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

Appropriation/Budget Activity	R-1 Program Element (Number/Name)											
1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	PE 0708730N / <i>Maritime Tech (MARITECH)</i>											
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	55.506	26.186	6.667	3.329	-	3.329	-	-	-	-	-	-
2466: <i>NSRP ASE</i>	33.362	3.983	4.398	0.000	-	0.000	-	-	-	-	-	-
3435: <i>Advanced Shipyard Technology</i>	2.849	2.908	2.269	3.329	-	3.329	-	-	-	-	-	-
9999: <i>Congressional Adds</i>	19.295	19.295	0.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The National Shipbuilding Research Program (NSRP) is an industry and enterprise wide research collaboration that seeks to reduce the Navy's shipbuilding and repair cost. The resulting technologies implemented in NSRP-ASE member shipyards, benefit both the shipyard and the US Navy.

The Advanced Shipyard Technology (AST) seeks to improve the productivity, quality, and reduce costs of maintenance performed by the Naval public shipyards. The resulting technologies implemented by this program benefit both the naval shipyard and the US Navy.

B. Program Change Summary (\$ in Millions)

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	26.779	6.697	8.147	-	8.147
Current President's Budget	26.186	6.667	3.329	-	3.329
Total Adjustments	-0.593	-0.030	-4.818	-	-4.818
• Congressional General Reductions	-	-0.030			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.377	0.000			
• SBIR/STTR Transfer	-0.971	0.000			
• Program Adjustments	0.000	0.000	-4.504	-	-4.504
• Rate/Misc Adjustments	0.001	0.000	-0.314	-	-0.314

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

Project: 9999: *Congressional Adds*

Congressional Add: *Advanced Additive Technologies for Sustainment of Navy Assets*

Congressional Add Subtotals for Project: 9999

	FY 2020	FY 2021
Congressional Add: <i>Advanced Additive Technologies for Sustainment of Navy Assets</i>	19.295	0.000
Congressional Add Subtotals for Project: 9999	19.295	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)		FY 2020		FY 2021
Congressional Add Totals for all Projects		19.295		0.000

Change Summary Explanation

The FY 2020 funding request was increased by 20 million for a Congressional Plus Up for Advanced Additive Technologies for Sustainment of Navy Assets.

FY 2022 funding request was reduced by \$4.504 million due to the elimination of the National Shipbuilding Research Program.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0708730N / Maritime Tech (MARITECH)				Project (Number/Name) 2466 / NSRP ASE			
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
2466: NSRP ASE	33.362	3.983	4.398	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

NSRP ASE is a collaboration of U.S. shipyards working with the Navy customer to reduce the cost of building and repairing naval ships and improving shipbuilding industry productivity through advanced technology and processes. NSRP ASE is an innovative and proven approach to public/private cooperation to manage cost-shared R&D based on a national consensus Strategic Investment Plan. The Plan targets potential industry-wide technology and process solutions which are vetted by industry experts and builds upon the progress made over the previous years. The collaboration's organizational structure promotes teaming of industry, government and academia to achieve the continuous product and process improvements necessary for improved Navy ship affordability. Solutions include both leverage of best commercial practices and creation of industry-wide initiatives with aggressive technology transfer to, and buy-in by, multiple U.S. shipyards. Navy PEOs (Ships, Subs and Carriers) and NAVSEA are directly involved in NSRP. The Plan calls for matching government and industry investments over several years.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Technology Development Projects	3.983	4.398	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The NSRP is an ongoing Research and Development program. This program awards small research projects and large research projects to (1) Improve Quality; (2) Reduce Total Ownership Costs; and, (3) Increase Energy Efficiency. These research projects have been known to produce technological advances in shipbuilding that once implemented have resulted in savings for the Navy.					
FY 2021 Plans: (1) Complete technology development projects in the four major initiative areas (Ship Design and Material Technologies, Ship Production Technologies, Business Process and Information Systems, and Infrastructure and Support (Regulatory Compliance, Technology Transfer and Workforce Development)) that will be competitively selected by industry subject matter experts and Navy stakeholders during GFY20, targeting the following priorities in Naval shipbuilding and repair: (1) Improving Quality; (2) Reduction of Total Ownership Costs; and, (3) Increasing Energy Efficiency. It is anticipated that projects selected will continue to be focused in the following areas: - Promotion of Modular Construction - Reduction of Re-work - Improving Production Engineering - Improving Specifications and Standards					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 2466 / <i>NSRP ASE</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - Improving Manufacturing Processes - Improving Production Planning - Data Exchange - Improving Safety & Health / Reducing Environmental Impacts - Education and Training - Total Ownership Cost <p>(2) Continue technology transfer among the Navy, shipbuilding industry, academia, equipment and material suppliers and the R&D community</p> <p>FY 2022 Base Plans: N/A</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Elimination of the National Shipbuilding Research Program by higher direction.</p>					
Accomplishments/Planned Programs Subtotals	3.983	4.398	0.000	0.000	0.000

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

N/A

Remarks

D. Acquisition Strategy

R&D projects have been solicited and awarded by an industry collaboration represented by the Executive Control Board (ECB) of the National Shipbuilding Research Program (NSRP). The Navy has entered into an agreement with the industry collaboration using "other transaction" authority pursuant to 10 U.S.C. 2371.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 2466 / <i>NSRP ASE</i>
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Proj 2466	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
	Ship Collaborative Framework Technologies																											

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 2466 / <i>NSRP ASE</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 2466</i>				
Ship Collaborative Framework Technologies	1	2020	4	2021

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

Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>			Project (Number/Name) 3435 / <i>Advanced Shipyard Technology</i>				
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3435: <i>Advanced Shipyard Technology</i>	2.849	2.908	2.269	3.329	-	3.329	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Shipyard Technology (AST) develops, matures, and transitions technology (production processes, human augmentation, business process, IT, tooling, etc.), into the naval shipyards. Advanced Shipyard Technology funding will facilitate collaboration between government (Naval Sea Systems Command (NAVSEA), the public naval shipyards, Navy customers, Naval Warfare Centers, and others), academia, and industry. AST is an innovative approach to leverage public/private cooperation and target technology and process solutions that build on progress made over the previous years. Funding ensures widespread adoption of innovative improvements, enhancing proficiency and productivity of the public naval shipyard workforce to achieve the continuous product and process improvements necessary for improved Navy ship repair costs, and an overall reduction in availability duration. FY23 funds will continue focus on efforts that prevent corrosion, enhance cold spray technology, laser ablation, and plasma coating removal. Additionally, our Artificial intelligence efforts will become more progressed, leading to inspections and the conduction of shipboard working paint removal and cold spray repairs.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Technology Transfer	2.908	2.269	3.329	0.000	3.329
Articles:	-	-	-	-	-
FY 2021 Plans:					
Complete technology development projects in the six major initiative areas (Surface Restoration, Additive Manufacturing and Repair, Expeditionary Maintenance, Automation and Robotics, Digital Shipyard, and Infrastructure) that will be competitively selected by sustainment and technology subject matter experts and Navy stakeholders.					
The following are priorities in Naval sustainment and repair: (1) Reduce Critical Path; (2) Reduce Cycle Times; (3) Reduce Life cycle Costs, (4) Increase throughput and, (5) Improve workforce safety and efficacy.					
It is anticipated that projects selected will continue to be focused in the following areas:					
<ul style="list-style-type: none"> - Modernizing Industrial Processes - Improving Material Availability - Increasing Workforce Capacity - New repair technologies 					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 3435 / <i>Advanced Shipyard Technology</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - Reducing Re-work - Improving Worker Efficiency - Improving Scheduling and Planning - Improving Safety & Health / Reducing Environmental Impacts - Education and Training - Total Ownership Cost <p>(2) Leverage technology transfer opportunities</p> <p><i>FY 2022 Base Plans:</i> Complete technology development projects in the six major initiative areas (Surface Restoration, Additive Manufacturing and Repair, Expeditionary Maintenance, Automation and Robotics, Digital Shipyard, and Infrastructure) that will be competitively selected by sustainment and technology subject matter experts and Navy stakeholders.</p> <p>The following are priorities in Naval sustainment and repair: (1) Reduce Critical Path; (2) Reduce Cycle Times; (3) Reduce Life cycle Costs, (4) Increase throughput and, (5) Improve workforce safety and efficacy.</p> <p>It is anticipated that projects selected will continue to be focused in the following areas:</p> <ul style="list-style-type: none"> - Modernizing Industrial Processes - Improving Material Availability - Increasing Workforce Capacity - New repair technologies - Reducing Re-work - Improving Worker Efficiency - Improving Scheduling and Planning - Improving Safety & Health / Reducing Environmental Impacts - Education and Training - Total Ownership Cost - Leverage technology transfer opportunities <p>Additionally,</p> <ul style="list-style-type: none"> - Artificial Intelligence - Disrupting Corrosion 					

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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 3435 / <i>Advanced Shipyard Technology</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Adaption to Automated Platforms					
<i>FY 2022 OCO Plans:</i> N/A					
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> FY22 funds increase 1.364M for additional focus on efforts that prevent corrosion, enhance cold spray technology, progress laser ablation and plasma coating removal technologies. Additionally, Artificial Intelligence efforts will be further progressed, leading to inspections and the conduction of shipboard work, with minimal human interaction, in paint removal and cold spray repairs.					
Accomplishments/Planned Programs Subtotals	2.908	2.269	3.329	0.000	3.329

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

N/A

Remarks

D. Acquisition Strategy

Technologies will be developed and fielded based on their level of maturity and measure of benefit to the public naval shipyards.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 3435 / <i>Advanced Shipyard Technology</i>
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Project 3435	FY 2019				FY 2020				FY 2021				FY2022				FY2023				FY2024				FY2025							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
	ADVANCED SHIPYARD TECHNOLOGY																															

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 3435 / <i>Advanced Shipyard Technology</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3435				
Advanced Shipyard Technologies	1	2020	4	2022

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

Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0708730N / Maritime Tech (MARITECH)			Project (Number/Name) 9999 / Congressional Adds				
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: Congressional Adds	19.295	19.295	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Shipyard Technology (AST) develops, matures, and transitions technology (production processes, human augmentation, business process, IT, tooling, etc.), into the naval shipyards. Advanced Shipyard Technology funding will facilitate collaboration between government (Naval Sea Systems Command (NAVSEA), the public naval shipyards, Navy customers, Naval Warfare Centers, and others), academia, and industry. AST is an innovative approach to leverage public/private cooperation and target technology and process solutions that build on progress made over the previous years. Funding ensures widespread adoption of innovative improvements, enhancing proficiency and productivity of the public naval shipyard workforce to achieve the continuous product and process improvements necessary for improved Navy ship repair costs, and an overall reduction in availability duration. The congressional add will accelerate the delivery of technical capabilities to support the warfighter and to advance technologies that will modernize and sustain military systems in an efficient, cost-effective manner. The additional funding will support the development of advanced additive technologies for sustainment of navy assets including Cold Spray.

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

	FY 2020	FY 2021
Congressional Add: Advanced Additive Technologies for Sustainment of Navy Assets	19.295	0.000
FY 2020 Accomplishments: N/A		
FY 2021 Plans: Efforts to accelerate the delivery of technical capabilities for the warfighter in a timely manner, additional development of additive manufacturing is required.		
Congressional Adds Subtotals	19.295	0.000

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

N/A

Remarks

D. Acquisition Strategy

Technologies will be developed and fielded based on their level of maturity and measure of benefit to the public naval shipyards.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Development	MIPR	Penn State U : University Park, PA	2.797	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	PNSY : Kittery, ME	1.000	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	NSWCPD : Philadelphia, PA	0.065	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	NSWCPC : Panama City, FL	0.900	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	MIPR	NCMS/CTMA : Ann Arbor, MI	11.495	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	MIPR	ARMY ARL : Adelphi, MD	1.350	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	ONR : Navy Yard, DC	0.500	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	NSWCCD : Potomac, MD	0.075	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	NUWCKP : Keyport, WA	0.113	0.000		0.000		0.000		-		0.000	-	-	-
Technology Development	WR	NUWC Keyport : Keyport, WA	0.000	5.500	Apr 2020	0.000		0.000		-		0.000	-	-	-
Technology Development	MIPR	Pearl Harbor : Pearl Harbor, HI	0.000	8.295	Apr 2020	0.000		0.000		-		0.000	-	-	-
Technology Development	WR	TRF Bangor : Bangor, WA	0.000	2.000	May 2020	0.000		0.000		-		0.000	-	-	-
Technology Development	WR	PSNS&IMF : Bremerton, WA	0.000	0.750	Jun 2020	0.000		0.000		-		0.000	-	-	-
Technology Development	MIPR	NAVSEA 05T : Navy Yard, DC	0.000	0.500	Jun 2020	0.000		0.000		-		0.000	-	-	-
Technology Development	WR	NNSY : Portsmouth, ME	0.000	0.500	Jul 2020	0.000		0.000		-		0.000	-	-	-
Technology Development	MIPR	VRC : Rapid Ciy, SD	0.000	1.250	Jul 2020	0.000		0.000		-		0.000	-	-	-
Subtotal			18.295	18.795		0.000		0.000		-		0.000	-	-	N/A

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
Funds provided to support the development of Cold Spray and Additive Manufacturing Technologies.

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	WR	NUWC Keyport : Keyport, WA	1.000	0.500	Mar 2020	0.000		0.000		-		0.000	-	-	-
Subtotal			1.000	0.500		0.000		0.000		-		0.000	-	-	N/A

Remarks
Cost-Reimbursable services for project management and technical insertion to public shipyards

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	19.295	19.295	0.000	0.000	-	0.000	-	-	N/A

Remarks

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0708730N / <i>Maritime Tech (MARITECH)</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 9999</i>				
ADVANCED SHIPYARD TECHNOLOGY	1	2020	4	2021