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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	655.311	60.842	71.093	62.115	-	62.115	-	-	-	-	-	-
0236: <i>SSN Comb Cont Sys Imprvmnt (ENG)</i>	655.311	60.842	63.593	62.115	-	62.115	-	-	-	-	-	-
9999: <i>Congressional Adds</i>	0.000	0.000	7.500	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The AN/BYG-1 is the combat control system common across all submarine platforms which incorporates tactical control, weapon/payload control and Tactical Local Area Network (TacLAN) functions into a single procurement program. AN/BYG-1 allows the submarine to rapidly update the ship-safety tactical picture, integrates the common tactical picture into the battlegroup, improves torpedo interfaces, and provides tactical TOMAHAWK and Harpoon capability. AN/BYG-1 systems will be continuously updated with hardware enhancements to address Commercial Off The Shelf (COTS) obsolescence, and provide capability improvements through software upgrades. Hardware updates are referred to as Tech Insertion (TI) kits and are differentiated by year of development (i.e. TI-18, TI-20, TI-22, TI-24, etc.). The TI upgrades provide the baseline for all future AN/BYG-1 procurements. AN/BYG-1 is part of the Submarine Warfare Federated Tactical Systems (SWFTS), a family of interdependent systems that conduct cooperative system development and installations.

Project Unit 0236: This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades for AN/BYG-1, the Multi-tube Weapons Simulator (MTWS), and the Common Weapon Launcher (CWL) in order to integrate improved tactical and payload control capabilities for all submarine classes. This program also develops new payload capabilities for the Submarine Launched Unmanned Aerial System (SLUAS).

Beginning in FY22, the Navy is pursuing a transformation across the Submarine Warfare Federated Tactical Systems (SWFTS) (PE 0604503N Project 0219, PE 0604562N Project 0236, PE 0604777N Project 0253 and PE 0604503N Project 0775) to maximize SWFTS cyber-resiliency and the speed of capability delivery. The transformation will be accomplished through a transition to Agile development processes comprised of a continuous series of 12-week software program increments in a DevSecOps environment. This process will better align with industry practice and enable the SWFTS systems to leverage industry capability improvements in AI/ML and other emerging technologies, while also being more responsive to cyber needs. The transformation is aligned to the requirements contained in the AN/BYG-1 Capability Development Document, and to the requirements contained in the OPNAV requirement ltr 9010, Ser N97/19U141554 of 22 May 2019.

SLUAS incorporates unmanned aerial vehicles, vehicle encapsulating canisters, vehicle command and control capabilities, and vehicle stowage into submarines. SLUAS extends the sensor range of the submarine, serving as a key enabler of Over-The-Horizon (OTH) weapons employment.

Provides funding for the development of the Common Weapon Launcher; Legacy Launchers; Multi-tube Weapons Simulator (MTWS); Information Assurance system; Onboard Team Trainer (OBTT); Command, Control, Computer and Intelligence Maintenance Tool (C3IMT); and Common Infrastructure Services (CIS) subsystem. This includes integration of Onboard Team Trainer - Master Controller (OBTT - MC) & Command, Control, Computer and Intelligence Maintenance Tool/Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within Submarine Warfare Federated Tactical System (SWFTS).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>
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FY22 provides funding to finalize development of TI-20 which added two new system baselines in support of VA BLK IV Virginia Payload Module (VPM) and the COLUMBIA Class (CLB). FY22 also provides funding for development of TI-22. Cybersecurity efforts continue to grow due to increasing interconnection complexity, more IP based traffic in future baselines, and development of Cyber Safe Controls. Integration efforts for additional submarine payloads including Contender, Maritime Strike Tomahawk (MST), Next Generation Countermeasure, Anti-Torpedo Torpedo Compact Rapid Attack Weapons program (ATT CRAW) continue in FY22. FY22 also continues efforts to support classified payloads.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	62.426	63.878	63.923	-	63.923
Current President's Budget	60.842	71.093	62.115	-	62.115
Total Adjustments	-1.584	7.215	-1.808	-	-1.808
• Congressional General Reductions	-	-0.285			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	7.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.009	0.000			
• SBIR/STTR Transfer	-1.575	0.000			
• Rate/Misc Adjustments	0.000	0.000	-1.808	-	-1.808

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 9999: *Congressional Adds*

Congressional Add: *Combat Systems of the Future End-to-End Cyber Security Tools*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2020	FY 2021
Congressional Add Subtotals for Project: 9999	0.000	7.500
Congressional Add Totals for all Projects	0.000	7.500

Change Summary Explanation

The overall FY22 funding was decreased by \$1.808M due to realignments of funding in support of miscellaneous adjustments.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>				Project (Number/Name) 0236 / <i>SSN Comb Cont Sys Imprvmnt (ENG)</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
0236: <i>SSN Comb Cont Sys Imprvmnt (ENG)</i>	655.311	60.842	63.593	62.115	-	62.115	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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Project Unit 0236: This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades for AN/BYG-1, the Multi-tube Weapons Simulator (MTWS), and the Common Weapon Launcher (CWL) in order to integrate improved tactical and payload control capabilities for all submarine classes. This program also develops new payload capabilities for the Submarine Launched Unmanned Aerial System (SLUAS).

Beginning in FY22, the Navy is pursuing a transformation across the Submarine Warfare Federated Tactical Systems (SWFTS) (PE 0604503N Project 0219, PE 0604562N Project 0236, PE 0604777N Project 0253 and PE 0604503N Project 0775) to maximize SWFTS cyber-resiliency and the speed of capability delivery. The transformation will be accomplished through a transition to Agile development processes comprised of a continuous series of 12-week software program increments in a DevSecOps environment. This process will better align with industry practice and enable the SWFTS systems to leverage industry capability improvements in AI/ML and other emerging technologies, while also being more responsive to cyber needs. The transformation is aligned to the requirements contained in the AN/BYG-1 Capability Development Document, and to the requirements contained in the OPNAV requirement Itr 9010, Ser N97/19U141554 of 22 May 2019.

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Provides funding for the development of the Common Weapon Launcher; Legacy Launchers; Multi-tube Weapons Simulator (MTWS); Information Assurance system; Onboard Team Trainer (OBTT); Command, Control, Computer and Intelligence Maintenance Tool (C3IMT); and Common Infrastructure Services (CIS) subsystem. This includes integration of Onboard Team Trainer - Master Controller (OBTT - MC) & Command, Control, Computer and Intelligence Maintenance Tool/Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within Submarine Warfare Federated Tactical System (SWFTS).

UNCLASSIFIED

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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 0236 / <i>SSN Comb Cont Sys Imprvmnt (ENG)</i>
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FY22 provides funding to finalize development of TI-20 which added two new system baselines in support of VA BLK IV Virginia Payload Module (VPM) and the COLUMBIA Class (CLB). FY22 also provides funding for development of TI-22. Cybersecurity efforts continue to grow due to increasing interconnection complexity, more IP based traffic in future baselines, and development of Cyber Safe Controls. Integration efforts for additional submarine payloads including Contender, Maritime Strike Tomahawk (MST), Next Generation Countermeasure, Anti-Torpedo Torpedo Compact Rapid Attack Weapons program (ATT CRAW) continue in FY22. FY22 also continues efforts to support classified payloads.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Title: AN/BYG-1 Software Development</p> <p align="right">Articles:</p> <p>FY 2021 Plans: Complete development of TI-18/APB-19 baseline for SSN 688 Class, OHIO SSGN Class, and OHIO SSBN Class. Continue development of TI-20 baseline (formerly known as TI-20/APB-19 and TI-20/APB-21) for VA Class and COLUMBIA SSBN Class submarines. Deliver initial TI-20 baseline (formerly known as TI-20/APB-19)</p> <p>FY 2022 Base Plans: Complete development of TI-20 baseline for VA Class and COLUMBIA SSBN Class submarines. Deliver TI-20 baseline (formerly known as TI-20/APB-21). Begin development of TI-22 (formerly known as TI-22/APB-23) for 688 Class and SSN21 Class submarines.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease is due to the aggregate of completion of TI-20 software development and the beginning of TI-22 software development requiring less funding in FY2022 than the funding required in FY2021 to complete TI-18/APB-19 development and continue TI-20 development.</p>	23.581	25.519	22.275	0.000	22.275
	-	-	-	-	-
<p>Title: AN/BYG-1 TI-22 Hardware Development</p> <p align="right">Articles:</p> <p>FY 2021 Plans: Begin development, integration, and test of AN/BYG-1 (TI-22) for SSN 688 Class and SSN21 Class submarines.</p> <p>FY 2022 Base Plans:</p>	0.000	3.538	8.632	0.000	8.632
	-	-	-	-	-

UNCLASSIFIED

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: N/A					
Title: Payload Integration	6.375	6.610	6.467	0.000	6.467
Articles:	-	-	-	-	-
FY 2021 Plans: Continue software development efforts to support submarine payload integration of Mk 48 APB5+/APB6, Contender, and Maritime Strike Tomahawk. Commence integration of Harpoon BLK 1C into Payload Control System. Commence support of planning/prototyping for classified payloads.					
FY 2022 Base Plans: Continue software development efforts to support submarine payload integration of Mk 48 APB5+/APB6, Contender, and Maritime Strike Tomahawk. Continue integration of Harpoon BLK 1C into Payload Control System. Continue support of planning/prototyping for classified payloads.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease is due to minor reduction in payload integration required for Mk 48 APB5+ as payload becomes more mature.					
Title: Testing	3.165	3.202	3.168	0.000	3.168
Articles:	-	-	-	-	-
FY 2021 Plans: Complete APB-17 OT on SEAWOLF/VIRGINIA. Complete APB-19 DT on 688/SSBN/SSGN.					
FY 2022 Base Plans: Complete APB-19 OT on 688/SSBN/SSGN.					
FY 2022 OCO Plans:					

UNCLASSIFIED

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease is due to the aggregate of the APB-17 OT and APB-19 DT requiring more funding in FY2021 than the funding required in FY2022 to complete APB-19 OT.					
Title: CyberSecurity					
Articles:					
	7.802	8.270	8.435	0.000	8.435
	-	-	-	-	-
FY 2021 Plans: Continue development of CyberSecurity Toolkit and IA certification Testing on BYG-1 TI-20. Continue RMF accreditations for various systems.					
FY 2022 Base Plans: Commence development of CyberSecurity Toolkit and IA certification Testing on BYG-1 TI-22. Continue RMF accreditations for various systems.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to inflation					
Title: Unmanned Aerial System (UAS)					
Articles:					
	2.193	2.237	2.282	0.000	2.282
	-	-	-	-	-
FY 2021 Plans: Continue Unmanned Aerial System development and integration efforts for 3 and 21 inch Submarine launched UAS.					
FY 2022 Base Plans: Continue Unmanned Aerial System development and integration efforts for 3 and 21 inch Submarine launched UAS.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement:					

UNCLASSIFIED

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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 0236 / <i>SSN Comb Cont Sys Imprvmnt (ENG)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Increase is due to inflation.					
Title: Common Infrastructure Services (CIS)	5.701	5.816	5.932	0.000	5.932
Articles:	-	-	-	-	-
FY 2021 Plans: Continue integration for Common Infrastructure Services to include Onboard Team Trainer - Master Controller & Command, Control, Computer and Intelligence Maintenance Tool/Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within SWFTS.					
FY 2022 Base Plans: Continue integration for Common Infrastructure Services to include Onboard Team Trainer - Master Controller & Command, Control, Computer and Intelligence Maintenance Tool/Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within SWFTS.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to inflation.					
Accomplishments/Planned Programs Subtotals	60.842	63.593	62.115	0.000	62.115

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN/5420: SSN <i>Combat Control Systems</i>	143.678	162.167	143.289	-	143.289	-	-	-	-	-	-

Remarks
OPN BA4 Ordinance Support & Equipment. BLI 5420 SSN Combat Control Systems

D. Acquisition Strategy
This budget line integrates software (formerly known as APBs) developed by the advanced development community. This program has been tailored in accordance with the new DoD5000 directive to incorporate annual MDA production reviews. Software products associated with AN/BYG-1 will be released to the Fleet every twelve weeks per the AGILE software development process.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / Submarine Tactical Warfare System	Project (Number/Name) 0236 / SSN Comb Cont Sys Imprvmt (ENG)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/BYG-1 TECH INSERTION	C/CPIF	GENERAL DYNAMICS (GDAIS) : FAIR LAKES, VA	114.232	9.067	Oct 2019	9.657	Oct 2020	9.199	Oct 2021	-		9.199	-	-	-
AN/BYG-1 TECH INSERTION	C/CPIF	PROGENY (PCS) : MANASSAS, VA	17.244	8.891	Oct 2019	9.604	Oct 2020	9.207	Oct 2021	-		9.207	-	-	-
GOVERNMENT ENGINEERING	WR	NUWC : NEWPORT, RI	90.440	3.853	Oct 2019	4.672	Oct 2020	4.675	Oct 2021	-		4.675	-	-	-
CYBERSECURITY	C/CPAF	PROGENY : MANASSAS, VA	50.013	7.164	Oct 2019	7.503	Oct 2020	7.505	Oct 2021	-		7.505	-	-	-
UNMANNED AERIAL SYSTEM	WR	NUWC : NEWPORT, RI	2.181	1.699	Oct 2019	1.733	Oct 2020	1.736	Oct 2021	-		1.736	-	-	-
UNMANNED AERIAL SYSEM	C/CPIF	PROGENY (PCS) : MANASSAS, VA	1.360	0.481	Oct 2019	0.491	Oct 2020	0.494	Oct 2021	-		0.494	-	-	-
Subtotal			275.470	31.155		33.660		32.816		-		32.816	-	-	N/A

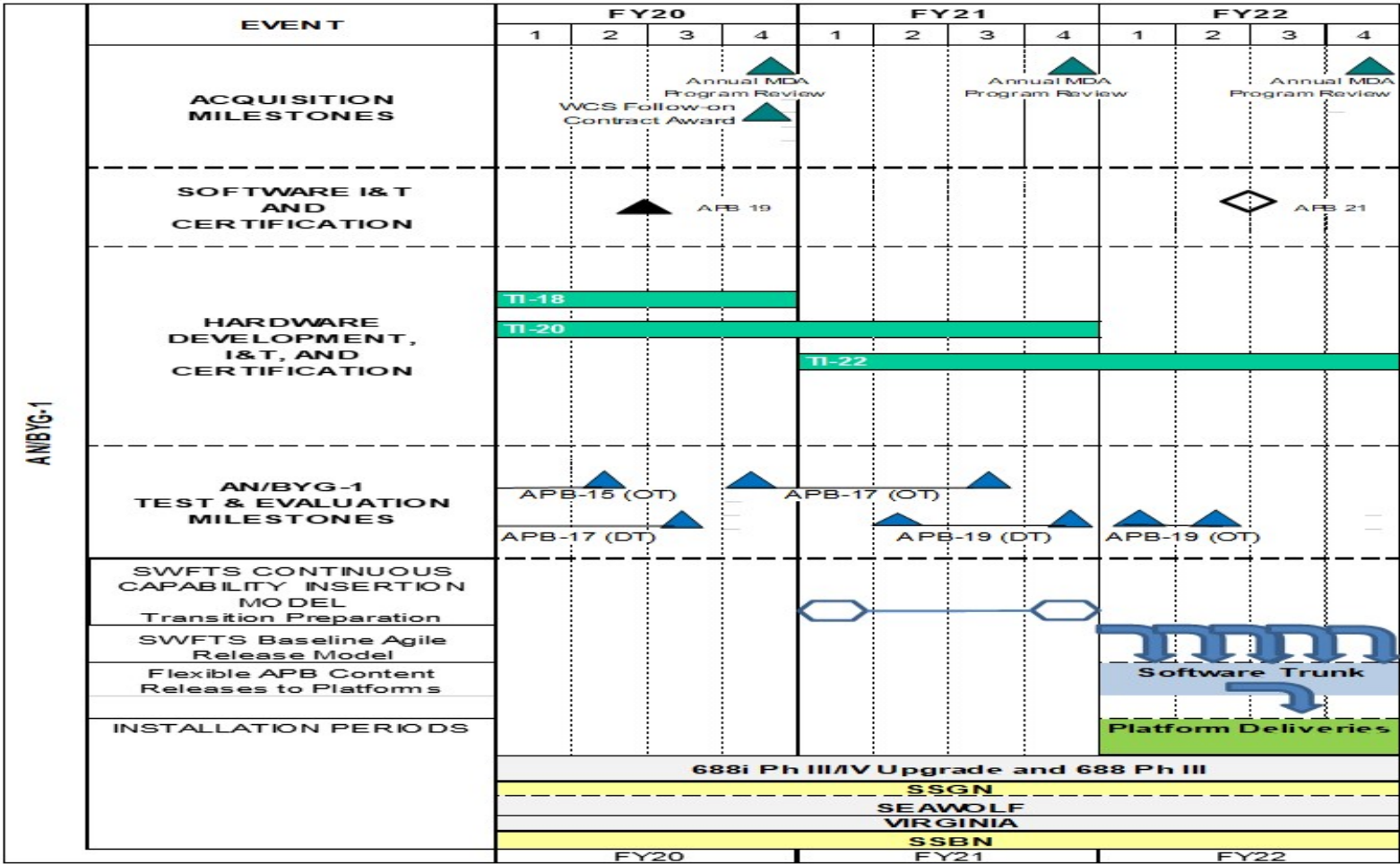
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SOFTWARE INTEGRATION	C/CPIF	GENERAL DYNAMICS (GDAIS) : FAIRLAKES, VA	103.553	7.606	Oct 2019	7.473	Oct 2020	7.529	Oct 2021	-		7.529	-	-	-
SOFTWARE INTEGRATION	WR	NUWC : NEWPORT, RI	68.459	4.862	Oct 2019	4.959	Oct 2020	4.650	Oct 2021	-		4.650	-	-	-
SOFTWARE INTEGRATION	C/CPAF	LOCKHEED MARTIN (LM-MSS) : MANASSAS, VA	25.697	3.749	Oct 2019	3.823	Oct 2020	3.695	Oct 2021	-		3.695	-	-	-
SOFTWARE INTEGRATION	C/CPFF	PROGENY (PCS) : MANASSAS, VA	14.582	4.803	Oct 2019	4.899	Oct 2020	4.627	Oct 2021	-		4.627	-	-	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity 1319 / 5				R-1 Program Element (Number/Name) PE 0604562N / Submarine Tactical Warfare System				Project (Number/Name) 0236 / SSN Comb Cont Sys Imprvmnt (ENG)							
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SOFTWARE DEVELOPMENT	Various	VARIOUS : Not Specified	58.540	2.380	Oct 2019	2.427	Oct 2020	2.429	Oct 2021	-		2.429	-	-	-
HARPOON PLATFORM INTEGRATION	C/CPFF	PROGENY : MANASSAS, VA	0.000	0.500	Oct 2019	0.510	Oct 2020	0.512	Oct 2021	-		0.512	-	-	-
Subtotal			270.831	23.900		24.091		23.442		-		23.442	-	-	N/A
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DEVELOPMENT TEST & EVALUATION	WR	NUWC : NEWPORT, RI	40.017	0.993	Oct 2019	1.012	Oct 2020	1.014	Oct 2021	-		1.014	-	-	-
TEST & EVALUATION	C/CPFF	GENERAL DYNAMICS : FAIRLAKES, VA	11.624	0.758	Oct 2019	0.773	Oct 2020	0.775	Oct 2021	-		0.775	-	-	-
TEST & EVALUATION	C/CPFF	GENERAL DYNAMICS : PITTSFIELD, MA	5.728	0.756	Oct 2019	0.761	Oct 2020	0.763	Oct 2021	-		0.763	-	-	-
TEST & EVALUATION	C/CPAF	PROGENY : MANASSAS, VA	3.288	0.495	Oct 2019	0.504	Oct 2020	0.507	Oct 2021	-		0.507	-	-	-
OPERATIONAL TEST & EVALUATION	WR	COMOPTEVFOR : NORFOLK, VA	18.568	0.839	Oct 2019	0.843	Oct 2020	0.844	Oct 2021	-		0.844	-	-	-
Subtotal			79.225	3.841		3.893		3.903		-		3.903	-	-	N/A
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PROGRAM MANAGEMENT SUPPORT	C/CPFF	VARIOUS : Not Specified	29.785	1.946	Oct 2019	1.949	Oct 2020	1.954	Oct 2021	-		1.954	-	-	-
Subtotal			29.785	1.946		1.949		1.954		-		1.954	-	-	N/A

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / Submarine Tactical Warfare System	Project (Number/Name) 0236 / SSN Comb Cont Sys Imprvmnt (ENG)



UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Page 1				
Acq Milestones: Annual MDA Program Review - FY20	4	2020	4	2020
Acq Milestones: Annual MDA Program Review - FY21	4	2021	4	2021
Acq Milestones: Annual MDA Program Review - FY22	4	2022	4	2022
Acq Milestones: WCS Follow-on Contract Award	4	2020	4	2020
Software I&T, Certification: Software I&T, Certification: APB-17	1	2020	4	2020
Software I&T, Certification: Software I&T, Certification: APB-19	2	2020	3	2020
Software I&T, Certification: Software I&T, Certification: APB-21	2	2022	3	2022
Hardware Development, I&T Certification: Hardware Development, I&T Certification: TI-18	1	2020	4	2020
Hardware Development, I&T Certification: Hardware Development, I&T Certification: TI-20	1	2020	4	2021
Hardware Development, I&T Certification: Hardware Development, I&T Certification: TI-22	1	2021	4	2022
Test & Evaluation Milestones: AN/BYG-1: APB-15 OT	1	2020	2	2020
Test & Evaluation Milestones: AN/BYG-1: APB-17 DT	1	2020	3	2020
Test & Evaluation Milestones: AN/BYG-1: APB-17 OT	4	2020	3	2021
Test & Evaluation Milestones: AN/BYG-1: APB-19 DT	2	2021	4	2021
Test & Evaluation Milestones: AN/BYG-1: APB-19 OT	1	2022	2	2022

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
9999: <i>Congressional Adds</i>	0.000	0.000	7.500	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

FY21 congressional adds provide funding to develop Inter-Subsystem Monitoring Tool (ISMT) Cyber Dashboard Prototype (\$3.862M), develop improvements to the Inter-Subsystem Monitoring Tool (ISMT) On-Board Team Training Master Controller (OBTT-MC) (\$1.000M) and support Security Information & Event Management (SIEM) tool integration into BYG-1/SWFTS for cyber monitoring and data gathering (\$2.638M).

Provides funding to develop a comprehensive network cybersecurity monitoring prototype to assist the operator in identifying cybersecurity threats and provide awareness and guidance to maintain cyber resiliency. The ISMT Cyber dashboard prototype utilizes a web display to provide the capability to generate a Commanding Officers (CO) Report integrating cyber-related data from the comprehensive network-monitoring tool. Utilizing cybersecurity gold standard guidelines, the tool will be designed within an advanced cybersecurity architecture, providing a cyber resilient infrastructure. As part of the design and requirements gathering, the architecture will leverage existing Submarine Warfare Federated Tactical System (SWFTS)/BYG-1 data as well as provide additional cyber data and/or functionality needed to provide shipboard cybersecurity monitoring and alerts.

Execute ISMT Cyber Dashboard Prototype:

- Purchase and setup laboratory equipment
- Develop sub-views, features, data processing layer, external alerting, and installation configuration layer
- Produce procedures for cyber trouble shooting
- Develop user training via the Onboard Tactical Trainer (OBTT)

Efforts provide program management, systems engineering, software engineering, configuration management, quality assurance, test and evaluation, logistics and supportability engineering for Inter Subsystem Monitoring Tool (ISMT) and On-Board Team Trainer-Master Controller (OBTT-MC). ISMT and OBTT-MC will be integrated into the AN/BYG-1 Combat Control System on SSN688/688I, SSGN, SSN21, SSBN, and Virginia Class Submarines. There also will be effort for SSBN submarines for both modernization and new construction in future software builds. ISMT and OBTT-MC support key SWFTS integration milestones during CI/CD process.

Provides funding to continue to develop a display that would provide more intuitive Cyber Alerts and to perform real time Audit Reduction and alerting in order to aid the Operator in performing required weekly Audit reviews.

This funding will:

- Enhance the Daily Reporting Feature
- Integrate a COTS SIEM tool on the back-end to provide the Operator with Enhanced Threat Detection Capabilities.
- Provide the Operator with a Visualization of Cyber Network Monitoring Capabilities (Continuation of CI 4021-2019)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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-Add a feature that allows Operators to Clear/acknowledge Dashboard alerts to remove false positives from the Cybersecurity Alert Interface on the BYG-1 common header.
 -Improve upon the IA Dashboard Alert descriptions with Corrective Actions

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2020	FY 2021
Congressional Add: Combat Systems of the Future End-to-End Cyber Security Tools	0.000	7.500
FY 2020 Accomplishments: N/A		
FY 2021 Plans: Inter-Subsystem Monitoring Tool (ISMT) Cyber Dashboard Prototype		
Purchase laboratory equipment for development of the cyber dashboard.		
Continue development of the sub-views, features, and data processing layer. Begin development of the user training for operator onboard the submarine platform.		
Begin production of the final build for delivery.		
Security Information & Event Management (SIEM) tool integration into BYG-1/SWFTS for cyber monitoring and data gathering		
Continue development of the SIEM tool to further incorporate drill down alerts to provide more detail for the fleet.		
Continue to integrate the SIEM tool on the back-end to provide the Operator with Enhanced Threat Detection Capabilities and to improve IA alert Dashboard notifications, descriptions and corrective actions in FY21.		
Congressional Adds Subtotals	0.000	7.500

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

N/A

Remarks

D. Acquisition Strategy

Inter-Subsystem Monitoring Tool (ISMT) Cyber Dashboard Prototype:

Once developed, the ISMT Cyber Dashboard would be part of the Program Insertion (PI) software baselines, utilizing

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>

the same Acquisition Strategy as the Tactical Warfare System.

Actual insertion point is being evaluated by the Program Office for Release-To-Fleet.

Inter-Subsystem Monitoring Tool (ISMT) On-Board Team Training Master Controller (OBTT-MC):

Once developed, the ISMT and OBTT-MC modifications would be part of the Program Insertion (PI) software baselines, utilizing the same Acquisition Strategy as the Tactical Warfare System.

This program has been tailored in accordance with the new DoD5000 directive to incorporate annual MDA production reviews.

Insertion point for enhance capability is being evaluated by the Program Office for Release-To-Fleet.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>

	EVENT	FY20				FY21				FY22			
		1	2	3	4	1	2	3	4	1	2	3	4
AN/BYG-1	ISMT CyberDashboard						▲	—	▲				
	ISMT/OBTT-MC									▲	—	—	▲
	Security Information & Event Management (SEIM)							▲	—	—	—	▲	
		FY20				FY21				FY22			

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604562N / <i>Submarine Tactical Warfare System</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 9999				
CSOF: ISMT Cyber Dashboard	2	2021	4	2021
Rite Solutions: ISMT/OBTT- MC	1	2022	4	2022
Progeny: Security Information & Event Management (SIEM) Tool	3	2021	3	2022