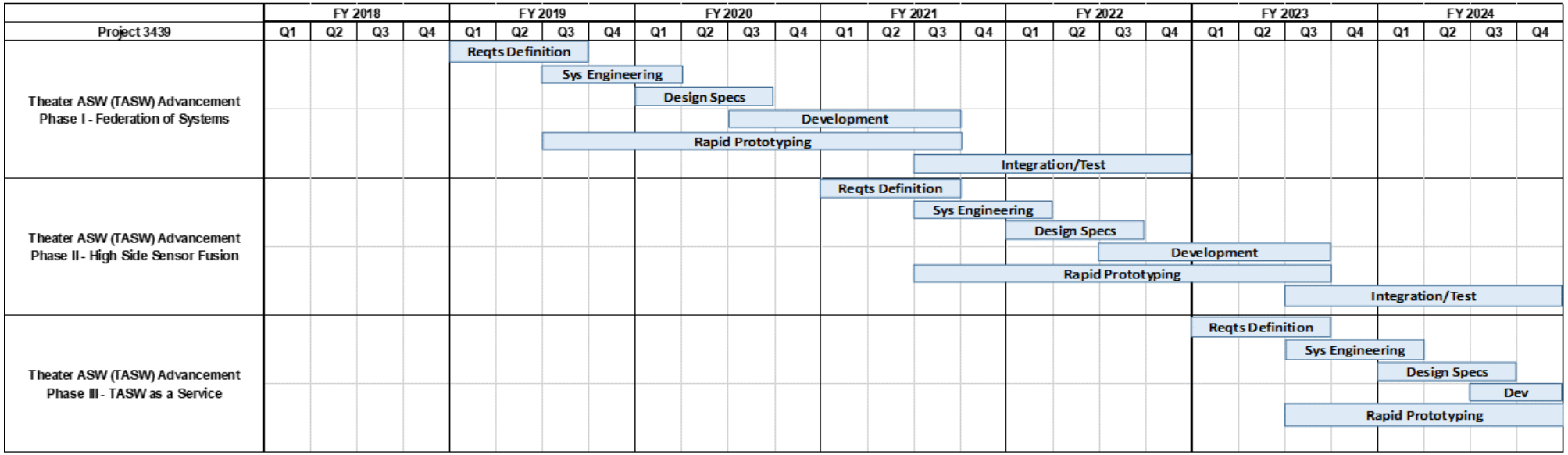

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3439 / *Project NAUTICA: Integrated Theater ASW C4I*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3439				
Theater ASW (TASW) Advancement Phase I - Federation of Systems: Requirements Definition	1	2019	3	2019
Theater ASW (TASW) Advancement Phase I - Federation of Systems: Systems Engineering	3	2019	1	2020
Theater ASW (TASW) Advancement Phase I - Federation of Systems: Design Specifications	1	2020	3	2020
Theater ASW (TASW) Advancement Phase I - Federation of Systems: Development	3	2020	3	2021
Theater ASW (TASW) Advancement Phase I - Federation of Systems: Rapid Prototyping	3	2019	3	2021
Theater ASW (TASW) Advancement Phase I - Federation of Systems: Integration/Test	3	2021	4	2022
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Requirements Definition	1	2021	3	2021
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Systems Engineering	3	2021	1	2022
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Design Specifications	1	2022	3	2022
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Development	3	2022	3	2023
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Rapid Prototyping	3	2021	3	2023
Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Integration/ Test	3	2023	4	2024
Theater ASW (TASW) Phase III - TASW As A Service: Requirements Definition	1	2023	3	2023
Theater ASW (TASW) Phase III - TASW As A Service: Systems Engineering	3	2023	1	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604518N / *Combat Information Center Conv*	**Project (Number/Name)** 3439 / *Project NAUTICA: Integrated Theater ASW C4I*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Theater ASW (TASW) Phase III - TASW As A Service: Design Specifications	1	2024	3	2024
Theater ASW (TASW) Phase III - TASW As A Service: Development	3	2024	4	2024
Theater ASW (TASW) Phase III - TASW As A Service: Rapid Prototyping	3	2023	4	2024