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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603680N / <i>Manufacturing Technology Program</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	0.000	74.826	61.704	61.843	-	61.843	63.115	64.403	65.691	67.005	Continuing	Continuing
1050: <i>Manufacturing Tech</i>	0.000	55.519	60.704	61.843	-	61.843	63.115	64.403	65.691	67.005	Continuing	Continuing
9999: <i>Congressional Adds</i>	0.000	19.307	1.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	20.307

A. Mission Description and Budget Item Justification

The Office of Naval Research's (ONR) mission is to foster scientific research for the advancement of naval power. This work does not stop at the laboratory. Delivery of breakthrough capability often requires new technologies in manufacturing and supply chains of national security. The Manufacturing Technology (ManTech) Program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development, optimization, and transition of enabling manufacturing technologies to key naval suppliers. In general, investments transition emerging Science and Technology (S&T) results to acquisition programs; improve industrial capabilities in production, maintenance, repair and industrial base responsiveness; and advance manufacturing technology to reduce cost, improve performance, and responsiveness. Currently, the ManTech Program is focused on affordability improvements for specific key acquisition platforms as defined in the Navy ManTech Investment Strategy. Key platforms currently targeted include: VIRGINIA Class Submarine (VCS)/COLUMBIA Class submarine (CLB); DDG 51 Class destroyer; CVN 78 Class carrier; FFG 62 Class frigate, and F-35 Lightning II aircraft. Office of Naval Research (ONR) ManTech helps these Navy programs achieve their respective affordability goals by transitioning developed manufacturing technology which, when implemented, results in needed cost reduction or cost avoidance. In addition to addressing affordability for key naval platforms, ManTech also addresses manufacturing technology to aid in capability acceleration to the fleet.

Today's Sailors and Marines are enabled by naval Science and Technology (S&T). Since 1946, the Office of Naval Research (ONR) has fostered scientific research related to the maintenance of maritime superiority and national defense. ONR manages the Department of the Navy's (DON) portfolio of naval Basic and Applied research, and Advanced Technology Development investments to ensure naval forces can effectively deter conflict, but when called upon, fight, win and come home safe. Current investments hedge against uncertainty, providing solutions to commanders today, and options for the future. The Naval S&T budget supports higher guidance defined by the National Defense Strategy, and responds to requirements identified by the Secretary of the Navy through research priorities set by the Chief of Naval Research, coordinated across the Naval Research Enterprise (NRE), and outlined in the Naval R&D Framework.

This Program Element (PE) funds Advanced Technology Development (ATD) that includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment. Efforts in this PE generally have Technology Readiness Levels (TRL) of 4 (component and/or breadboard validation in laboratory environment.), 5 (component and/or breadboard validation in relevant environment.), or 6 (system/subsystem model or prototype demonstration in a relevant environment).

Due to the number of efforts in this Program Element (PE), the programs described herein are representative of the work included in this PE.

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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	77.236	60.704	61.843	-	61.843
Current President's Budget	74.826	61.704	61.843	-	61.843
Total Adjustments	-2.410	1.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	1.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.410	0.000			
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

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

Project: 9999: *Congressional Adds*

Congressional Add: *Energetics processing*

Congressional Add: *Chemical reactor and crystallizer technology*

Congressional Add: *Machine learning for in-water hull inspection*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2022	FY 2023
	4.827	0.000
	14.480	0.000
	0.000	1.000
Congressional Add Subtotals for Project: 9999	19.307	1.000
Congressional Add Totals for all Projects	19.307	1.000

Change Summary Explanation

Funding: no significant change

Technical: Not applicable

Schedule: Not applicable

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy										Date: March 2023		
Appropriation/Budget Activity 1319 / 3					R-1 Program Element (Number/Name) PE 0603680N / <i>Manufacturing Technology Program</i>				Project (Number/Name) 1050 / <i>Manufacturing Tech</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
1050: <i>Manufacturing Tech</i>	0.000	55.519	60.704	61.843	-	61.843	63.115	64.403	65.691	67.005	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Office of Naval Research's (ONR) mission is to foster scientific research for the advancement of naval power. This work does not stop at the laboratory. Delivery of breakthrough capability often requires new technologies in manufacturing and supply chains of national security. The Manufacturing Technology (ManTech) Program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development, optimization, and transition of enabling manufacturing technologies to key naval suppliers. In general, investments transition emerging Science and Technology (S&T) results to acquisition programs; improve industrial capabilities in production, maintenance, repair and industrial base responsiveness; and advance manufacturing technology to reduce cost, improve performance, and responsiveness. Currently, the ManTech Program is focused on affordability improvements for specific key acquisition platforms as defined in the Navy ManTech Investment Strategy. Key platforms currently targeted include: VIRGINIA Class submarine (VCS)/COLUMBIA Class submarine (CLB), DDG 51 Class destroyer, CVN 78 Class carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft. Through its affordability efforts, ManTech helps these Navy programs achieve their respective affordability goals by transitioning developed manufacturing technology which, when implemented, results in needed cost reduction or cost avoidance. In addition to addressing affordability for key naval platforms, ManTech also addresses manufacturing technology to aid in capability acceleration to the fleet.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Composites Processing and Fabrication	7.694	7.877	8.000	0.000	8.000
Articles:	-	-	-	-	-
Description: The primary technical goal of the Composites Processing and Fabrication activity is improving weapon systems affordability, enhancing weapon system effectiveness and improving reliability/warfighter readiness through the increased utilization of composite materials and structures. This is being achieved through the development, maturation, and transition of affordable and robust manufacturing, assembly, and repair processes that fully exploit the benefits of composite materials. Concentration is on affordability for the following platforms: VIRGINIA Class submarine (VCS)/COLUMBIA Class submarine (CLB), DDG 51 Class destroyer, CVN 78 Class carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft. In addition to addressing affordability for key naval platforms, ManTech also addresses manufacturing technology to aid in capability acceleration to the fleet.					
Composites processing and fabrication technology areas include but are not limited to fiber-reinforced polymeric (organic) resin composites; ceramic-matrix, metal-matrix, and carbon-carbon composites; composite internal stiffening core materials such as foam, ceramic, balsa wood, polymeric or metallic honeycomb, or other					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 3	R-1 Program Element (Number/Name) PE 0603680N / <i>Manufacturing Technology Program</i>	Project (Number/Name) 1050 / <i>Manufacturing Tech</i>

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Description: The primary technical goal of the Electronics Processing and Fabrication activity is improving electronic weapon systems affordability by developing and transitioning affordable, robust manufacturing processes and capabilities for electronics critical to defense applications over their full life-cycle. Efforts create new and improved electronics/electro-optics manufacturing processes for transition to the production floor. Emphasis is on affordability for the following platforms: VIRGINIA Class submarine (VCS)/COLUMBIA Class submarine (CLB), DDG 51 Class destroyer, CVN 78 Class carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft. In addition to addressing affordability for key naval platforms, ManTech also addresses manufacturing technology to aid in capability acceleration to the fleet.</p> <p>Electronics processing and fabrication technology areas include but are not limited to Electronics manufacturing technology (materials, devices, circuits, modules, subsystems); semiconductor devices/vacuum electronics/passive components; compound semiconductors/wide bandgap semiconductors; low-cost, high-throughput manufacturing and assembly techniques; nanoelectronics; electronics packaging technologies (including tamper proof and non-hermetic approaches); optics manufacturing technology (materials devices, circuits, modules, subsystems); optical interconnects; fiber optics and photonics; technologies for electronics and electro-optics testing and evaluation; optical imaging for manufacturing operations; and High Energy Laser (HEL)/directed energy weapons.</p> <p>FY 2023 Plans:</p> <ul style="list-style-type: none"> - Continue to develop and transition electronics and electro-optics manufacturing technology improvements that result in cost reduction for key affordability platforms: VCS/CLB, DDG 51, CVN 78, FFG 62 (formerly FFG(X)), and F-35. - Continue to develop and transition electronics and electro-optics manufacturing technology improvements that accelerate capability to the fleet. Areas of concentration include (1) SWARM/unmanned/autonomous vehicle production, (2) High Energy Laser (HEL) weapon systems/directed energy, (3) fleet sustainment technology (ships/aircraft), and (4) other ONR manufacturing acceleration efforts. <p>FY 2024 Base Plans:</p> <ul style="list-style-type: none"> - Continue to develop and transition electronics and electro-optics manufacturing technology improvements that result in cost reduction for key affordability platforms: VCS/CLB, DDG 51, CVN 78, FFG 62 (formerly FFG(X)) and F-35. 					

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>- Continue to develop and transition electronics and electro-optics manufacturing technology improvements that accelerate capability to the fleet based on DoD Critical Technology areas. Areas of concentration include (1) SWARM/unmanned/autonomous vehicle production, (2) High Energy Laser (HEL) weapon systems/directed energy, (3) fleet sustainment technology (ships/aircraft), and (4) other ONR manufacturing acceleration efforts.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: There is no significant funding change from FY 2023 to FY 2024</p>					
<p>Title: Metals Processing and Fabrication</p> <p align="right">Articles:</p> <p>Description: The primary technical goal of the Metals Processing and Fabrication activity is to develop affordable, robust manufacturing and repair processes/capabilities for metals and special materials critical to Navy weapon system applications. Emphasis is on affordability for the following platforms: VIRGINIA Class submarine (VCS)/COLUMBIA Class submarine (CLB), DDG 51 Class destroyer, CVN 78 Class carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft. In addition to addressing affordability for key naval platforms, ManTech also addresses manufacturing technology to aid in capability acceleration to the fleet.</p> <p>This activity also includes the development, optimization, and transition of repair technology for the repair, overhaul, and sustainment of key navy systems. Metals processing and fabrication technology areas include but are not limited to: processing methods; metals additive manufacturing; metallic materials-based systems; casting; joining techniques; machining; surface and heat treatments; coating/cladding; assembly; metal/non-metals interfaces issues; and inspection and compliance verification.</p> <p>FY 2023 Plans:</p> <p>- Continue to develop and transition metals manufacturing technology improvements that result in cost reduction for key affordability platforms: VCS/CLB, DDG 51, CVN 78, FFG 62 (formerly FFG(X)), and F-35.</p> <p>- Continue to develop and transition metals manufacturing technology improvements that accelerate capability to the fleet. Areas of concentration include (1) SWARM/unmanned/autonomous vehicle production, (2) advanced submarine fabrication technology, (3) fleet sustainment technology (ships/aircraft), and (4) other ONR manufacturing acceleration efforts.</p>	11.541	11.816	12.000	0.000	12.000
	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>- Continue Repair Technology (RepTech) Thrust to develop, optimize, and transition repair technology for key naval platforms at depots and logistics centers.</p> <p>FY 2024 Base Plans:</p> <p>- Continue to develop and transition metals manufacturing technology improvements that result in cost reduction for key affordability platforms: VCS/CLB, DDG 51, CVN 78, FFG 62 (formerly FFG(X)) and F-35.</p> <p>- Continue to develop and transition metals manufacturing technology improvements that accelerate capability to the fleet based on DoD Critical Technology areas. Areas of concentration include (1) SWARM/unmanned/autonomous vehicle production, (2) advanced submarine fabrication technology, (3) fleet sustainment technology (ships/aircraft), and (4) other ONR manufacturing acceleration efforts.</p> <p>- Continue Repair Technology (RepTech) Thrust to develop, optimize, and transition repair technology for key naval platforms at depots and logistics centers.</p> <p>- Initiate/Complete efforts for metals manufacturing technology improvements for CH-53K</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: There is no significant funding change from FY 2023 to FY 2024</p>					
<p>Title: Manufacturing Enterprise/Other</p> <p align="right">Articles:</p> <p>Description: The Manufacturing Enterprise/Other activity includes: (1) efforts targeted towards improving, in general, the manufacturing enterprise for the production of key naval platforms (both shipbuilding and aircraft); (2) energetics efforts; (3) naval research enterprise and laboratory support for key projects; and (4) technical program support. Manufacturing Enterprise addresses the development, optimization, and transition of manufacturing enterprise technology to key naval platform suppliers. Emphasis is on affordability for the following shipbuilding platforms: VIRGINIA Class submarine (VCS)/COLUMBIA Class submarine (CLB), DDG 51 Class destroyer, CVN 78 Class carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft. In addition to addressing affordability for key naval platforms, ManTech also addresses manufacturing technology to aid in capability acceleration to the fleet.</p>	24.743 -	29.195 -	29.843 -	0.000 -	29.843 -

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Manufacturing enterprise technology areas include, but are not limited to design for easier production/design for manufacturability; development of build/assembly strategies; modeling and simulation technologies; model-based tools and approaches to optimize ease of production; intelligent manufacturing planning and factory execution; elimination of inefficiencies in design optimization, material usage, labor utilization, work flow, etc.; supply chain procedures and improvements (such as network centric manufacturing capabilities to facilitate resilient and adaptable supply chains); development of more efficient structural fabrication product lines; streamlining of outfitting operations; prediction and reduction of welding distortion; advanced automation and robotics for manufacturing; advanced data analytics, artificial intelligence and machine learning for production environments; and inspection technologies such as digital radiography and ultrasonic technologies. Energetics efforts concentrate on developing energetics solutions to ensure the availability of safe, affordable, and quality energetics products largely in support of Program Executive Office (PEO) Integrated Warfare Systems (IWS).</p> <p>FY 2023 Plans:</p> <ul style="list-style-type: none"> - Continue, at an increased level, to develop and transition advanced manufacturing enterprise technology improvements that result in cost reduction for key affordability platforms: VCS/CLB, DDG 51, CVN 78, FFG 62 (formerly FFG(X)), and F-35. - Continue to develop and transition advanced manufacturing enterprise technology improvements that accelerate capability to the fleet. Areas of concentration include (1) SWARM/unmanned/autonomous vehicle production, and (2) fleet sustainment technology (ships/aircraft). - Continue to develop and transition energetics manufacturing technology improvements that result in cost reduction for Naval Systems. - Continue to develop and transition energetics manufacturing technology improvements that accelerate capability to the fleet. An area of concentration includes energetics production improvement. <p>FY 2024 Base Plans:</p> <ul style="list-style-type: none"> - Continue to develop and transition advanced manufacturing enterprise technology improvements that result in cost reduction for key affordability platforms: VCS/CLB, DDG 51, CVN 78, FFG 62 (formerly FFG(X)) and F-35. 					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>- Continue to develop and transition advanced manufacturing enterprise technology improvements that accelerate capability to the fleet. Areas of concentration include (1) SWARM/unmanned/autonomous vehicle production, and (2) fleet sustainment technology (ships/aircraft) and (3) other ONR manufacturing acceleration efforts.</p> <p>- Continue to develop and transition energetics manufacturing technology improvements that result in cost reduction for Naval Systems.</p> <p>- Continue to develop and transition energetics manufacturing technology improvements that accelerate capability to the fleet. An area of concentration for capability acceleration is energetics production improvement.</p> <p>- Initiate/complete efforts for advanced manufacturing enterprise technology improvements CH-53K</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: There is no significant funding change from FY 2023 to FY 2024</p>					
Accomplishments/Planned Programs Subtotals	55.519	60.704	61.843	0.000	61.843

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

N/A

Remarks

D. Acquisition Strategy

Efforts are focused on affordability improvements (both acquisition and life-cycle) for specific key acquisition platforms as defined in the Navy ManTech Investment Strategy. Currently, the majority of Navy ManTech efforts are focused on affordability improvements for: VIRGINIA Class submarine (VCS)/COLUMBIA Class submarine (CLB), DDG 51 Class destroyer, CVN 78 Class carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft. A smaller portion of ManTech's budget (approximately 20%) is directed towards capability acceleration -- manufacturing acceleration of key technologies to enable transition of these technologies to the fleet more quickly.

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Appropriation/Budget Activity 1319 / 3	R-1 Program Element (Number/Name) PE 0603680N / <i>Manufacturing Technology Program</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
9999: <i>Congressional Adds</i>	0.000	19.307	1.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	20.307
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects

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

	FY 2022	FY 2023
<i>Congressional Add:</i> Energetics processing	4.827	0.000
<i>FY 2022 Accomplishments:</i> Conduct energetics processing advanced technology development		
<i>FY 2023 Plans:</i> N/A		
<i>Congressional Add:</i> Chemical reactor and crystallizer technology	14.480	0.000
<i>FY 2022 Accomplishments:</i> Conduct chemical reactor and crystallizer technology advanced technology development		
<i>FY 2023 Plans:</i> N/A		
<i>Congressional Add:</i> Machine learning for in-water hull inspection	0.000	1.000
<i>FY 2022 Accomplishments:</i> N/A		
<i>FY 2023 Plans:</i> Conduct machine learning for in-water hull inspection research.		
Congressional Adds Subtotals	19.307	1.000

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

N/A

Remarks

D. Acquisition Strategy

N/A