Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604558N *I New Design SSN*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	2,459.544	174.351	321.010	259.443	-	259.443	317.698	347.879	281.815	287.455	Continuing	Continuing
1947: *New Design SSN HM&E*	1,633.046	101.709	80.405	220.421	-	220.421	277.832	307.227	240.347	245.157	Continuing	Continuing
1950: *New Design SSN Combat Sys Dev*	781.598	39.214	37.485	36.251	-	36.251	37.039	37.769	38.529	39.300	Continuing	Continuing
3062: *Submarine Multi-Mission Team Trainer*	44.900	2.556	3.120	2.771	-	2.771	2.827	2.883	2.939	2.998	Continuing	Continuing
9999: *Congressional Adds*	0.000	30.872	200.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	230.872
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 516												

A. Mission Description and Budget Item Justification

The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The VIRGINIA Class Submarine, formerly the New Attack Submarine (New SSN), is being designed to fulfill this need. It will counter the potential threats of the next century in a multi- mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing significant capability and improved performance enhancements while managing technical risk. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the VIRGINIA Class Submarine and build its Hull, Mechanical and Electrical (HM&E) systems and Command, Control, Communications, and Intelligence (C3I) System. The increase in the FY2021 budget in this PE provides funding for the Tactical Submarine Evolution Plan (TSEP) which includes; Virginia Class Submarine Undersea Dominance Payload Integration (UDPI)(i.e. Advanced Payloads), Advanced Acoustic Sensors, Subsea Seabed Warfare (SSW), host ship interaction with large volume UUVs, and future block concept design. This PE directly supports the following VIRGINIA Class Submarine missions: (1) covert strike warfare (STRIKE); (2) anti-submarine warfare (ASW); (3) covert intelligence collection/surveillance (ISR), indication and warning (I&W), and electronic warfare (EW); (4) anti-surface ship warfare (ASUW); (5) special warfare; (6) covert mine warfare; and (7) battle group support.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604558N *I New Design SSN*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	180.233	121.010	201.638	-	201.638
Current President's Budget	174.351	321.010	259.443	-	259.443
Total Adjustments	-5.882	200.000	57.805	-	57.805
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	200.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-5.882	0.000			
• Program Adjustments	0.000	0.000	59.923	-	59.923
• Rate/Misc Adjustments	0.000	0.000	-2.118	-	-2.118

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: 9999: *Congressional Adds*		
Congressional Add: *New Design SSN SBIR (Cong)*	19.295	0.000
Congressional Add: *New Design SSN*	11.577	0.000
Congressional Add: *Future capability development*	0.000	100.000
Congressional Add: *Design risk reduction*	0.000	100.000
Congressional Add Subtotals for Project: 9999	30.872	200.000
Congressional Add Totals for all Projects	30.872	200.000

Change Summary Explanation

FY 2021 President's Budget request budget request increased from the FY 2020 President's Budget request request to fund Virginia Class Submarine Undersea Dominance Payload Integration (UDPI)(i.e. Advanced Payloads) as discussed in Project 1947.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 1947 / *New Design SSN HM&E*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
1947: *New Design SSN HM&E*	1,633.046	101.709	80.405	220.421	-	220.421	277.832	307.227	240.347	245.157	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 516

A. Mission Description and Budget Item Justification

This project encompasses all the ship system development efforts for the VIRGINIA Class Submarine and the Technology Insertion Program for reducing costs and upgrading performance of future hulls by virtue of improvements in ship design and systems. Technology development implementation and logistics for developmental items, and VIRGINIA Class test & evaluation are included. The thrust of these efforts will be to develop and apply multiple advanced system technologies which are integrated into the design of the VIRGINIA Class Submarine. Technologies developed in this program will be considered for applicability to the COLUMBIA Program (CLB) for commonality opportunities. New technologies are being transitioned from industry and government research and development programs where doing so offers substantial performance improvement and/or affordability payoffs. Transition opportunities include those from the Defense Advanced Research Projects Agency (DARPA) and Office of Naval Research (ONR) Future Naval Capabilities Program. The increase in the FY2021 budget in this PE provides funding for the Tactical Submarine Evolution Plan (TSEP) which includes; Virginia Class Submarine Undersea Dominance Payload Integration (UDPI), Advanced Acoustic Sensors, Subsea Seabed Warfare (SSW), host ship interaction with large volume UUVs, and future block concept design.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: New Design SSN HM&E	97.638	73.479	210.361	0.000	210.361
Articles:	-	-	-	-	-
FY 2020 Plans: -Continue PSA and installation of SDIP components and modifications. -Continue SAS integration and installation during PSA. -Complete design details for SDIP Technologies' insertion into the VIRGINIA Class baseline for Block V. -Continue development of HM&E systems concepts, technologies including obsolescence redesign for integration into VIRGINIA Class Block V Technical Baseline. -Continue efforts based on OPNAV direction for integrating advanced payload systems and SOF capabilities into VIRGINIA Class platforms. -Continue efforts to include various options for leveraging increased vertical payload volume commensurate with insertion of VPM into Block V and other concepts beyond Block V for host ship interaction with large volume UUVs. -Continue development of design options to support TSEP.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Continue transition of products from the Office of Naval Research Manufacturing Technology Program (MANTECH). -Continue the transition of products from ONR FNC Programs. ***FY 2021 Base Plans:*** -Continue and greatly expand Virginia Class Submarine Undersea Dominance Payload Integration (UDPI) efforts to modify the current host ship systems (to include electrical, hydraulic, fluid systems, safety and security testing) in support of launching payloads from multiple different hull/ocean interfaces. Funding will be used for the non-recurring engineering (NRE) efforts to modify the Block V VIRGINIA Class design to support hosting of various advanced payloads. Additional UDPI efforts include; vendor component development, specification and diagram changes, design disclosure and ILS product reviews - all of which are required to support integrating the identified advanced payload systems into the technical baseline for a Block V insertion. Further details available at the appropriate classification level. Other related Tactical Submarine Evolution Plan (TSEP) efforts include: -Commence NRE and design efforts for Advanced Acoustic Sensors. -Continue efforts on Subsea Seabed Warfare (SSW) specific to VIRGINIA Class host ship integration. -Continue efforts to include concepts beyond Block V for host ship interaction with large volume UUVs. -Continue and expand efforts for Block VI preliminary design and concept development. -Complete installation of SDIP components and modifications during PSA. -Complete SAS integration and installation during PSA. -Continue development of HM&E systems concepts technologies, including obsolescence redesign and performance improvement, for integration into VIRGINIA Class Block V Technical Baseline. -Continue transition of products from the Office of Naval Research Manufacturing Technology Program (MANTECH) and transition of products from ONR FNC Programs. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase in the FY2021 budget in this PE provides funding for the Tactical Submarine Evolution Plan (TSEP) which includes; Virginia Class Submarine Undersea Dominance Payload Integration (UDPI), Advanced Acoustic Sensors, Subsea Seabed Warfare (SSW), host ship interaction with large volume UUVs, and future block concept design. Further details available at the appropriate classification level.					
Title: TEST AND EVALUATION	4.071	6.926	10.060	0.000	10.060
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: -Continue work associated with previous test events (IOT&E, Arctic, Dry-Deck Shelter, Block III FOT&E). This consists of documenting and testing fixes to deficiencies identified during previously completed Developmental and Operational Testing as well as addressing recommendations noted by the Oversight Community from OSD. -Analyze the data and publish the reports, from the PCU SOUTH DAKOTA (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance. These trials consisted of a Weapon System Accuracy Trial (WSAT 1), an Acoustic Trial (ACTRL 1), an Underwater Electromagnetic Trial (UEM 1), and a Hydrodynamic Performance Trial (HPT 1). This information derived will be used to fully develop the next phase of testing which will be accomplished post-PSA. This post-PSA phase will include a Tactical Weapons Proficiency Assist (TWPA), an Acoustic Trial (ACTRL 2), and Underwater Electromagnetic Trial (UEM 2), and a Hydrodynamic Performance Trial (HPT 2). The post-PSA trials will be modified to ensure full evaluation of the technology insertion changes (made during PSA) is done without repeating testing accomplished during the pre-PSA trials. -Finalize plans for the test and evaluation phase of the Acoustic Superiority initiatives to meet current and future warfare requirements. -Continue efforts to develop the FOT&E plan, to include the Cybersecurity test strategy, for Block V. The Cybersecurity test strategy will be planned and executed in coordination with the USS COLUMBIA Class IOT&E Cybersecurity test strategy. - Complete the development of the Combined Shock and Submergence Test Report and Validation Report. -Continue development of the Block V Transient Shock Analysis Verification and Validation Plan, as well as, the Block V Vulnerability Assessment Report to meet the LFT&E legislation mandated in Title 10 USC 2366.					
FY 2021 Base Plans: -Continue work associated with previous test events (IOT&E, Arctic, Dry-Deck Shelter, Block III FOT&E). This consists of documenting and testing fixes to deficiencies identified during previously completed Developmental and Operational Testing as well as addressing recommendations noted by the Oversight Community from OSD. -Commence execution, data analysis, and publishing of preliminary reports, from the USS SOUTH DAKOTA (SSN 790) post-PSA trials in order to fully characterize the ship signature and re-baselined performance. These trials will consist of an Acoustic Trial (ACTRL 2), an Underwater Electromagnetic Trial (UEM 2), a Hydrodynamic Performance Trial (HPT 2), a Tactical Weapons Proficiency Assist (TWPA), and UWDC Tactical Development (TACDEV) Exercises, along with performance assessments and Future Naval Capability (FNC) testing. The post-PSA trials will be modified to ensure full evaluation of the technology insertion changes (made during PSA) is done without requiring repeat testing during the pre-PSA trials. The testing, data analysis, and report generation will continue into FY2022.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Finalize plans for the test and evaluation phase of the Acoustic Superiority initiatives to meet current and future warfare requirements. -Continue efforts to develop the FOT&E plan, to include the Cybersecurity test strategy, for Block V. The Cybersecurity test strategy will be planned and executed in coordination with the USS COLUMBIA Class IOT&E Cybersecurity test strategy. -Continue development of the Block V Transient Shock Analysis Verification and Validation Plan, as well as, the Block V Vulnerability Assessment Report to meet the LFT&E legislation mandated in Title 10 USC 2366. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY20 to FY21 is due to test and evaluation and publishing of reports from USS South Dakota (SSN790) Post Shakedown Availability (PSA) Trials of the modified ship components in order to fully characterize the ship signature and re-baselined performance.					
Accomplishments/Planned Programs Subtotals	101.709	80.405	220.421	0.000	220.421

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SCN/2013: *Virginia Class Submarine*	7,137.077	8,334.733	4,235.880	-	4,235.880	6,333.739	6,328.481	7,605.857	7,202.510	24,287.839	148,281.774
• OMN/0204283N: *Sub Ops & Safety*	11.038	11.462	12.003	-	12.003	12.131	12.357	12.604	0.000	Continuing	Continuing
• OPN/0942: *Virginia Class Support Equipment*	66.328	28.465	22.868	-	22.868	22.964	23.474	23.792	24.260	Continuing	Continuing

Remarks

D. Acquisition Strategy

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I, II and III ships (SSNs 774-791) have been delivered. Ten Block IV ships are awarded and under construction. The program has awarded the fourth MYP (Block V) contract, incorporating Acoustic Superiority (AS) modifications and Virginia Payload Module (VPM).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Component Development	WR	NSWC : Carderock, MD	264.565	8.318	Nov 2018	5.266	Nov 2019	11.571	Oct 2020	-		11.571	Continuing	Continuing	Continuing
Component Development	WR	NUWC : Newport, RI	119.464	2.237	Nov 2018	1.480	Nov 2019	9.698	Oct 2020	-		9.698	Continuing	Continuing	Continuing
Component Development	WR	NRL : Washington, DC	8.900	0.516	Nov 2018	0.360	Nov 2019	0.791	Oct 2020	-		0.791	Continuing	Continuing	Continuing
Component Development	C/CPFF	Electric Boat : Groton, CT	919.178	83.858	Nov 2018	64.401	Nov 2019	177.405	Nov 2020	-		177.405	Continuing	Continuing	Continuing
Component Development	C/CPFF	Progeny Applied : Manassas, VA	0.000	0.000		0.000		7.162	Dec 2020	-		7.162	0.000	7.162	-
Component Development	SS/CPFF	Applied Research Laboratory : Penn State University	25.273	1.520	Dec 2018	0.990	Dec 2019	2.175	Dec 2020	-		2.175	Continuing	Continuing	Continuing
Component Development	SS/FP	National Shipbuilding Research Program : Not Specified	5.239	0.500	Mar 2019	0.500	Mar 2020	0.500	Mar 2021	-		0.500	Continuing	Continuing	Continuing
Component Development	Various	Miscellaneous : Not Specified	24.671	0.689	Dec 2018	0.482	Dec 2019	1.059	Dec 2020	-		1.059	Continuing	Continuing	Continuing
		Subtotal	1,367.290	97.638		73.479		210.361		-		210.361	Continuing	Continuing	N/A

Remarks

1. HM&E Product Development NSWC increase from FY2020 to FY2021 provides funding for conducting model testing and analysis which mitigate design risk for TSEP efforts. NSWC Carderock model testing will focus on hull structure, confirmation models, and hydrodynamics.
2. HM&E Product Development NUWC increase from FY2020 to FY2021 provides funding for conducting model testing and analysis which mitigate design risk for TSEP efforts. NUWC Newport model testing will focus on the electronics suite and command and control systems.
3. HM&E Product Development NRL increase from FY2020 to FY2021 provides funding for corrosion and Underwater Electromagnetic Signature (UEM) studies and analysis for TSEP.
4. HM&E Product Development Electric Boat increase from FY2020 to FY2021 is driven by the ramp up into full execution of VIRGINIA Class Submarine Payload Integration Execution Plans to support Virginia Class Submarine Undersea Dominance Payload Integration (UDPI) on Block V, Advanced Acoustic Sensors, Subsea and Seabed Warfare (SSW), host ship interaction with large volumn UUVs, and future block concept design for TSEP.
5. HM&E Product Development ARL PSU increase from FY2020 to FY2021 provides funding for analysis and model testing to ensure hydrodynamic induced signature characteristics are minimized.
6. HM&E Product Development Miscellaneous-Not Specified category provides increased funding for the transition of FNC and SBIR Phase III efforts to support TSEP efforts in FY2021.
7. HM&E Product Development Progeny FY2021 funding is required for Payload Support Electronic System (PSES) efforts to ensure a successful integration of Advanced Payloads with the Common Weapon Launcher (CWL).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 1947 / *New Design SSN HM&E*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation - DT&E	WR	NSWC : Carderock, MD	93.361	0.248	Nov 2018	2.010	Nov 2019	2.917	Nov 2020	-		2.917	Continuing	Continuing	Continuing
Test and Evaluation - LFT&E	WR	NSWC : Carderock, MD	5.277	0.530	Nov 2018	0.650	Nov 2019	0.905	Nov 2020	-		0.905	1.700	9.062	-
Test and Evaluation - DT&E	WR	NUWC : Newport, RI	138.157	0.501	Dec 2018	0.966	Nov 2019	1.398	Nov 2020	-		1.398	Continuing	Continuing	Continuing
Test and Evaluation - OT&E	PO	COMOPTEVFOR : Norfolk, VA	18.884	0.313	Nov 2018	0.374	Nov 2019	0.533	Nov 2020	-		0.533	Continuing	Continuing	Continuing
Test and Evaluation - LFT&E	C/CPFF	Electric Boat : Groton, CT	2.370	0.250	Jan 2019	0.325	Dec 2019	0.462	Nov 2020	-		0.462	Continuing	Continuing	Continuing
Test and Evaluation - LFT&E	WR	NUWC : Newport,RI	0.125	0.125	Nov 2018	0.125	Nov 2019	0.181	Nov 2020	-		0.181	0.000	0.556	-
Test and Evaluation - DT&E	C/CPFF	NUWC : Newport, RI - CORE Team	7.582	2.104	Jan 2019	2.476	Dec 2019	3.664	Nov 2020	-		3.664	0.000	15.826	-
		Subtotal	265.756	4.071		6.926		10.060		-		10.060	Continuing	Continuing	N/A

Remarks

FY21 Test and Evaluation budget increased by $3.134M to Analyze the data, and publish the reports, from the PCU South Dakota (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,633.046	101.709		80.405		220.421		-		220.421	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

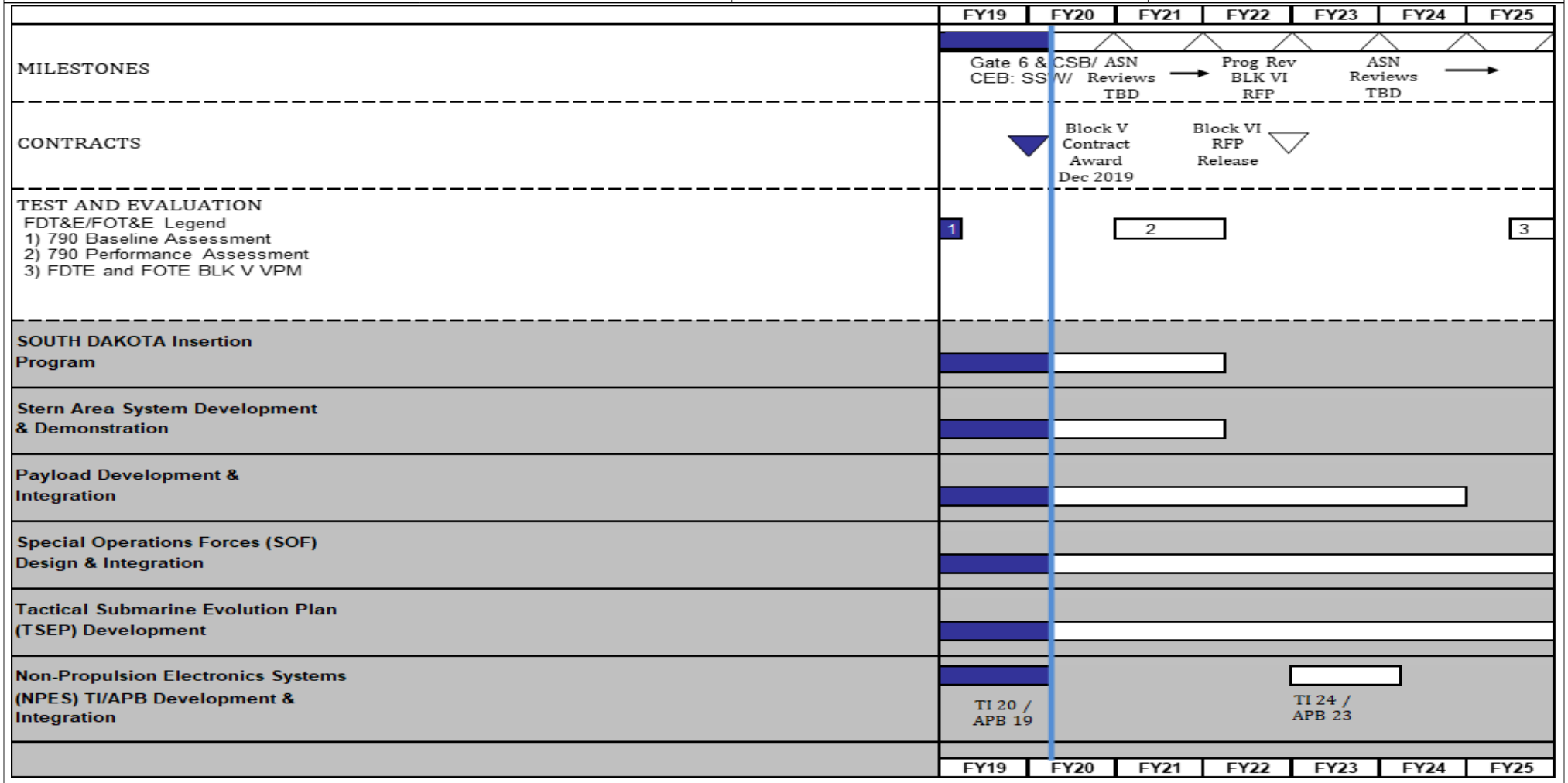

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1947 / *New Design SSN HM&E*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1947				
MILESTONE: VCS FY 19 Gate 6 & CSB / CEB: SSW	4	2019	4	2019
MILESTONE: VCS FY 20 Gate 6	4	2020	4	2020
MILESTONE: VCS FY 21 Gate 6	4	2021	4	2021
MILESTONE: VCS FY 22 Gate 6	4	2022	4	2022
MILESTONE: Prog Rev Block VI RFP	3	2022	3	2022
MILESTONE: VCS FY 23 Gate 6	4	2023	4	2023
MILESTONE: VCS FY 24 Gate 6	4	2024	4	2024
CONTRACTS: Block V Contract Award	1	2020	1	2020
CONTRACTS: Block VI RFP Release	4	2022	4	2022
TEST & EVALUATION: U/R 790 Baseline Assessment	1	2019	2	2019
TEST & EVALUATION: U/R 790 Performance Assessment	1	2021	1	2022
SOUTH DAKOTA Insertion Program	1	2019	1	2022
Stern Area System Development & Demonstration	1	2019	1	2022
Payload Development & Integration	1	2019	4	2024
Special Operations Forces (SOF) Design & Integration	1	2019	4	2025
Tactical Submarine Evolution Plan (TSEP) Development	1	2019	4	2025
Non-Propulsion Electronics Systems (NPES) TI20/APB19 Development & Integration	1	2019	1	2020
NPES TI24/APB23 Development & Integration	1	2023	1	2024
MILESTONE: VCS FY 25 Gate 6	4	2025	4	2025
TEST & EVALUATION: FDTE and FOTE VLK V VPM	2	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 1950 / *New Design SSN Combat Sys Dev*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
1950: *New Design SSN Combat Sys Dev*	781.598	39.214	37.485	36.251	-	36.251	37.039	37.769	38.529	39.300	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 516

A. Mission Description and Budget Item Justification

This project provides the engineering development required to outfit each ship of the VIRGINIA Class Submarine with a combat system which satisfies ORD requirements in all 7 mission areas, namely; ASW, STRIKE, ISR, Covert Mine Warfare, Battle Group Support, ASUW, and Special Warfare. The fully integrated combat system, otherwise referred to as the Non-Propulsion Electronics System (NPES), is composed of a collection of functional sub-systems, such as sonar, navigation, exterior communications, weapons launch, Large Vertical Array, Submarine Warfare Federated Tactical System (SWFTS) virtualization, Electronic Warfare Next Generation Architecture, etc., which evolve over the life of the program due to either competitive selection of new suppliers, component obsolescence replacement, increased technical performance, or improvements in reliability. Non-recurring engineering activity is needed to perform platform integration of the components, software modification to accommodate electronic data exchange, unique submarine environment qualification and update of all logistics products.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: C3I Systems Engineering	15.111	15.016	13.960	0.000	13.960
Articles:	-	-	-	-	-
FY 2020 Plans: -Initiate design of next generation displays in the Command and Control Center to mitigate obsolescence risk associated with existing glass. -Complete design of improved speed log automated sensor fail-over and integrate within the inertial navigation suite & NPES network. -Complete design of the fiber optic backbone and Command and Control System Module (CCSM) power distribution for the virtualization enabled, CYBER hardened TI-24 and beyond architecture.					
FY 2021 Base Plans: -Initiate NPES interfacing system software re-factoring to support the re-architected configuration that enables virtualization (separation of hardware/software dependency). -Conduct platform integration of the next generation inertial navigators, and Time Frequency Distribution System at COATS. -Conduct at-sea testing of the BPS-17 RADAR.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1950 / *New Design SSN Combat Sys Dev*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Initiate hotel services design change GFI stemming from re-allocation of space-weight-power in conjunction with the NPES re-architecture initiative. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Slight reduction in the budget from FY20 to FY21 reflects estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation.					
Title: Sonar, Combat Control, and Architecture (S/CC/A) Subsystems	24.103	22.469	22.291	0.000	22.291
Articles:	-	-	-	-	-
Description: Continue development of S/CC/A System Improvements necessary to maintain VIRGINIA Class ORD compliance, counter CYBER threats, and maintain commonality with in-service submarine designs. ***FY 2020 Plans:*** -Initiate TI-24 S/CC/A detailed design, programmed to be the configuration for the last 2 VCS Blk V hulls (SSN810 & SSN811) and leveraged by the Columbia Class 2nd hull (SSBN 827). -Complete the design of the virtualization enabling system architecture and select tested technologies that support incorporation of CYBER defense as one of the design pillars. -Complete platform level integration of the first Large Vertical Array sonar sensor on SSN790 and conduct at-sea performance testing. ***FY 2021 Base Plans:*** -Continue TI-24 S/CC/A detailed design, programmed to be the configuration for the last 2 VCS Blk V hulls (SSN810 & SSN811) and leveraged by the Columbia Class 2nd hull (SSBN 827). -Initiate platform integration studies and analysis of a completely re-architected NPES infrastructure and conduct critical item testing of key enabling electronics components. -Conduct find, fix, and defect correction efforts associated with first time Large Vertical Array sonar at-sea performance testing. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1950 / *New Design SSN Combat Sys Dev*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Slight reduction in the budget from FY20 to FY21 reflects estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation.					
Accomplishments/Planned Programs Subtotals	39.214	37.485	36.251	0.000	36.251

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SCN/2013: *VA CL*	7,137.077	8,334.733	4,235.880	-	4,235.880	6,333.739	6,328.481	7,605.857	7,202.510	24,287.839	148,281.774
• O&M,N/0204283N: *Sub Ops & Safety*	11.038	11.462	12.003	-	12.003	12.131	12.357	12.604	0.000	Continuing	Continuing
• OPN/0942: *VA CL Support Equipment*	66.328	28.465	22.868	-	22.868	22.964	23.474	23.792	24.260	Continuing	Continuing

Remarks

D. Acquisition Strategy

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I, II and III ships (SSNs 774-791) have been delivered. Ten Block IV ships are awarded and under construction. The program has awarded the fourth MYP (Block V) contract, incorporating Acoustic Superiority (AS) modifications and Virginia Payload Module (VPM).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 1950 / *New Design SSN Combat Sys Dev*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Unique Virginia Class Improvements	Various	Various : Various	90.421	3.750	Feb 2019	3.750	Feb 2020	3.350	Feb 2021	-		3.350	Continuing	Continuing	Continuing
Tech Insertion/Advanced Processing Build (TI/APB) Integration	Various	Various : TBD	3.949	7.195	Nov 2018	6.950	Nov 2019	5.850	Nov 2020	-		5.850	Continuing	Continuing	Continuing
Photonics	C/CPIF	Kollmorgen : Northampton, MA	61.701	0.635	Jan 2019	0.808	Jan 2020	0.950	Jan 2021	-		0.950	0.000	64.094	-
Large Vertical Array South Dakota Improvement Program	Various	Various : TBD	4.518	6.925	Nov 2018	4.800	Nov 2019	4.250	Oct 2020	-		4.250	Continuing	Continuing	Continuing
Platform Integration	SS/CPFF	Electric Boat : Groton, CT	57.631	6.370	Nov 2018	6.100	Nov 2019	6.111	Nov 2020	-		6.111	Continuing	Continuing	Continuing
Photonics	C/CPIF	Lockheed Martin : Manassas, VA	0.500	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Virtualization Enabling Architecture Development	Various	Various : TBD	4.318	5.850	Nov 2018	4.551	Nov 2019	5.100	Nov 2020	-		5.100	Continuing	Continuing	Continuing
Technical Direction Agent	WR	NUWC : Newport, RI	324.100	3.784	Nov 2018	5.481	Nov 2019	5.845	Oct 2020	-		5.845	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Carderock, MD	14.669	0.220	Nov 2018	0.420	Nov 2019	0.450	Oct 2020	-		0.450	Continuing	Continuing	Continuing
Acoustic Intercept & Sonar	C/CPFF	Progeny Applied : Manassas, VA	0.500	0.635	Nov 2018	0.400	Jan 2020	0.425	Jan 2021	-		0.425	Continuing	Continuing	Continuing
High Frequency & Sonar Sensors	C/CPFF	Applied Research Lab : University of Texas	0.300	0.400	Nov 2018	0.455	Nov 2019	0.485	Nov 2020	-		0.485	Continuing	Continuing	Continuing
Next Generation Architecture - Electronic Warfare System	WR	NSMA : Various	3.799	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	SSC : Charleston, SC	10.077	1.300	Nov 2018	1.345	Nov 2019	1.275	Nov 2020	-		1.275	Continuing	Continuing	Continuing
Systems Engineering	WR	NUWC : Keyport, WA	13.585	0.650	Nov 2018	0.875	Nov 2019	0.825	Oct 2020	-		0.825	Continuing	Continuing	Continuing
Miscellaneous	Various	Various : Various	146.367	0.700	Nov 2018	0.600	Dec 2019	0.500	Jan 2021	-		0.500	Continuing	Continuing	Continuing
		Subtotal	736.435	38.414		36.535		35.416		-		35.416	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 1950 / *New Design SSN Combat Sys Dev*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

1. Estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation.
2. FY21 increase of the Virtualization Enabling Architecture Development reflects increased activity needed to support TI-24 fielding on SSN810 and beyond.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Various	Various	Various : TBD	6.212	0.000		0.000		0.000		-		0.000	0.000	6.212	-
		Subtotal	6.212	0.000		0.000		0.000		-		0.000	0.000	6.212	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Support Services/ETS	C/CPAF	SEAPORT : Rockville, MD	38.756	0.800	Dec 2018	0.950	Dec 2019	0.835	Dec 2020	-		0.835	Continuing	Continuing	Continuing
DAWDF	Various	Various : Various	0.195	0.000		0.000		0.000		-		0.000	0.000	0.195	-
		Subtotal	38.951	0.800		0.950		0.835		-		0.835	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	781.598	39.214		37.485		36.251		-		36.251	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1950 / *New Design SSN Combat Sys Dev*

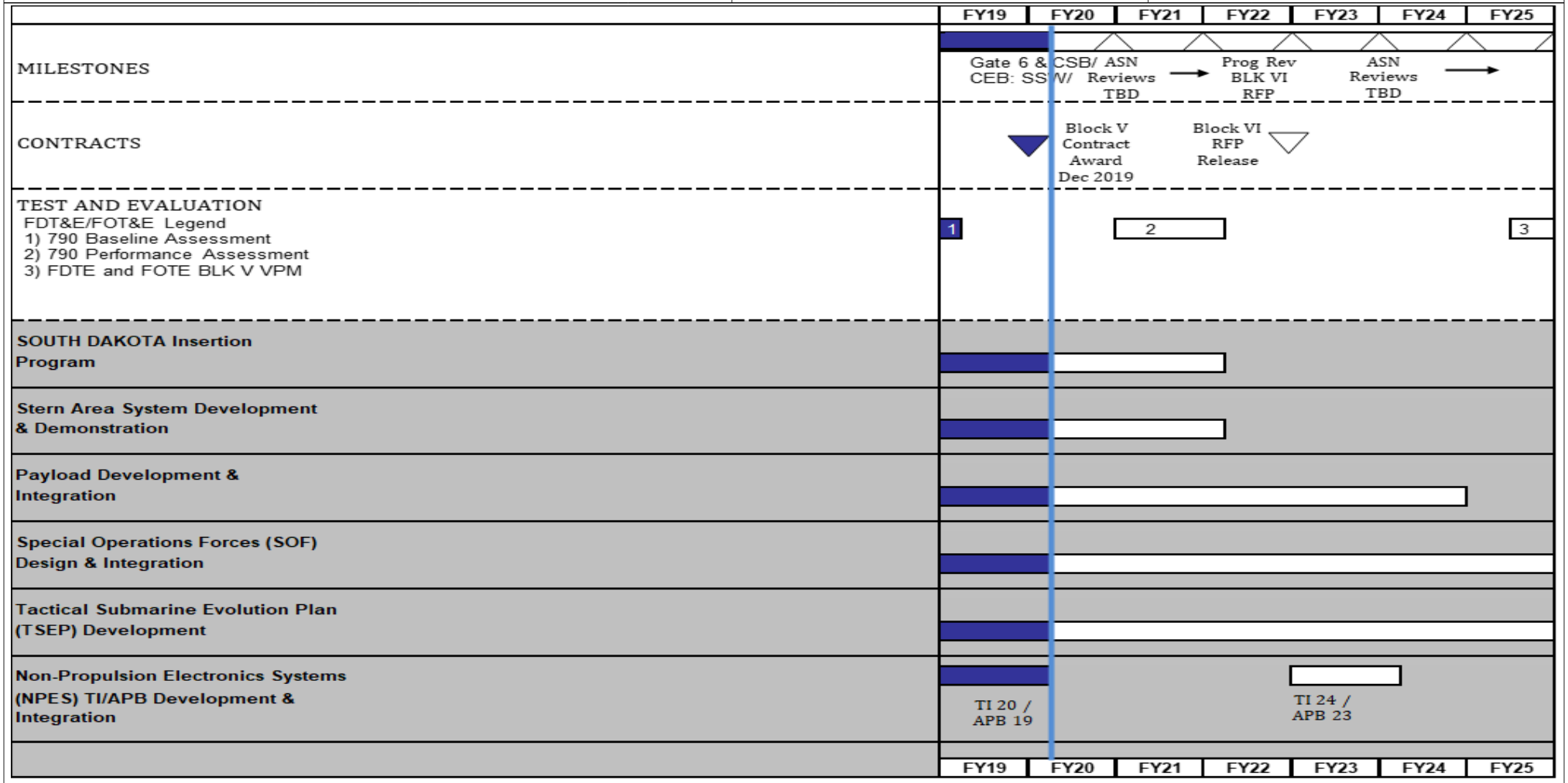

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 1950 / *New Design SSN Combat Sys Dev*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1950				
MILESTONE: VCS FY 19 Gate 6 & CSB / CEB: SSW	4	2019	4	2019
MILESTONE: VCS FY20 Gate 6	4	2020	4	2020
MILESTONE: VCS FY21 Gate 6	4	2021	4	2021
MILESTONE: VCS FY22 Gate 6	4	2022	4	2022
MILESTONE: Prog Rev Block VI RFP	3	2022	3	2022
MILESTONE: VCS FY23 Gate 6	4	2023	4	2023
MILESTONE: VCS FY24 Gate 6	4	2024	4	2024
CONTRACTS: Block V Contract Award	1	2020	1	2020
CONTRACTS: Block VI RFP Release	4	2022	4	2022
TEST & EVALUATION: U/R 790 Baseline Assessment	1	2019	2	2019
TEST & EVALUATION: U/R 790 Performance Assessment	1	2021	1	2022
SOUTH DAKOTA Improvement Program	1	2019	1	2022
Stern Area System Development & Demonstration	1	2019	1	2022
Payload Development & Integration	1	2019	4	2024
Special Operations Forces (SOF) Design & Integration	1	2019	4	2025
Tactical Submarine Evolution Plan (TSEP) Development	1	2019	4	2025
Non-Propulsion Electronics Systems (NPES) TI20/APB19 Development & Integration	1	2019	1	2020
NPES TI24/APB 23 Development & Integration	1	2023	1	2024
MILESTONE: VCS FY 25 Gate 6	4	2025	4	2025
TEST & EVALUATION: FDTE and FOTE VLK V VPM	2	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 3062 / *Submarine Multi-Mission Team Trainer*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3062: *Submarine Multi-Mission Team Trainer*	44.900	2.556	3.120	2.771	-	2.771	2.827	2.883	2.939	2.998	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shore based Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment. The Combat Control System (CCS) AN/BYG-1 and sonar system AN/BQQ-10 are installed on SSN, SSBN and SSGN class submarines. These tactical systems are planned for future upgrades with the next hardware and software revisions which will provide enhanced War Fighter capabilities. The Tactical Acoustic Rapid COTS (commercial-off-the-shelf) Insertion (ARCI) phased upgrades are also being installed with future revisions. The Advanced Processing Builds (APB) and Technical Insertion (TI) sensors, which feed technology insertion into the CCS/Acoustic development, directly impact the trainers.

The Submarine Multi-Mission Team Trainer (SMMTT) supports operator, employment, strike, and Battle Group training for enlisted and officer pipelines. The SMMTT provides operators and combat teams the opportunity to train ashore, prior to, and between deployments. The shore based training provides a means of maintaining team proficiency in stand alone or in combined team mode prior to ship deployment.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Submarine Multi-Mission Team Trainer	2.556	3.120	2.771	0.000	2.771
Articles:	-	-	-	-	-
Description: To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shore based Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment.					
FY 2020 Plans: Develop implementation of latest Advanced Processor Build (APB), Technical Insertion (TI) and associated training displays. These efforts include new sensor developments and simulations to match advancements in tactical systems supported by SMMTT. These efforts will also integrate the APB into the SMMTT baseline along with integrating the Sonar Sensors LCCA and Large Vertical Array (LVA). FY2020 also adds Harpoon Simulation/Stimulation to the portfolio.					
FY 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 3062 / *Submarine Multi-Mission Team Trainer*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Develop implementation of latest Advanced Processor Build (APB), Technical Insertion (TI) and associated training displays. These efforts include visualization of new sensor developments and simulations to match advancements in tactical systems supported by SMMTT. These efforts will also integrate the APB into the SMMTT baseline along with integrating the Sonar Sensors WQS-9, Low Cost Conformal Array (LCCA) and Large Vertical Array (LVA). FY2021 also adds Torpedo Reference Model simulation with payload APB 5+ Software Build to the portfolio. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decreases by .349 in FY 2021 due to the reduction in complexity of the development and implementation of the latest Advanced Processor Build (APB), Technical Insertion (TI) and associated training displays.					
Accomplishments/Planned Programs Subtotals	2.556	3.120	2.771	0.000	2.771

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN/5661: *Submarine Training Device Mods*	56.834	67.229	69.240	-	69.240	83.046	84.919	83.088	84.330	Continuing	Continuing

Remarks

D. Acquisition Strategy

The SMMTT program software development is accounted for in this RDTEN line. All production kits are procured in OPN PE 0804731N BLI 566100.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 3062 / *Submarine Multi-Mission Team Trainer*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Component Development	Reqn	NSWC/CD : Bethesda, MD	32.163	1.195	Jan 2019	1.438	Dec 2019	1.271	Dec 2020	-		1.271	Continuing	Continuing	Continuing
Component Development	C/CPFF	ARL : UT Austin	3.293	0.300	Feb 2019	0.336	Jan 2020	0.300	Jan 2021	-		0.300	Continuing	Continuing	Continuing
Component Development	Reqn	NUWC/NPT : Newport, RI	9.444	1.061	Jan 2019	1.346	Jan 2020	1.200	Oct 2020	-		1.200	0.000	13.051	-
		Subtotal	44.900	2.556		3.120		2.771		-		2.771	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	44.900	2.556		3.120		2.771		-		2.771	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 3062 / *Submarine Multi-Mission Team Trainer*

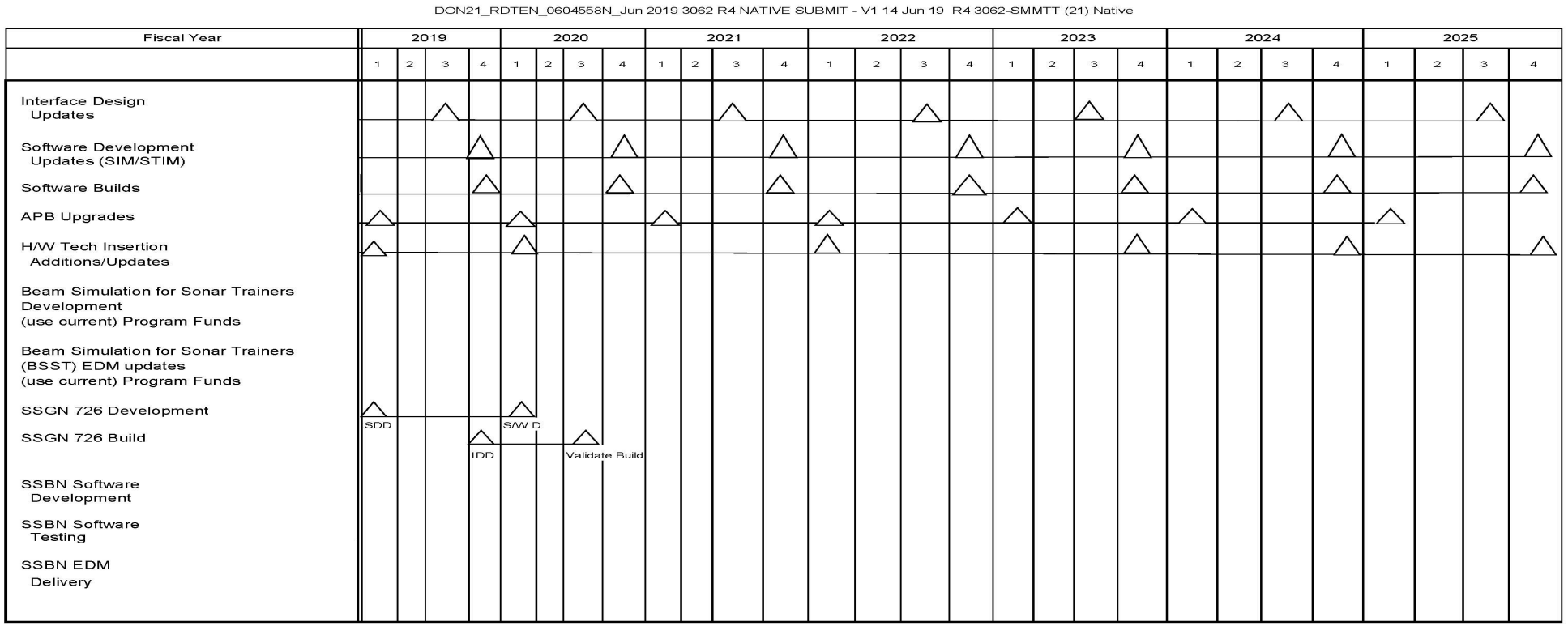

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 3062 / *Submarine Multi-Mission Team Trainer*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3062				
Interface design updates: Interface Design Updates	3	2020	3	2025
Software Development Updates: Software Development Updates (SIM/STIM)	4	2020	4	2025
Software Builds: Software Builds	4	2020	4	2025
Advanced Processing Build(APB) Upgrades: Advanced Processing Build (APB) Upgrades	1	2020	1	2025
Hardware Tech Insertion Updates: Hardware Tech Insertion Updates	1	2019	4	2025
SSGN 726 Software Development: SSSGN Development	1	2019	1	2020
SSGN 726 Software Build: SSGN 726 Build	4	2019	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604558N / *New Design SSN*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	30.872	200.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	230.872
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The FY19 RDT&E program increase continued payload system integration and electronic support measure full spectrum digitization.

The FY19 RDT&E Congressional add for small business technology insertion was applied to further development in the areas of payloads integration and delivery; anti-submarine warfare enhancements; advanced submarine control; and non-tactical software applications. Funding will be obligated via existing SBIR contracts.

The FY20 RDT&E Congressional add for Future Capability Development will be applied to existing contracts and government activities to fund concept design and development and risk reduction.

This FY20 RDT&E Congressional add for Design Risk Reduction will be applied to existing efforts to continue design and development of the Virginia Class SSW platform and to support design risk reduction.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
Congressional Add: New Design SSN SBIR (Cong)	19.295	0.000
FY 2019 Accomplishments: - Perform systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan. - Perform systems engineering of advanced Anti-Submarine Warfare (ASW) / SONAR Initiatives to support future capabilities improvements for the VIRGINIA Class Submarine. - Perform systems engineering of the NOSIS mobile application development suite and potential changes to Consolidated Afloat Network Enterprise System (CANES) in support of the introduction of mobile applications with the fielding of the SECRET Wireless LAN (SWLAN).		
FY 2020 Plans: - Continue systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan. - Continue systems engineering of advanced Anti-Submarine Warfare (ASW) / SONAR Initiatives to support future capabilities improvements for the VIRGINIA Class Submarine.		

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
- Continue systems engineering of the NOSIS mobile application development suite and potential changes to Consolidated Afloat Network Enterprise System (CANES) in support of the introduction of mobile applications with the fielding of the SECRET Wireless LAN (SWLAN).		
Congressional Add: New Design SSN ***FY 2019 Accomplishments:*** - Perform systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan. - Expand the Advanced Technology Acquisition System (ATLAS) architecture to support Electronic Support Measure (ESM) Full Spectrum Digitization. ***FY 2020 Plans:*** - Continue systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan. - Continue expansion the Advanced Technology Acquisition System (ATLAS) architecture to support Electronic Support Measure (ESM) Full Spectrum Digitization.	11.577	0.000
Congressional Add: Future capability development ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** -Funds future concept design and development integration studies for use in future block development. -Funds the inclusion and integration of SAS into the Virginia Class Program of Record. -Funding design development and integration efforts for Block IV acoustic sensor suites. -Funds further development of the IAH propulsor for future insertions to Virginia Class. -Funds non-recurring engineering design and development for future submarine propulsion plant designs. -Further details can be provided at a higher classification level.	0.000	100.000
Congressional Add: Design risk reduction ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** -Funding for the design and development of Virginia Class SSW platform to increase design maturity at construction start and reduce risk to the program. Includes component and subcomponent development and prototyping in FY20. -Further details can be provided at a higher classification level.	0.000	100.000
Congressional Adds Subtotals	30.872	200.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 9999 / *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SCN/2013: *Virginia Class Submarine*	7,137.077	8,334.733	7,003.880	-	7,003.880	6,333.739	6,328.481	7,605.857	7,202.510	24,287.839	151,049.774
• OMN/0204283N: *Sub Ops & Safety*	11.038	11.462	12.003	-	12.003	12.131	12.357	12.604	0.000	Continuing	Continuing
• OPN/0942: *Virginia Class Support Equipment*	66.328	28.465	22.868	-	22.868	22.964	23.474	23.792	24.260	Continuing	Continuing

Remarks

D. Acquisition Strategy

Maximizing leverage of FY19 Congressional adds to support small business and incorporate advanced technology into the program of record.

Maximizing leverage of FY20 Congressional adds to reduce risk and incorporate advanced technology into the program of record.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Electronic support measure full spectrum digitalization	C/CPFF	Progeny Systems : Manassas, VA	0.000	11.577	Apr 2019	0.000		0.000		-		0.000	0.000	11.577	-
SBIR Increase	TBD	Various : Various	0.000	19.295	Apr 2019	0.000		0.000		-		0.000	0.000	19.295	-
Future Capability Development	TBD	Various : Various	0.000	0.000		100.000	Apr 2020	0.000		-		0.000	0.000	100.000	-
Design Risk Reduction	TBD	Various : Various	0.000	0.000		100.000	Apr 2020	0.000		-		0.000	0.000	100.000	-
		Subtotal	0.000	30.872		200.000		0.000		-		0.000	0.000	230.872	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	30.872		200.000		0.000		-		0.000	0.000	230.872	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 9999 / *Congressional Adds*

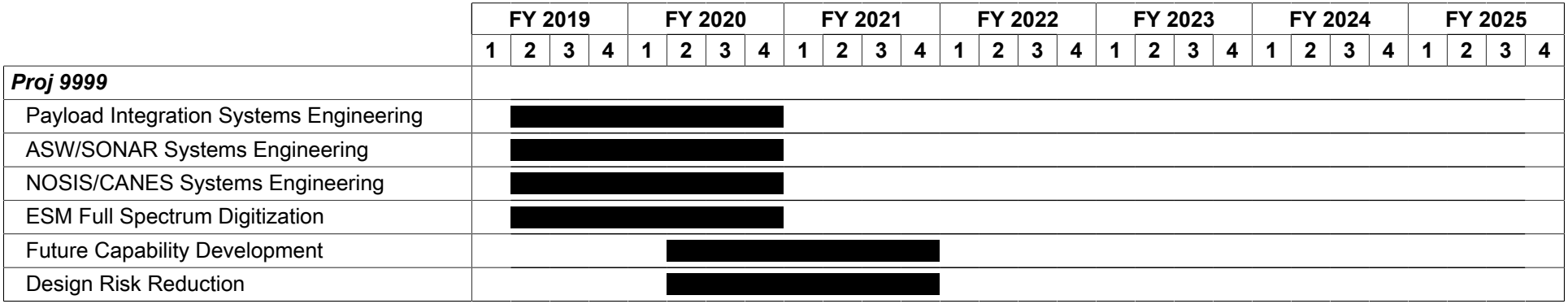

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604558N / *New Design SSN*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Payload Integration Systems Engineering	2	2019	4	2020
ASW/SONAR Systems Engineering	2	2019	4	2020
NOSIS/CANES Systems Engineering	2	2019	4	2020
ESM Full Spectrum Digitization	2	2019	4	2020
Future Capability Development	2	2020	4	2021
Design Risk Reduction	2	2020	4	2021