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

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</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	41.252	21.630	46.657	106.957	-	106.957	-	-	-	-	-	-
0409: <i>DDG-51 Flt III Concept Development</i>	0.000	0.000	5.520	6.184	-	6.184	-	-	-	-	-	-
0411: <i>DDG(X) Concept Development</i>	0.000	0.000	12.946	79.689	-	79.689	-	-	-	-	-	-
3377: <i>T-ATS Ship Concept Development</i>	4.975	0.837	0.000	0.000	-	0.000	-	-	-	-	-	-
3389: <i>OPLOG IPT Development</i>	36.277	20.793	18.191	21.084	-	21.084	-	-	-	-	-	-
9999: <i>Congressional Adds</i>	0.000	0.000	10.000	0.000	-	0.000	-	-	-	-	-	-

**Program MDAP/MAIS Code:**  
**Project MDAP/MAIS Code(s):** 180

**Note**  
Project 3389 prior years includes \$11.319M FY2018 funding financed under this PE project 9999/C404 (Congressional add).

**A. Mission Description and Budget Item Justification**  
The FY 2022 funding request was reduced by \$4.762 million to account for the availability of prior year execution balances.

0409 - This project provides Test and Evaluation (T&E) requirements for DDG-51 Flight III to meet Initial Operational Capability (IOC) in FY24. T&E will concentrate on verifying integration and interoperability of employed technologies and systems in the DDG-51 FLT III design to achieve the mission capabilities and performance requirements as defined in the DDG-51 Flight III Capability Development Document (CDD). T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP). Funding planned is for the execution of Developmental Testing (DT), Operational Testing (OT), and Live Fire Test and Evaluation (LFT&E).

0411 - The Navy's DDG(X) program (formerly known as Large Surface Combatant or LSC) is the Navy's Future Guided Missile Destroyer ship acquisition program to follow the DDG 51 class that is essential to field capabilities required for the future fight as validated by the Future Surface Combatant Force (FSCF) ICD, FSCF AoA, and Future Naval Force Study (FNFS). DDG(X) will integrate non-developmental systems into a new hull design that incorporates platform flexibility and the space, weight, power and cooling (SWAP-C) to meet future combatant force capability/system requirements that are not achievable without the new hull design. The DDG(X) platform will have the flexibility to rapidly and affordably upgrade to future warfighting systems when they become available as well as have improved range and fuel efficiency for increased operational flexibility and decreased demand on the logistics force. DDG(X) will provide an Integrated Power System with flexibility to enable fielding of high demand electric weapons, sensor systems and computing resources. To decouple ship development risk from technology risk, accommodation of

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<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>
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additional future capabilities will be pre-planned; these future capabilities may include: missile launchers capable of larger weapons to exceed adversary capabilities, high power lasers, or other systems that can be efficiently incorporated when developed and demonstrated.

3389 - Naval Operational Logistics (OPLOG) Integration IPT Development - Develops enabling technologies for future and in-service afloat operational logistics and integrated supply force and combatant logistics requirements; and conducts cooperative initiatives with acquisition programs, program sponsors, engineering managers, the Navy science and technology community and Fleet customers. OPLOG develops integrated, cross-platform (i.e. applicable to more than one ship class/type) operational logistics and energy conservation technologies and capabilities as well as draft acquisition and operations policy ensuring future Naval systems leverage emerging logistic capabilities and technologies to provide operationally effective and energy efficient logistics delivery.

C651- Congressional Add for the Ship Control System (SCS) and Bridge Integration PARM (PMS443) to support bridge design configuration analysis, modernization, and standardization. This will directly contribute to national security by improved capabilities to ship and treat the bridge as a single combat system warfighting environment, enhancing operational availability and readiness and increasing lethality. In addition, leveraging modeling and simulation methods and data synthesis will assist in the early identification of future mishaps leading to increased fleet operational readiness and a reduction in unexpected maintenance costs.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	22.534	70.270	156.841	-	156.841
Current President's Budget	21.630	46.657	106.957	-	106.957
Total Adjustments	-0.904	-23.613	-49.884	-	-49.884
• Congressional General Reductions	-	-0.313			
• Congressional Directed Reductions	-	-33.300			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.021	0.000			
• SBIR/STTR Transfer	-0.883	0.000			
• Program Adjustments	0.000	0.000	-47.339	-	-47.339
• Rate/Misc Adjustments	0.000	0.000	-2.545	-	-2.545

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

**Project:** 9999: *Congressional Adds*

Congressional Add: *Bridge Integration Program*

	<b>FY 2020</b>	<b>FY 2021</b>
	0.000	10.000
Congressional Add Subtotals for Project: 9999	0.000	10.000
Congressional Add Totals for all Projects	0.000	10.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	
<b><u>Change Summary Explanation</u></b> FY 2022 Change Explanation Project 0409: Increase of \$1.483 million in support of testing and evaluation required for initial operating capability of the DDG 51 Flt III and FFG. Supports the initiation of Verification, Validation, and Accreditation (V, V&A) plans and packages for each of the Flight III models. VV&A plans are required to support the Initial Survivability Assessment Report (ISAR). Project 0411: Decrease of \$42.100 million to properly align funding to the Advanced Surface Machinery Systems budget line in support of Integrated Propulsion Systems. Decrease of \$6.000 million for proper phasing of funding. Proj 3389: Decrease of \$4.460 million to offset Navy higher priority items and \$4.762M to account for the availability of prior year execution balances. Increase of \$8.500 million to support Modular CONSOL Adapter Kits (MCAK) prototypes. Project C651: Congressional increase for Ship Control Systems and Bridge Integration.		

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0409 / <i>DDG-51 Flt III Concept Development</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
0409: <i>DDG-51 Flt III Concept Development</i>	0.000	0.000	5.520	6.184	-	6.184	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Project MDAP/MAIS Code:** 180

**A. Mission Description and Budget Item Justification**

This project provides Test and Evaluation (T&E) requirements for DDG-51 Flight III to meet Initial Operational Capability (IOC) in FY24. T&E will concentrate on verifying integration and interoperability of employed technologies and systems in the DDG-51 FLT III design to achieve the mission capabilities and performance requirements as defined in the DDG-51 Flight III Capability Development Document (CDD). T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP). Funding planned is for the execution of Developmental Testing (DT), Operational Testing (OT), and Live Fire Test and Evaluation (LFT&E).

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> DDG-51 Flight III Test and Evaluation	0.000	5.520	6.184	0.000	6.184
<b>Articles:</b>	-	-	-	-	-
<b>FY 2021 Plans:</b> Conduct DDG-51 test planning in support of Development Testing (DT), Operational Testing (OT), and Live Fire Test and Evaluation (LFT&E). Begin Modeling and Simulation (M&S) updates and planning activities to include Total Mine Simulation System (TMSS), Cruise Missile analysis, Advance Survivability Assessment Program (ASAP), Integrated Recovery Model (IRM), and the Navy Enhanced Sierra Mechanics (NESM) Models. Conduct first DDG-51 FLT III Cybersecurity Tabletop exercise.					
<b>FY 2022 Base Plans:</b> Continue M&S efforts and model updates in NESM, ASAP, and IRM to support vulnerability analysis. Develop Verification, Validation, and Accreditation (V,V&A) plans and packages for all M&S platforms for Flight III. Cybersecurity testing continues with the second DDG-51 FLT III Cybersecurity Tabletop exercise.					
<b>FY 2022 OCO Plans:</b> N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0409 / <i>DDG-51 Flt III Concept Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
The FY 2022 budget request increases due to the initiation of Verification, Validation, and Accreditation (V,V&A) plans and packages for each of the Flight III models. VV&A plans are required to support Initial Survivability Assessment Report (ISAR) completion in FY 2024.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	5.520	6.184	0.000	6.184

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<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>
• SCN 2122/5300: <i>DDG-51 Class</i>	5,809.323	3,379.140	2,016.787	-	2,016.787	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The DDG-51 class ships use a competitive acquisition strategy using Multi-Year Procurement (MYP) contracts awarded to two shipbuilders in FY 2018.

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0409 / <i>DDG-51 Flt III Concept Development</i>
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<b>Test and Evaluation (\$ in Millions)</b>				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			
Modeling and Simulation	WR	NRL : Washington, DC	0.000	0.000		0.205	Jul 2021	0.327	Oct 2021	-		0.327	-	-	-
Modeling and Simulation	WR	NSWC CD : Bethesda, MD	0.000	0.000		1.335	Mar 2021	1.423	Oct 2021	-		1.423	-	-	-
Modeling and Simulation	Various	T&E Solutions : Various	0.000	0.000		0.530	May 2021	0.980	Dec 2021	-		0.980	-	-	-
Modeling and Simulation	Various	Various : Various	0.000	0.000		0.100	May 2021	0.122	Oct 2021	-		0.122	-	-	-
Test and Evaluation	Various	Various : Various	0.000	0.000		1.413	Mar 2021	1.290	Nov 2021	-		1.290	-	-	-
LFT&E	Various	T&E Solutions : Various	0.000	0.000		0.275	May 2021	0.305	Dec 2021	-		0.305	-	-	-
LFT&E	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.060	May 2021	0.065	Dec 2021	-		0.065	-	-	-
Cyber DT	Various	Various : Various	0.000	0.000		1.602	Aug 2021	1.672	Nov 2021	-		1.672	-	-	-
<b>Subtotal</b>			0.000	0.000		5.520		6.184		-		6.184	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		0.000	0.000	5.520	6.184	-	-	-	N/A

**Remarks**  
 Performing activity funding distribution revised based on the evolution of the DDG FLT III TEMP between FY2021 and FY2022 budget submissions. FY2021 Award Dates reflect revised timeline based on FY2021 enactment in JAN 2021.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0409 / <i>DDG-51 Flt III Concept Development</i>



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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0409 / <i>DDG-51 Flt III Concept Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 0409</b>				
Navy Enhanced Sierra Mechanics (NESM) Model Development	1	2021	2	2022
Advance Survivability Assessment Program (ASAP) Model Update	1	2021	3	2022
Integrated Recoverability Model (IRM) Update	1	2021	3	2022
Cyber Table Top (CTT) -1	2	2021	2	2021
Initial Survivability Assessment Report (ISAR) Verification, Validation & Accreditation (VV&A) Development	1	2022	3	2022
Cyber Table Top (CTT) -2	2	2022	2	2022

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<b>Appropriation/Budget Activity</b> 1319 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>				<b>Project (Number/Name)</b> 0411 / <i>DDG(X) Concept Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
0411: <i>DDG(X) Concept Development</i>	0.000	0.000	12.946	79.689	-	79.689	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Navy's DDG(X) program (formerly known as Large Surface Combatant or LSC) is the Navy's Future Guided Missile Destroyer ship acquisition program to follow the DDG 51 class that is essential to field capabilities required for the future fight as validated by the Future Surface Combatant Force (FSCF) ICD, FSCF AoA, and Future Naval Force Study (FNFS). DDG(X) will integrate non-developmental systems into a new hull design that incorporates platform flexibility and the space, weight, power and cooling (SWAP-C) to meet future combatant force capability/system requirements that are not achievable without the new hull design. The DDG(X) platform will have the flexibility to rapidly and affordably upgrade to future warfighting systems when they become available as well as have improved range and fuel efficiency for increased operational flexibility and decreased demand on the logistics force. DDG(X) will provide an Integrated Power System with flexibility to enable fielding of high demand electric weapons, sensor systems and computing resources. To decouple ship development risk from technology risk, accommodation of additional future capabilities will be pre-planned; these future capabilities may include: missile launchers capable of larger weapons to exceed adversary capabilities, high power lasers, or other systems that can be efficiently incorporated when developed and demonstrated.

The DDG(X) strategy includes a robust Digital Engineering approach to provide a framework around which the program can achieve efficiencies throughout its life cycle. The use of integrated digital tools and models within a structured, configuration managed environment will drive process efficiency to capture and authenticate necessary data to successfully accomplish design, construction, maintenance, modernization, operations and sustainment of DDG(X).

The DDG(X) program is focused on identifying and mitigating the risk of critical system technologies sufficiently prior to Milestone B. Through a combination of analysis, modeling & simulation (M&S) and physical scale-model prototyping, the DDG(X) hull form will be designed to meet the Navy's Top Level Requirements (TLRs) for the class, and its critical risks will be mitigated or retired. DDG(X) will use a four phased risk reduction process for IPS that provides the Navy with a relevant means to reduce system risk at the optimum time through the use of persistent digital engineering and land based test best practices to ensure successful ship activation.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> DDG(X) Design and Analysis	0.000	8.946	79.689	0.000	79.689
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> DDG(X) Design and Analysis efforts include all of the program and engineering efforts necessary to produce the technical packages required for the various stages of ship design. The engineering efforts are executed in four phases: Concept Design, Preliminary Design (FY22), Contract Design (FY24) and Detail Design (FY26). Concept Design will complete in FY 2022 and will include cost/capability trades to establish					

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>draft Capability Development Document (CDD) requirements; set-based engineering to result in identification of critical systems and their requirements; planning for critical system testing and analysis; execution of early critical systems testing and analysis. Preliminary Design integrates the new hull form, non-developmental systems, critical systems, and flexibility for future systems into an affordable and producible ship design. Contract Design will complete the critical systems and integration testing required prior to Milestone B, further refine the DDG(X) baseline, and complete development of the detailed ship specifications necessary for Detail Design. DDG(X) Design and Analysis and critical systems risk mitigation are dependently linked throughout the phases; engineering activities are necessary to specify critical systems, their sizing, requirements, and configuration that are necessary and appropriate to meet warfighting requirements. Critical systems risk mitigation efforts are critical to informing the system performance capabilities to properly integrate into the DDG(X).</p> <p><b>FY 2021 Plans:</b> In FY 2020, requirements analysis and concept studies were executed leading to development of Top Level Requirements (TLR) for DDG(X). These TLRs were approved by the CNO in Dec 2020 and will serve as the basis for the draft CDD. Set Based Design (SBD) will be used to identify the critical system technologies necessary to achieve the draft CDD requirements affordably. Initial critical systems risk mitigation plans will be developed based on Senior Technical Authority identified critical systems and analysis and testing efforts will begin. Products worked this year will include the draft CDD, Integrated Master Schedule, Engineering Management Plan, Initial Ship Baseline, Systems Engineering Plan, and Critical Systems Test &amp; Analysis Plan. Integration of the shipyards with the design team will begin with specific focus on digital engineering strategy, acquisition strategy, ship cost estimation, requirements and producibility analysis. Develop a collaborative Acquisition Strategy based on Industrial Base analysis, engagement with shipbuilders and lessons learned from other programs including DDG 51, DDG 1000, FFG 62 and Columbia.</p> <p><b>FY 2022 Base Plans:</b> With approved TLRs, draft CDD, and the DDG-51 shipyards integrated into the design team, efforts will transition into Preliminary Design (PD), which includes developing a functional baseline design to achieve the draft CDD warfighting requirements and execute critical systems risk mitigation efforts. The CDD will remain draft throughout most of the Preliminary Design to allow refinement of requirements based on knowledge gained during the design efforts and input from industry. The DDG(X) digital engineering strategy will be implemented to incorporate data exchange efficiencies. Complete preparation efforts and deliverables required for the final validated CDD in FY23.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>Utilize the integrated team, including industry, to complete cost and capability trades under Concept Design. Begin refining design solutions where appropriate to ensure ship design meets acquisition and life cycle cost goals. Develop ship configuration and arrangements, overall allocation of space to system architectures, major propulsion, electrical, mission-essential mechanical and combat system elements, vendor selections where appropriate and possible, interface control specifications for future warfare systems integration, long lead material candidates, ship manning, cyber-functionality of systems and components, and aviation integration.</p> <p>Begin selection of major system components for the functional baseline including the hull form geometry, power and propulsion system components, and deck systems. Select vendors of some of the key DDG(X) systems. Establish flexibility features, such as the interfaces for future warfare systems and energy storage, including high powered direct energy weapons and sensors. Refine critical systems specifications including the power and propulsion system. Continue critical system risk mitigation efforts including scale model hull form seakeeping, dynamic stability, and resistance in accordance with FY 2020 National Defense Authorization Act. Incorporate results of power and propulsion prototyping and test/analysis for critical power, propulsion, and propulsion system technology to be completed under PE 0603573N/PU 2471 in FY 2022.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The increase from FY2021 to FY2022 reflects transition from Concept to Preliminary Design (PD). PD has the increased scope necessary to create the products required to meet the scheduled System Functional Review in support of Milestone B. The systems engineering process requires increased shipbuilder and vendor participation and more technical disciplines to engage in design, design analysis, test planning, testing, and other systems engineering activities.</p>					
<p><b>Title:</b> DDG(X) Power and Propulsion Risk Mitigation</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> In accordance with the FY 2020 NDAA, DDG(X) shall execute land based testing to reduce the technological and integration risks of the propulsion system. This effort will execute risk mitigation efforts for the DDG(X) Integrated Power System (IPS) selected and specified during design and analysis, including prototyping and testing in and Integrated Power and Energy Test Facility (ITF) that successfully demonstrates performance in a suitably realistic environment necessary to mitigate the technology risk.</p>	0.000	4.000	0.000	0.000	0.000
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>DDG(X) is initiating a phased systems engineering approach where risk is incrementally reduced to the necessary level to support performance of follow-on design and construction activities. This four-phased testing and risk reduction approach builds assurance that the IPS system can be installed and activated efficiently by the shipbuilder with performance characteristics that are well understood. Phase 1 (Digital Engineering) includes establishing a description of the components and system non-real-time models that are needed for the DDG(X) effort initiating the IPS digital engineering effort. This ensures requirements, specifications, and other important factors that determine intended use and performance bounds are defined. Phase 2 (Surrogate Testing) employs refined digital models and full-scale integrated surrogate components that functionally represent the intended DDG(X) power and propulsion system for testing at ITF. These models and surrogates support the build specification and guide the connection of equipment and interfaces at the ITF. Phase 3 (Tactical Hardware Testing) develop and transition ITF to the DDG(X) Land Based Engineering Site (LBES), builds a full-scale tactical representation of the shipboard power and propulsion system. Phase 4 (Shipboard Test &amp; Activation) 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.</p> <p>The development of the Integrated Power and Energy System Test Facility (ITF) at NSWCPD for DDG(X) will be transferred after FY21 from this PE to the Electric Ships Program (PMS 320) funding line (PE0603573N/PU 2471) as the program office responsible for DDG(X) power and propulsion system execution.</p> <p><b>FY 2021 Plans:</b> Using FY 2020 Congressional Add funds placed in PE 0603573N/2471 the Navy began refurbishment of the former DDG 1000 land based test site, referred to as the ITF, at the Naval Surface Warfare Center Philadelphia Division and commenced digital engineering efforts of power and energy systems at Florida State University Center for Advanced Power Systems. During FY2021, planning and initial execution of phases 1 and 2 of the four phased development approach will be executed. Design studies will be initiated with suppliers of major power and propulsion system components based upon power and propulsion design decisions made in the Design and Analysis efforts. Necessary modifications of the ITF will continue in a phased approach to support future testing for DDG(X).</p> <p><b>FY 2022 Base Plans:</b> The development of the Integrated Power and Energy System Test Facility (ITF) at NSWCPD for DDG(X) has been transferred in FY 2022 from this PE to the Electric Ships Program (PMS 320) funding line (PE0603573N/</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0411 / <i>DDG(X) Concept Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
PU 2471) to highlight the significant Navy investment in land based testing to reduce DDG(X) power and propulsion risks and leverage additional power and energy development efforts executed by PMS 320.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2021 to FY 2022 decrease is due to transferring Power and Propulsion Risk Mitigation funding, specifically the development of the Integrated Power and Energy System Test Facility (ITF) at NSWCPD, originally funded in this PE (PE063564N/PU 0411) to the Electric Ships Program (PMS 320) funding line (PE0603573N/PU 2471) as the program office with the subject matter expertise for DDG(X) power and propulsion system risk reduction. This funding realignment was executed to more clearly highlight the significant Navy investment in land based testing to reduce DDG(X) power and propulsion risks and to leverage additional power and energy development efforts executed by PMS 320. Under the PMS 320 funding line, these risks will be suitably reduced via land-based testing at an Integrated Power & Energy Systems Test Facility(ITF) at NSWC Philadelphia. Surrogate systems will provide a representative environment to understand interactions and reduce critical risks at the element, subsystem, and system levels of operation prior to Detail Design.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	12.946	79.689	0.000	79.689

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<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>
• SCN/0204221N/2129: <i>DDG(X)</i>	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
 A formal acquisition strategy for DDG(X) is still being developed. Under the intended acquisition strategy, Preliminary, Contract and Detail Design for DDG(X) will be accomplished through a collaborative Navy-Industry effort that includes Navy management of engineering efforts supported by a multidisciplinary team composed of contractor ship design agents, system vendors, shipyard personnel, and government subject matter experts. As maturity of the design increases, it is expected that the shipbuilders will take on increasing levels of responsibility for the design.

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0411 / <i>DDG(X) Concept Development</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
LSC Design and Analysis	C/CPFF	Industry : Various	0.000	0.000		2.863	Apr 2021	28.636	Nov 2021	-		28.636	-	-	-
LSC Design and Analysis	C/CPFF	BIW : Bath, ME	0.000	0.000		0.511	Mar 2021	8.100	Nov 2021	-		8.100	-	-	-
LSC Design and Analysis	C/CPFF	HII : Pascagoula, MS	0.000	0.000		0.500	Mar 2021	8.100	Nov 2021	-		8.100	-	-	-
LSC Design and Analysis	WR	Other Government Organizations : Various	0.000	0.000		0.287	Mar 2021	6.030	Nov 2021	-		6.030	-	-	-
LSC Design and Analysis	WR	NSWC Carderock : Carderock, MD	0.000	0.000		2.087	Mar 2021	14.775	Nov 2021	-		14.775	-	-	-
LSC Design and Analysis	WR	NSWC Philadelphia : Philadelphia, PA	0.000	0.000		1.429	Mar 2021	7.535	Nov 2021	-		7.535	-	-	-
LSC Design and Analysis	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.676	Mar 2021	3.100	Nov 2021	-		3.100	-	-	-
Power & Prop Risk Mitigation	WR	Other Government Organizations : Various	0.000	0.000		2.118	Mar 2021	0.000		-		0.000	-	-	-
Power & Prop Risk Mitigation	C/CPFF	Various : Various	0.000	0.000		1.882	Mar 2021	0.000		-		0.000	-	-	-
<b>Subtotal</b>			0.000	0.000		12.353		76.276		-		76.276	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management Support	WR	Various : Various	0.000	0.000		0.593	Mar 2021	3.413	Oct 2021	-		3.413	-	-	-
<b>Subtotal</b>			0.000	0.000		0.593		3.413		-		3.413	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	0.000	0.000	12.946	79.689	-	79.689	-	-	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0411 / <i>DDG(X) Concept Development</i>

Proj 0411	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
					CT																							
									SRR ▼																			
									PD																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 0411 / <i>DDG(X) Concept Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 0411</b>				
Conceptual Design	1	2021	1	2022
System Requirements Review	1	2022	1	2022
Preliminary Design	1	2022	4	2022

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

<b>Appropriation/Budget Activity</b> 1319 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603564N / Ship Prel Design & Feasibility Studies				<b>Project (Number/Name)</b> 3377 / T-ATS Ship Concept Development			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3377: T-ATS Ship Concept Development	4.975	0.837	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Towing, Salvage and Rescue Ships (T-ATS 6 Class) will recapitalize the current Fleet tugs and salvage ships with a common hull that is capable of performing the missions of the retiring T-ATF and T-ARS classes. This project provides Test and Evaluation Phase Developmental Testing (DT) and Operational Testing (OT) requirements per the Test and Evaluation Master Plan (TEMP) schedule.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> T-ATS 6 Class Test & Evaluation (T&E)	0.837	0.000	0.000	0.000	0.000
<b>Articles:</b>	-	-	-	-	-
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b> N/A					
<b>FY 2022 OCO Plans:</b> N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	0.837	0.000	0.000	0.000	0.000

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

<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• SCN/5035: Towing, Salvage, and Rescue Ship (T-ATS)	150.282	168.209	80.800	-	80.800	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Detail Design and Construction (DD&C) was awarded for Lead Hull in March 2018.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
1319 / 4				PE 0603564N / Ship Prel Design & Feasibility Studies				3377 / T-ATS Ship Concept Development								
<b>Product Development (\$ in Millions)</b>				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	
Engineering Support	Various	NAVAIR/NSWC/NIWC : MD, MD, SC	0.769	0.000		0.000		0.000		-		0.000	-	-	-	
Industry Design Studies	Various	Various : Various	0.679	0.000		0.000		0.000		-		0.000	-	-	-	
<b>Subtotal</b>			1.448	0.000		0.000		0.000		-		0.000	-	-	N/A	
<b>Support (\$ in Millions)</b>				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	
Milestone Documentation Support	C/FFP	CACI : DC	2.041	0.000		0.000		0.000		-		0.000	-	-	-	
RFP and Specification Development	Various	Alion/CACI/NIWC : DC, DC, SC	0.705	0.000		0.000		0.000		-		0.000	-	-	-	
Test & Evaluation Execution	Various	OPTEVFOR, CACI, ALION : VA, DC	0.690	0.337	Jul 2020	0.000		0.000		-		0.000	-	-	-	
<b>Subtotal</b>			3.436	0.337		0.000		0.000		-		0.000	-	-	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				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	
Developmental Testing/Operational Testing	C/FFP	CACI : DC	0.091	0.500	Jul 2020	0.000		0.000		-		0.000	-	-	-	
<b>Subtotal</b>			0.091	0.500		0.000		0.000		-		0.000	-	-	N/A	
<b>Project Cost Totals</b>			4.975	0.837		0.000		0.000		-		0.000	-	-	N/A	
<b>Remarks</b>																

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3377 / <i>T-ATS Ship Concept Development</i>

Proj 3377	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
	DT											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3377 / <i>T-ATS Ship Concept Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 3377</b>				
Developmental Testing	1	2020	2	2020

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</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
3389: <i>OPLOG IPT Development</i>	36.277	20.793	18.191	21.084	-	21.084	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	-

**Note**

FY 2016 and prior year efforts were financed under NDSF BA4 PE 0408042N Project 3117 Naval Operational Logistics (OPLOG) Integration. FY2017, FY2019 and forward is financed under this Program Element (Project 3389). FY 2018 financed under Congressional add Project 9999/C404 included in prior years shown in this budget.

**A. Mission Description and Budget Item Justification**

Project 3389 - Develops enabling technologies for future and in-service afloat operational logistics and integrated supply systems; defines integrated combat logistics force and combatant logistics requirements; and conducts cooperative initiatives with acquisition programs, program sponsors, engineering managers, the Navy science and technology community, and Fleet customers. Operational Logistics Integration R&D (OPLOG) develops integrated, cross-platform (i.e. applicable to more than one ship class/type) operational logistics and operational energy conservation technologies and capabilities as well as draft acquisition and operations policy ensuring future Naval systems leverage emerging logistic capabilities and technologies to provide operationally effective and energy efficient logistics delivery.

Though the operational logistics family of systems touches all aspects of Naval presence and power projection, operational logistics capability and system interfaces typically have been left to individual acquisition programs to develop and resolve. Technology development is necessary to mitigate technological and operational risk before ship acquisition programs accept new technologies. This project provides a foundation for the transition and systems development of science & technology initiatives evolving from the Office of Naval Research (ONR) Power & Energy Future Naval Capabilities (FNC), Enterprise and Platform Enablers FNC, Seabasing FNC, and from other enabling Government, industry and academia concepts to the acquisition community. Thus, this project resources continued research and development of appropriate technologies with applicability to multiple acquisition programs and defines and matures performance and interface requirements for those technologies. This project continues to identify, develop, integrate, demonstrate, and transition logistics technologies to improve the cost effectiveness of Fleet at sea logistics delivery through outreach, coordination and collaboration with industry, academia, Fleet, and Enterprise representatives.

This project will continue to develop improved shipboard replenishment, transfer, and handling systems and components as well as asset visibility and standardized packaging technologies. This project includes development of approaches to reduce operation and maintenance costs of, and energy consumption by the logistics Fleet. This integrated suite of developed capabilities will enable multiple ship types to leverage common technologies common across DoD (Joint) and commercial transportation networks providing a more affordable, energy efficient, mission capable force. These capabilities and system-of-systems approach will be applied to concept development of future auxiliary force architectures.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Title:</b> Advanced Systems</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2021 Plans:</b> Continue advanced refueling system R&amp;D to include: begin multiple size prototype development and testing of Open Ocean and Expeditionary Advanced Base Operations (EABO) Joint Off-Shore Fuel Farm (JOFF); Continue Seabased Petroleum Distribution System (SPDS) scaled prototype tech data package development and fabrication, system demonstrations, test and evaluations, start full scale tech data package; complete modular consolidated (CONSOL) tanker adapter kit initial operational test and evaluation at sea; and complete Improved Modular Fuel Distribution System (iMFDS) concept design and detailed design development and start prototype fabrication.</p> <p><b>FY 2022 Base Plans:</b> Research, development, and testing of advanced refueling systems and concepts to include: completion of Seabased Petroleum Distribution System (SPDS) tech data package and fabrication of scaled prototype, operationally relevant testing of subscale SPDS, and continue development of full scale prototype; continue development of initial Open Ocean and Expeditionary Advanced Base Operations (EABO) support Joint Off-Shore Fuel Farm (JOFF) Prototypes; continue additional prototype fabrication and testing of CONSOL kits for other tanker classes with at sea fuel testing before transitioning; continue iMFDS development in preparation for testing.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase of funding by \$3.168 due to additional design work and testing for the modular CONSOL adapter kit on the different tanker deck layouts which require additional prototype fabrication and testing with fuel at sea in FY 2022 increasing development, prototype fabrication and testing costs.</p>	19.943	17.551	20.719	0.000	20.719
	-	-	-	-	-
<p><b>Title:</b> Logistics Architectures</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This is annual funding needed by the Center for Naval Analyses (CNA) to maintain the Combat Logistics Force database so OPLOG can utilize the data to support logistics R&amp;D and concept development.</p> <p><b>FY 2021 Plans:</b></p>	0.050	0.065	0.065	0.000	0.065
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Center for Naval Analyses (CNA) collects data and maintains the Combat Logistics Force (CLF) database to support ongoing and future analyses. There has been no cost adjustment for inflation over the years. Cost of analysis is increasing by \$15K starting in FY 2021.  <b>FY 2022 Base Plans:</b> Center for Naval Analyses (CNA) collects data and maintains the Combat Logistics Force (CLF) database to support ongoing and future analyses.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> No increase/decrease of funding from FY 2021 to FY 2022.					
<b>Title:</b> Shipboard Energy Conservation (E-STREAM)  <b>FY 2021 Plans:</b> Complete E-STREAM Fueling and Replenishment (EFAS) and Efficient shipboard Replenishment At Sea (ERAS) shipboard installation and sea trials. Complete Navy Standard Transmission Replacement (NSTR) hybrid E-STREAM sea trials.  <b>FY 2022 Base Plans:</b> Complete technical data package and integrated logistics support plan for NSTR Hybrid for transition.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> -\$.275 decrease of funds from FY 2021 to FY 2022 due to completion of ERAS shipboard installation and sea trials and completion of NSTR hybrid E-STREAM sea trials.	0.800	0.575	0.300	0.000	0.300
<b>Articles:</b>	-	-	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	20.793	18.191	21.084	0.000	21.084

<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A <b>Remarks</b>
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</i>

**D. Acquisition Strategy**  
Not applicable for OPLOG R&D efforts

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</i>
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<b>Product Development (\$ in Millions)</b>				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			
Primary Hardware Development	Various	VARIOUS : Various	10.600	9.265	Jan 2020	8.450	Jan 2021	8.725	Jan 2022	-		8.725	-	-	-
Ancillary Hardware Development	Various	VARIOUS : Various	3.700	2.650	Jan 2020	2.287	Jan 2021	2.400	Jan 2022	-		2.400	-	-	-
Ship Integration	Various	VARIOUS : Various	2.700	0.850	Jan 2020	0.750	Jan 2021	0.700	Jan 2022	-		0.700	-	-	-
Ship Suitability	Various	VARIOUS : Various	1.450	1.000	Jan 2020	0.850	Jan 2021	0.300	Jan 2022	-		0.300	-	-	-
System Engineering	Various	VARIOUS : Various	3.190	1.750	Jan 2020	1.810	Jan 2021	1.000	Jan 2022	-		1.000	-	-	-
<b>Subtotal</b>			21.640	15.515		14.147		13.125		-		13.125	-	-	N/A

**Remarks**

1. Primary Hardware Development, Ancillary Hardware Development and System Engineering is related to the Advanced Systems Joint Offshore Fuel Farm (JOFF) and SeaBased Petroleum Distribution System (SPDS) prototype development.
2. Award dates reflect initial award of incremental execution.
3. PY includes FY2017 Proj. 3389 and FY2018 Congressional Add Proj. C404

<b>Support (\$ in Millions)</b>				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			
Development Support	Various	VARIOUS : Various	2.525	0.750	Jan 2020	0.820	Jan 2021	0.434	Jan 2022	-		0.434	-	-	-
Software Development	Various	VARIOUS : Various	0.025	0.100	Jan 2020	0.025	Jan 2021	0.025	Jan 2022	-		0.025	-	-	-
Integrated Logistics Support	Various	VARIOUS : Various	0.818	0.300	Jan 2020	0.225	Jan 2021	0.150	Jan 2022	-		0.150	-	-	-
Configuration Management	Various	VARIOUS : Various	1.900	0.627	Jan 2020	0.605	Jan 2021	0.200	Jan 2022	-		0.200	-	-	-
Technical Data	Various	VARIOUS : Various	1.750	0.600	Jan 2020	0.400	Jan 2021	0.150	Jan 2022	-		0.150	-	-	-
Studies & Analysis	Various	VARIOUS : Various	0.635	0.300	Jan 2020	0.175	Jan 2021	0.100	Jan 2022	-		0.100	-	-	-
<b>Subtotal</b>			7.653	2.677		2.250		1.059		-		1.059	-	-	N/A

**Remarks**

1. Award dates reflect initial award of incremental execution.
2. PY includes FY2017 Proj. 3389 and FY2018 Congressional Add Proj. C404

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</i>
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<b>Test and Evaluation (\$ in Millions)</b>				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			
Developmental Test & Evaluation	Various	VARIOUS : Various	3.300	1.250	Jan 2020	0.825	Jan 2021	2.900	Jan 2022	-		2.900	-	-	-
Operational Test & Evaluation	Various	VARIOUS : Various	2.323	0.951	Jan 2020	0.650	Jan 2021	3.600	Jan 2022	-		3.600	-	-	-
<b>Subtotal</b>			5.623	2.201		1.475		6.500		-		6.500	-	-	N/A

**Remarks**

- DT&E and OT&E cost increase in FY22 are related to prototype test and demonstration for Advanced Systems Joint Offshore Fuel Farm (JOFF) and SeaBased Petroleum Distribution System (SPDS).
- Award dates reflect initial award of incremental execution.
- PY includes FY2017 Proj. 3389 and FY2018 Congressional Add Proj. C404

<b>Management Services (\$ in Millions)</b>				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			
Contractor Engineering Support	Various	VARIOUS : Various	0.511	0.150	Jan 2020	0.150	Jan 2021	0.150	Jan 2022	-		0.150	-	-	-
Government Engineering Support	Various	VARIOUS : Various	0.850	0.250	Jan 2020	0.169	Jan 2021	0.250	Jan 2022	-		0.250	-	-	-
<b>Subtotal</b>			1.361	0.400		0.319		0.400		-		0.400	-	-	N/A

**Remarks**

- Award dates reflect initial award of incremental execution.
- PY includes FY2017 Proj. 3389 and FY2018 Congressional Add Proj. C404

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		36.277	20.793	18.191	21.084	21.084	-	-	N/A

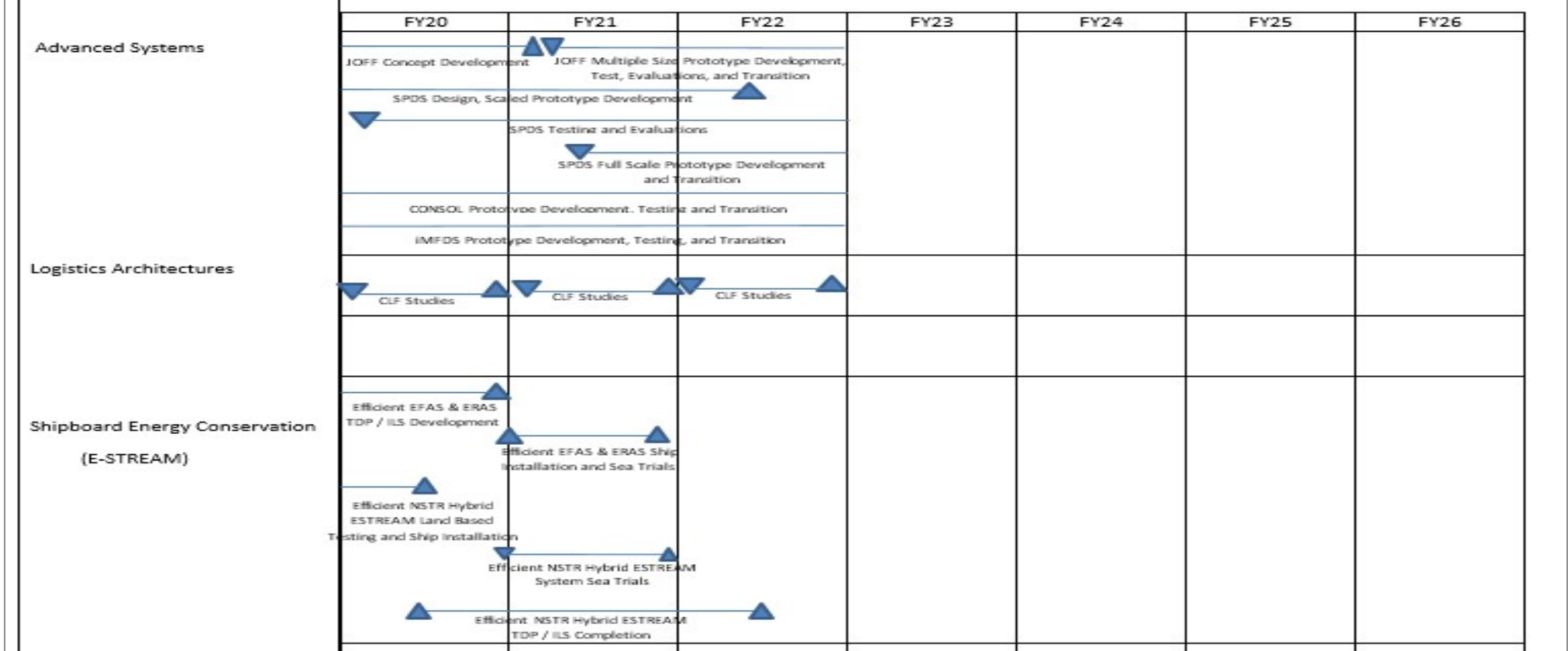
**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / Ship Prel Design & Feasibility Studies	<b>Project (Number/Name)</b> 3389 / OPLOG IPT Development

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022</b>		<b>Date: April 2021</b>
<b>Appropriation/Budget Activity</b> 1319: Research, Development, Test & Evaluation, Navy (RDT&E,N) / BA 04: Advanced Component Development & Prototype (ACD&P)	<b>R-1 Program Element (Number/Name)</b> PE 0603564N, Ship Prel Design & Feasibility Studies	<b>Project (Number/Name)</b> Project 3389 OPLOG IPT Development

Note: FY16 and Prior, Project 3889 was funded in PE 0408042N / National Defense Sealift Fund under Project 3117 OPLOG IPT development.



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 3389 / <i>OPLOG IPT Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Proj 3389</i></b>				
Advanced Systems	1	2020	4	2022
Logistics Architectures	1	2020	4	2022
Shipboard Energy Conservation (E-STREAM)	1	2020	2	2022

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 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	10.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

With the mishaps related to the McCain and Fitzgerald collisions, the U.S. Navy seeks oversight and modernization of surface fleet bridge configurations. The goal of the Bridge Integration Program is to modernize bridges for functional commonality and improved watch stander performance. In order to identify trends that will improve to bridge commonality, rigorous and methodical data analysis, such as modeling and simulation, will be employed. The results of this analysis will ultimately lead to a reduced number of bridge configurations, allowing Sailors to more easily transition between ship assignments and reducing the cost of maintaining trainers across multiple bridge configurations.

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

	FY 2020	FY 2021
<b>Congressional Add:</b> Bridge Integration Program	0.000	10.000
<b>FY 2020 Accomplishments:</b> N/A		
<b>FY 2021 Plans:</b> NAVSEA SEA21 PMS443 Ship Control System (SCS) and Bridge Integration PARM supports bridge design configuration analysis, modernization, and standardization. This will directly contribute to national security by improved capabilities to ship and treat the bridge as a single combat system warfighting environment, enhancing operational availability and readiness and increasing lethality. In addition, leveraging modeling and simulation methods and data synthesis will assist in the early identification of future mishaps leading to increased fleet operational readiness and a reduction in unexpected maintenance costs.		
<b>Congressional Adds Subtotals</b>	0.000	10.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 9999 / <i>Congressional Adds</i>
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<b>Support (\$ in Millions)</b>				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			
SCS / BI PARM Analysis	IA	GSA : Illinois	0.000	0.000		8.700	Apr 2021	0.000		-		0.000	-	-	-
SCS / BI PARM Analysis	WR	NSWC : TBD	0.000	0.000		1.300	Sep 2021	0.000		-		0.000	-	-	-
<b>Subtotal</b>			0.000	0.000		10.000		0.000		-		0.000	-	-	N/A

**Remarks**  
 C651- Congressional Add for the Ship Control System (SCS) and Bridge Integration PARM (PMS443) to support bridge design configuration analysis, modernization, and standardization. This will directly contribute to national security by improved capabilities to ship and treat the bridge as a single combat system warfighting environment, enhancing operational availability and readiness and increasing lethality. In addition, leveraging modeling and simulation methods and data synthesis will assist in the early identification of future mishaps leading to increased fleet operational readiness and a reduction in unexpected maintenance costs.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	0.000	10.000	0.000	-	0.000	-	-	N/A

**Remarks**

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

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 9999 / <i>Congressional Adds</i>
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Ship Control Systems / Bridge Integration PARM establishment	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
							Provided Funds to GSA ◆																					

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Navy</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603564N / <i>Ship Prel Design &amp; Feasibility Studies</i>	<b>Project (Number/Name)</b> 9999 / <i>Congressional Adds</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Ship Control Systems / Bridge Integration PARM establishment</i>				
GSA Contract # 47QFLA20C0006 Funding Issued	3	2021	3	2021