Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603573N *I Advanced Surface Machinery Sys*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	468.236	200.889	133.911	93.942	-	93.942	96.313	104.244	130.809	103.616	Continuing	Continuing
2471: *Integrated Power Systems (IPS)*	375.139	171.565	133.911	93.942	-	93.942	96.313	104.244	130.809	103.616	Continuing	Continuing
9999: *Congressional Adds*	93.097	29.324	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	122.421

A. Mission Description and Budget Item Justification

This Program Element (PE) supports innovative research and development of advanced surface ship Hull, Mechanical, and Electrical (HM&E) components and systems, primarily power and energy systems, and the subsequent test, evaluation, and demonstration of those systems for future ships and back-fit ships, where appropriate. This PE provides resources for Ships HM&E cyber analysis. This PE also serves as the bridge for power and energy systems between Science and Technology (S&T), ship platform, and mission systems acquisition programs by identifying prospective applications for S&T research, advanced development, and performing additional product development and qualification when necessary to meet platform or mission system requirements. This PE includes risk mitigation efforts for the DDG(X) Integrated Power System (IPS) which will satisfy the FY20 National Defense Authorization Act (NDAA) Section 131 requirements for land-based testing of propulsion systems in a realistic environment and FY22 NDAA Section 221 requirement for a land-based test program for the engineering plant prior to DDG(X) construction start. The IPS hardware development and procurement and Land Based Test Site (LBTS) integration and test efforts executed under this PE / PU are informed by DDG (X) Ship Design specifications developed under PE 0603564N / PU 0411.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	207.000	133.911	151.324	-	151.324
Current President's Budget	200.889	133.911	93.942	-	93.942
Total Adjustments	-6.111	0.000	-57.382	-	-57.382
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.113	0.000			
• SBIR/STTR Transfer	-5.998	0.000			
• Program Adjustments	0.000	0.000	-58.360	-	-58.360
• Rate/Misc Adjustments	0.000	0.000	0.978	-	0.978

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

	FY 2023	FY 2024
Project: 9999: *Congressional Adds*		

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603573N *I Advanced Surface Machinery Sys*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Congressional Add: *Silicon carbide flexible bus node*	20.642	0.000
Congressional Add: *Large format lithium ion batteries*	8.682	0.000
Congressional Add Subtotals for Project: 9999	29.324	0.000
Congressional Add Totals for all Projects	29.324	0.000

Change Summary Explanation

In FY 2024 to FY 2025 the PE decreases by an overall total of -$39.969M. The DDG(X) Power & Propulsion Risk Mitigation & Demonstration decrease of -$38.871M which aligns with the PE 0603564N / PU 0411 as the Navy revalidates the TLR for the ship's mobility that directly impacts the procurement and test sites configuration requirements. The Power & Energy decrease of -$0.353M in design/development is due to the refinement of scope associated with the output voltages and the alignment with the draft MIL-STD-1399. The HM&E Cybersecurity decrease of -$0.745M of SABER development funds to the SABER program office PE 0603563N project 3244.

Schedule:
The Navy, in 2023, opened up efforts to re-validate the Top Level Requirements (TLRs) for the DDG(X) to ensure that those TLRs are in line with the warfighters' need to meet the pacing threat. This effort opened up decision space and will result in rework in the conceptual design phase of the design process and delays preliminary design and follow on events and milestones of the ship acquisition to the right.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / *Advanced Surface Machinery Sys*	Project (Number/Name) 2471 / *Integrated Power Systems (IPS)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
2471: *Integrated Power Systems (IPS)*	375.139	171.565	133.911	93.942	-	93.942	96.313	104.244	130.809	103.616	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project Unit includes the development and risk reduction of advanced surface ship Hull, Mechanical, and Electrical (HM&E) components and systems, primarily power and energy systems, for all future ships and back-fit ships where appropriate as well as HM&E cyber security. Specific sub-projects include:
The DDG(X) power and propulsion risk mitigation demonstration sub-project will be used to de-risk the DDG(X) Integrated Power System (IPS) and satisfy the FY 2020 National Defense Authorization Act (NDAA) Section 131 requirements for land-based testing of propulsion systems in a realistic environment and FY 2022 NDAA Section 221 requirement for a land based test program for the engineering plant prior to DDG(X) construction start. The DDG(X) hardware development and procurement and Land Based Test Site (LBTS) integration and test efforts executed under this PE / PU are informed by DDG (X) Ship Design specifications developed under PE 0603564N / PU 0411. IPS test findings will inform decisions in baseline specifications and design products, developed under PE 0603564N / PU 0411, ensuring that the ship can accommodate the space, weight, power, cooling (SWAP-C) required by the IPS and that the IPS can meet DDG(X) power and energy requirements. The interdependency of DDG(X) design and IPS risk reduction is critical. This subproject will employ a four-phased testing and risk reduction approach (updated to align with FY 2020 and FY 2022 NDAA land-based testing requirements) to build assurance that the DDG(X) IPS system can be installed and activated efficiently by the shipbuilder with performance characteristics that are well understood.
- Phase 1 (IPS Modeling & Simulation (M&S)), commenced in FY 2021, establishes a description of the components and system non-real-time models that are needed for the DDG(X) IPS digital engineering effort to provide performance feedback to DDG(X) IPS design and specification. Persistent digital engineering efforts initiated as part of Phase 1 extend through the life of the DDG(X) program.
- Phase 2 (Land Based Test Site), commenced in FY 2021, initially employs refined digital models and scaled integrated surrogate components that functionally represent the intended DDG(X) IPS and transitions to full scale testing by procurement, integration and test of DDG(X) specific major long lead hardware components.
- Phase 3 (Land Based Engineering Site) builds a tactical representation of the DDG(X) shipboard power and propulsion system based on the DDG(X) full scale hardware procured in phase 2. The LBES will be an enduring activity over the life of the ship and provides capability to perform performance & endurance testing of the IPS.
- Phase 4 (Shipboard Test & Activation), funded by future DDG(X) Shipbuilding and Conversion, Navy (SCN), conducts shipboard integration testing of the power and propulsion system with other ship systems to confirm performance as specified in the contract requirements and interoperability at the platform level.

Naval Power and Energy Systems developments and transitions including power generation, power conversion, power distribution, energy storage, power utilization and automation and control functions for fully integrated electric propulsion (such as T-AKE -1 class or DDG 1000 class), hybrid electric propulsion (such as LHD 8 and LHA(R) class), as well as legacy mechanical propulsion ships (such as DDG 51 class). Naval Power and Energy Systems sub-project supports optimized integration of naval warship power and energy systems to support Directed Energy (DE) and other high powered mission systems, ship power quality requirements including frequency and voltage control for AC systems, Directed Energy (DE) and other high powered mission systems, appropriate component and system controls, integration of components and systems into future and current ships, and providing power and energy system solution alternatives to new and existing platforms. Existing ships'

power systems require optimized integration via energy storage and advanced controls techniques to withstand the effects of DE and other high powered mission systems and avoid negative impacts to power generating equipment (diesel/gas turbine engines and generators).
- Power & Energy System developments are aligned with the Navy's 30-year shipbuilding plan and the Chief of Naval Operations Surface Capability Evolution Plan via the Naval Power and Energy Systems Technology Development Roadmap (TDR), which outlines the way ahead for future developments and provides a basis for coordinated planning and investment by the Navy and private industry.
- The power and energy systems developed by this Project are the power and energy foundation of the ships kill chain and are developed with efficiency requirements as part of total life cycle cost minimization. Efforts within Power and Energy Systems are to design, develop, test and integrate shipboard power systems to incorporate advanced sensors, directed energy and other advanced weapons. Design and testing include modeling and simulation, as well as land-based testing, to reduce risk and demonstrate readiness for shipboard use.

Ships HM&E Cyber analysis employs cyber analysis tools to identify potential vulnerabilities in ship-wide or HM&E enclave/system architectures, hardware components, and software for applicable surface ships, and designs and tests cyber protections for applicable surface ship systems, enclaves, and platforms.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: DDG (X) Power & Propulsion Risk Mitigation & Demonstration	140.836	113.325	74.454	0.000	74.454
Articles:	-	-	-	-	-
FY 2024 Plans: FY 2024 Plans: Continue DDG(X) power and propulsion risk reduction activities to meet intent of (NDAA) Section 131 and FY22 NDAA Section 221 requirements for land-based testing of propulsion systems in a realistic environment aligned with the DDG(X) IPS design efforts as part of DDG(X) Design Development efforts executed under PE 0603564N/0411. Specifically: - Phase 1 (IPS M&S): Continue risk reduction activities for the DDG(X) IPS by utilizing ship power systems simulation to support equipment and interface specification refinement. Conduct real-time integrated system modeling (including controls) assessing power & propulsion system performance. Provide DDG(X) IPS design performance feedback to the ship design (PE 0603564N / PU 0411) as part of preliminary design and refinement of the power and propulsion system design and specifications. Demonstrate interfaces for energy storage and advanced controls capabilities that are required to support future mission system capabilities such as directed energy weapons and advanced sensors. - Phase 2 (Land Based Test Site): Continue risk reduction testing and test site modifications and construction for incorporation of DDG(X) IPS hardware. Continue Shipbuilder procurement of DDG(X) IPS hardware components including a propulsion motor & drive, primary & auxiliary power generators, electrical distribution, IPS controls, auxiliary systems, etc. to host full scale ship IPS (Land Based Engineering Site). Continue refinement of					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
interfaces and specifications for individual power and propulsion system components and validation of Digital Engineering efforts. ***FY 2025 Base Plans:*** Continue DDG(X) power and propulsion risk reduction activities to meet intent of (NDAA) Section 131 and FY22 NDAA Section 221 requirements for land-based testing of propulsion systems in a realistic environment aligned with the DDG(X) IPS design efforts as part of DDG(X) Design Development efforts executed under PE 0603564N/ PU 0411. Specifically: - Phase 1 (IPS M&S): Continue risk reduction activities for the DDG(X) IPS by utilizing ship power systems simulation to support equipment and interface specification refinement. Conduct real-time integrated system modeling (including controls) assessing power & propulsion system performance. Provide DDG(X) IPS design performance feedback to the ship design (PE 0603564N / PU 0411) as part of preliminary design and refinement of the power and propulsion system design and specification. Continue to demonstrate interfaces for energy storage and advanced controls capabilities that are required to support future mission system capabilities such as directed energy weapons and advanced sensors. - Phase 2 (Land Based Test Site): Continue risk reduction testing and test site modifications and construction for incorporation of DDG(X) IPS hardware. Continue Shipbuilder procurement of DDG(X) IPS hardware components including a propulsion motor & drive, diesel/gas turbine engines and generators, electrical distribution, mechanical systems, IPS controls, auxiliary systems, etc. to host full scale ship IPS (Land Based Engineering Site). Continue refinement of interfaces and specifications for individual power and propulsion system components and validation of Digital Engineering efforts ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** In FY 2024 to FY 2025 the DDG(X) Power & Propulsion Risk Mitigation & Demonstration decreases by an overall total of -$38.871M, which is aligned with the PE 0603564N / PU 0411 as the Navy revalidates the TLR for the ship's mobility that directly impacts the procurement and test sites configuration requirements.					
Title: Power and Energy Systems	21.770	17.937	17.584	0.000	17.584
Articles:	-	-	-	-	-
FY 2024 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Energy storage, referred to as Energy Magazine, is required to avoid negative impacts of Directed Energy (DE) weapons and other high powered mission systems on power generating equipment (diesel/gas turbine engines and generators) and ship electrical distribution systems. The Energy Magazine is a common, modular, scalable intermediate power system that standardizes energy storage across multiple mission systems (lasers, advanced radars, Surface Electronic Warfare Improvement Program (SEWIP), and other pulsed loads) and ships classes, and eliminates wasteful need for mission systems to each develop, build, test, qualify/certify and support their own unique energy storage systems. The Energy Magazine (EM) also provides stable backup power functionality and leads to reduction of uninterruptable power supplies (UPS) aboard ship. Energy Magazine is designed for both new construction and back-fit applications where advanced combat systems are being deployed. Energy Magazine-Prototype (EM-P): Conduct testing of EM-P hardware in the FSU CAPS M&S environment against representative naval warship electrical architectures and relevant directed energy weapon systems loads and independent government testing to confirm performance requirements against representative Naval power system and validate digital models of the EM-P system. Evaluate performance of the EM prototype and, as applicable, incorporate lessons learned in EM. EM-P activities are planned to complete in FY24. Continue to support PEO IWS, OPNAV, and ONR laser integration demonstration(s). Energy Magazine (EM): Complete the preliminary design and start detail design, start characterization for Lithium Ion (Li) Batteries, and initiate procurement of all long lead time material to fabricate and assemble EM first units. conduct Test Readiness Reviews and continue and complete testing. Deliver and update EM models and conduct component and system simulations that focus on EM software development and EM performance. Generate and validate detailed interface requirements, test plans and procedures for use in virtual environment demonstration(s) and independent government testing to confirm performance requirements. Continue to support PEO IWS, Office of the Chief of Naval Operations, and Office of Naval Research laser testing and planning activities. Evaluate performance of the EM prototype and, as applicable, incorporate lessons learned in EM. Develop an Advanced Power Conversion Module (APCM) to convert ships power for use by high powered future ship equipment with different voltage requirements, such as radars, sensors, etc. Utilize Silicon Carbon (and					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
other high bandgap semiconductor materials) power electronic modules that enable more compact, thermally tolerant power conversion equipment making them highly desirable for naval applications. Advanced Power Generation Modules (APGM): Ongoing developments lower Total Ownership Cost (TOC) by developing advanced materials package capable of minimum 3X engine life over projected increases in Gas Turbine (GT) loads and temperatures: The transitioned ONR FNC SW-19-03 (GT Marinization Package), planned FY 2024 focus areas include completion of material/coating production specifications, completion of casting/coating manufacturing process development, initiation of parts fabrication for qualification testing, and monitoring condition of at-sea demonstration hardware. Naval Power Technology Development / Platform Integration & Transition: Continue to support maturation and transition of Power & Energy System developments that are aligned with the Navy's 30-year shipbuilding plan and the Chief of Naval Operations Surface Capability Evolution Plan via the Naval Power and Energy Systems Technology Development Roadmap (TDR), which outlines the way ahead for future developments and provides a basis for coordinated planning and investment by the Navy and private industry. ***FY 2025 Base Plans:*** Energy storage, referred to as Energy Magazine, is required to avoid negative impacts of Directed Energy (DE) weapons and other high powered mission systems on power generating equipment (diesel/gas turbine engines and generators) and ship electrical distribution systems. The Energy Magazine is a common, modular, scalable intermediate power system that standardizes energy storage across multiple mission systems (lasers, advanced radars, Surface Electronic Warfare Improvement Program (SEWIP), and other pulsed loads) and ships classes, and eliminates wasteful need for mission systems to each develop, build, test, qualify/certify and support their own unique energy storage systems. The Energy Magazine (EM) also provides stable backup power functionality and leads to reduction of uninterruptable power supplies (UPS) aboard ship. Energy Magazine is designed for both new construction and back-fit applications where advanced combat systems are being deployed. Energy Magazine (EM): Complete the detail design and Critical Design Review, complete characterization for Lithium Ion (Li) Batteries, procurement of all remaining material to fabricate and assemble EM first units and begin fabrication of first article. Continue to update EM models and conduct component and system simulations that focus on EM software development and EM performance. Generate and validate detailed interface					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
requirements, test plans and procedures for use in virtual environment demonstration(s) and independent government testing to confirm performance requirements. Continue to support PEO IWS, Office of the Chief of Naval Operations, and Office of Naval Research laser testing and planning activities. Evaluate and, as applicable, and continue to incorporate lessons learned from performance of the EM prototype in EM and EM technical deliverables. Continue development of an Advanced Power Conversion Module (APCM). Perform M&S activities to validate requirements completed in FY 2024 to establish specifications required for future procurement of an APCM. Develop an Advanced Power Conversion Module (APCM) to convert ships power for use by high powered future ship equipment with different voltage requirements, such as radars, sensors, etc. Utilize Silicon Carbon (and other high bandgap semiconductor materials) power electronic modules that enable more compact, thermally tolerant power conversion equipment making them highly desirable for naval applications. Advanced Power Generation Modules (APGM): Project and funding transferred to PE 0603724N / PU 0829 in FY 2025 Naval Power Technology Development / Platform Integration & Transition: Continue to support maturation and transition of Power & Energy System developments that are aligned with the Navy's 30 year shipbuilding plan and the Chief of Naval Operations Surface Capability Evolution Plan via the Naval Power and Energy Systems Technology Development Roadmap (TDR), which outlines the way ahead for future developments and provides a basis for coordinated planning and investment by the Navy and private industry. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease of -$0.353M from FY 2024 to FY 2025 in design/development is due to the refinement of scope associated with the output voltages and the alignment with the draft MIL-STD-1399.					
Title: HM&E Cyber Analysis	8.959	2.649	1.904	0.000	1.904
Articles:	-	-	-	-	-
Description: Previous titled: HM&E Cybersecurity - Hardware Development / Prototyping & Cyber Analysis					
FY 2024 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Conduct Cyber Table Top type events and cyber vulnerability analysis via Model Based Systems Engineering tools of HM&E systems/networks on additional ship classes. One analysis will be performed on the Enterprise Remote Monitoring (eRM) system, used on almost all surface ships to report data back to shore in support of Condition Based Maintenance. This funding supports development, security, and operations (DevSecOps) at Naval Surface Warfare Center Philadelphia Division (NSWCPD) for HM&E systems. ***FY 2025 Base Plans:*** Continue to Conduct Cyber Table Top type events and cyber vulnerability analysis via Model Based Systems Engineering tools of HM&E systems/networks on additional ship classes. One potential analysis is on the DDG 1000-class deck hatch system for the Conventional Prompt Strike (CPS) capability. Work will continue on HM&E DevSecOps. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease of -$0.745M from FY 2024 to FY 2025 is due to a realignment of SABER development funds to the SABER program office, PE 0603563N / PU 3244.					
Accomplishments/Planned Programs Subtotals	171.565	133.911	93.942	0.000	93.942

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• RDTEN/0603564N/0411: *DDG(X) Concept Development*	48.636	74.050	28.344	-	28.344	68.716	43.126	40.422	41.208	Continuing	Continuing

Remarks

PE 0603564N/PU 0411 DD(X) Ship Design and 0603573/PU 2471 are inter-related with the ship design portion developing and providing initial ship specifications and descriptions for the Integrated Power System (IPS) and major component procurements that drive ship size and arrangements.

D. Acquisition Strategy

For new contract awards, full and open competition is utilized to the maximum extent possible to provide maximum benefit to the Navy at the lowest possible cost to the taxpayer. When able to meet Navy requirements, commercial technology is leveraged to further minimize cost to the Navy.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / *Advanced Surface Machinery Sys*	Project (Number/Name) 2471 / *Integrated Power Systems (IPS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Power & Energy Sys	SS/CPFF	Rolls Royce : Walpole, MA	37.983	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Power & Energy Sys	C/CPIF	DRS : Milwaukee WI	10.700	8.600	Sep 2023	4.500	Nov 2023	6.036	Jun 2025	-		6.036	Continuing	Continuing	Continuing
Power & Energy Sys	C/CPFF	DRS : DRS, Milwaukee WI	78.523	3.215	Aug 2023	0.000	Nov 2023	0.000		-		0.000	Continuing	Continuing	Continuing
Power & Energy Sys	C/CPFF	Industry : Various	60.400	2.064	Aug 2023	6.001	Nov 2023	5.943	Nov 2024	-		5.943	Continuing	Continuing	Continuing
Power & Energy Sys	WR	NSWCPD : Phila, PA	70.583	3.607	Oct 2023	3.911	Nov 2023	2.895	Nov 2024	-		2.895	Continuing	Continuing	Continuing
Power & Energy Sys	WR	Other Government Organizations : Various	4.087	3.853	Oct 2023	2.853	Nov 2023	2.360	Nov 2024	-		2.360	Continuing	Continuing	Continuing
Cyber analysis	WR	NSWCPD : Phila, PA	18.203	2.088	Nov 2022	1.585	Nov 2023	1.250	Nov 2024	-		1.250	Continuing	Continuing	Continuing
Cyber analysis	C/CPIF	Boeing : Huntington Beach, CA	2.000	0.800	May 2023	0.000	May 2024	0.000		-		0.000	Continuing	Continuing	Continuing
Cyber analysis	C/FP	Various HM&E Equipment Vendors : Various	2.066	0.105	Oct 2023	1.064	Jan 2024	0.325	Jan 2025	-		0.325	Continuing	Continuing	Continuing
Cyber analysis	C/CPIF	Industry : Various	5.402	0.356	Aug 2023	0.000	Jan 2024	0.329	Jan 2025	-		0.329	Continuing	Continuing	Continuing
Cyber analysis	C/CPFF	Hexagon US Federal : Huntsville, AL	4.106	1.396	Jan 2023	0.000	Jan 2024	0.000		-		0.000	Continuing	Continuing	Continuing
Cyber analysis	C/CPFF	JHU APL : Laurel, MD	7.205	2.528	Jul 2023	0.000	Nov 2023	0.000		-		0.000	Continuing	Continuing	Continuing
Cyber analysis	C/CPFF	Visionary Products Incorporated (VPI) Technologies : Draper, UT	2.361	0.453	Aug 2023	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Cyber analysis	MIPR	Sandia National Labs : Albuquerque, NM	6.513	0.350	Nov 2022	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Cyber analysis	WR	NSWC Damneck : Damneck, VA	0.000	0.883	Aug 2023	0.000		0.000		-		0.000	0.000	0.883	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / *Advanced Surface Machinery Sys*	Project (Number/Name) 2471 / *Integrated Power Systems (IPS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DDG(X) Power & Prop Risk Mitigation & Demo	WR	Other Government Organizations : Various	0.000	9.832	Sep 2023	1.064	Nov 2023	1.811	Nov 2024	-		1.811	Continuing	Continuing	Continuing
DDG(X) Power & Prop Risk Mitigation & Demo	Various	GE : Various	0.200	16.548	Mar 2023	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
DDG(X) Power & Prop Risk Mitigation & Demo	C/CPFF	Industry : Various	18.974	57.012	Sep 2023	56.164	Nov 2023	18.249	Nov 2024	-		18.249	0.000	150.399	-
DDG(X) Power & Prop Risk Mitigation	WR	NSWCPD : Phila. PA	6.324	15.332	Oct 2023	8.740	Nov 2023	10.197	Nov 2024	-		10.197	0.000	40.593	-
DDG(X) Power & Prop Risk Mitigation	Various	Shipbuilders (BIW/ HII) : Various	2.715	41.144	Sep 2023	46.729	Nov 2023	43.297	Nov 2024	-		43.297	0.000	133.885	-
		Subtotal	338.345	170.166		132.611		92.692		-		92.692	Continuing	Continuing	N/A

Remarks

FY 2024 to FY 2025 decrease in Product Development is due primarily to the Navy revalidating the TLR for the ship's mobility, which directly impacts the procurement and test sites configuration requirements.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	NSWCCD-SSES : Phila, PA	24.954	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	24.954	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management	C/CPFF	Herren Associates : Alexandria, VA	11.840	1.399	Nov 2022	1.300	Nov 2023	1.250	Nov 2024	-		1.250	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	11.840	1.399		1.300		1.250		-		1.250	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	375.139	171.565		133.911		93.942		-		93.942	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

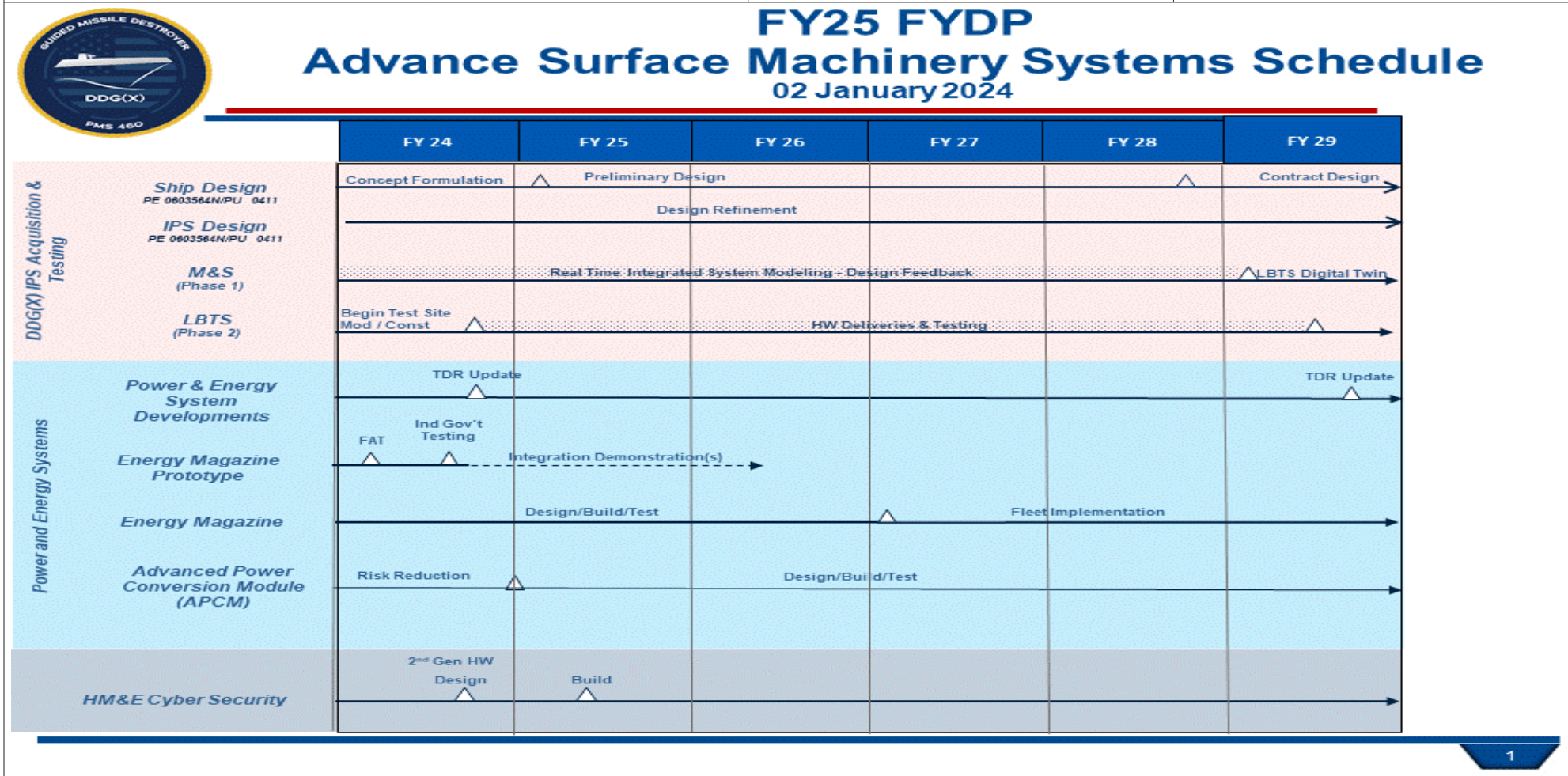

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 2471 / *Integrated Power Systems (IPS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2471				
DDG(X) Power & Propulsion Risk Mitigation & Demo / DDG(X) IPS ACQ & Testing	1	2023	4	2029
Power and Energy Systems	1	2023	4	2029
HM&E Cyber Security	1	2023	4	2029

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / *Advanced Surface Machinery Sys*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
9999: *Congressional Adds*	93.097	29.324	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	122.421
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Adds:
Silicon Carbide Power Modules (C447)
Solid State Circuit Breaker Development (C755)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Silicon carbide flexible bus node ***FY 2023 Accomplishments:*** Develop contracting strategy and execute scope associated with Silicon carbide flexible bus node ***FY 2024 Plans:*** N/A	20.642	0.000
Congressional Add: Large format lithium ion batteries ***FY 2023 Accomplishments:*** Develop contracting strategy and scope of effort associated with Large format lithium ion batteries ***FY 2024 Plans:*** N/A	8.682	0.000
Congressional Adds Subtotals	29.324	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / *Advanced Surface Machinery Sys*	Project (Number/Name) 9999 / *Congressional Adds*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SiC Power Modules	C/CPFF	RCT : Linthicum Heights MD	28.562	0.000		0.000		0.000		-		0.000	0.000	28.562	-
SiC Power Modules	Various	Various : Various	2.310	0.000		0.000		0.000		-		0.000	0.000	2.310	-
Adv. Power electronics Integration	Various	Various : Various	7.236	0.000		0.000		0.000		-		0.000	0.000	7.236	-
Suface Combatant Component Level prototyping	Various	Various : Various	9.361	0.000		0.000		0.000		-		0.000	0.000	9.361	-
Surface Combatant Component Level Prototyping	Various	General Electric : Various	17.818	0.000		0.000		0.000		-		0.000	0.000	17.818	-
Surface Combatant Component Level Prototyping	Various	Rolls-Royce : Various	4.480	0.000		0.000		0.000		-		0.000	0.000	4.480	-
Surface Combatant Component Level Prototyping	Various	FSU CAPS : Tallahassee, FL	10.800	0.000		0.000		0.000		-		0.000	0.000	10.800	-
Surface Combatant Component Level Prototyping	WR	NSWCPD : Philadelphia,PA	5.778	0.000		0.000		0.000		-		0.000	0.000	5.778	-
Small Boat Electric Propulsion	Various	Various : Various	4.824	0.000		0.000		0.000		-		0.000	0.000	4.824	-
Solid State Circuit Breaker Development	C/BA	Not Specified : Not Specified	1.928	0.000		0.000		0.000		-		0.000	0.000	1.928	-
SiC Power FBN	C/BA	RCT : Linthicum Heights, MD	0.000	20.392	Jun 2023	0.000		0.000		-		0.000	0.000	20.392	-
Large Format Lithium Ion Battery	C/BA	Various : Various	0.000	8.266	Jan 2024	0.000		0.000		-		0.000	0.000	8.266	-
SiC Power FBN	Various	FSU CAPS : Tallahassee, FL	0.000	0.250	Jun 2023	0.000		0.000		-		0.000	0.000	0.250	-
Large Format Lithium Ion Battery	WR	Other Gov't Activities : Various	0.000	0.416	Oct 2023	0.000		0.000		-		0.000	0.000	0.416	-
		Subtotal	93.097	29.324		0.000		0.000		-		0.000	0.000	122.421	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / *Advanced Surface Machinery Sys*	Project (Number/Name) 9999 / *Congressional Adds*	

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	93.097	29.324		0.000		0.000		-		0.000	0.000	122.421	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 9999 / *Congressional Adds*

	FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028				FY 2029			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 9999																												
SiC Flexible Bus Node		[redacted]																										
Large Format Lithium ion Batteries		[redacted]																										

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603573N / *Advanced Surface Machinery Sys*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
SiC Flexible Bus Node	2	2023	4	2024
Large Format Lithium ion Batteries	2	2023	4	2024