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

Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0204413N / Amphibious Tactical Supt Units							
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	64.743	5.577	1.706	1.657	-	1.657	-	-	-	-	-	-
2231: LCAC / LCU 1700	58.052	1.033	0.975	1.158	-	1.158	-	-	-	-	-	-
2477: NECC Additive Manufacturing	0.000	0.000	0.497	0.499	-	0.499	-	-	-	-	-	-
2909: Amphibious Lighterage Development	6.691	4.544	0.234	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Landing Craft, Air Cushion (LCAC): Research and development efforts to transfer technologies into functional uses on the current LCACs. Current technology initiatives include sustainability/reliability/readiness/performance analyses, LCAC communication improvements, compliance with Cybersecurity policy regulations, and LCAC Total Ownership Costs (TOC) reduction initiatives.

Landing Craft, Utility (LCU 1700): Replacement program for the current LCU 1610 class craft - a class of craft that has exceeded its 25-year planned service life by nearly double, average age of craft is approaching 50-years-old. LCU 1700 will provide similar payload, range, speed, and interoperability. Detail design contract awarded Q2 FY18.

The Amphibious Support Craft Vehicle (ASCV) which will be the Lighter Amphibious Resupply Cargo, 5 ton (LARC-V) Replacement, provides amphibious equipment and personnel transport as well as near shore salvage and diving capability.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	6.931	1.713	3.956	-	3.956
Current President's Budget	5.577	1.706	1.657	-	1.657
Total Adjustments	-1.354	-0.007	-2.299	-	-2.299
• Congressional General Reductions	-	-0.007			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.100	0.000			
• SBIR/STTR Transfer	-0.254	0.000			
• Program Adjustments	0.000	0.000	-2.275	-	-2.275
• Rate/Misc Adjustments	0.000	0.000	-0.024	-	-0.024

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Appropriation/Budget Activity
1319: *Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development*

R-1 Program Element (Number/Name)
PE 0204413N / *Amphibious Tactical Supt Units*

Change Summary Explanation

The FY 2022 funding request was reduced by \$0.409 million to account for the availability of prior year execution balances.

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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 0204413N / <i>Amphibious Tactical Supt Units</i>	Project (Number/Name) 2231 / LCAC / LCU 1700
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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
2231: LCAC / LCU 1700	58.052	1.033	0.975	1.158	-	1.158	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Landing Craft, Air Cushion (LCAC): Research and development efforts to transfer technologies into functional uses on the current LCACs. Ongoing technology initiatives include sustainability/reliability/readiness/performance analyses, LCAC communication improvements, Cybersecurity policy regulations compliance, and LCAC Total Ownership Costs (TOC) reduction initiatives.

Landing Craft, Utility (LCU 1700): Replacement program for the current LCU 1610 class craft - a class of craft that has exceeded its 25-year planned service life by nearly double, average age of craft is approaching 50-years-old. LCU 1700 will provide similar payload, range, speed, and interoperability. Detail design contract awarded Q2 FY18.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: LCAC and LCU 1700 RDT&E,N	1.033	0.975	1.158	0.000	1.158
Articles:	-	-	-	-	-
FY 2021 Plans:					
LCAC:					
- Continue to improve reliability and maintainability of the LCAC HM&E systems.					
- Maintain compliance with cybersecurity directives and mandates.					
LCU:					
- Conduct risk reduction efforts, which support Life Cycle/Total Ownership Cost (TOC) reductions for the class.					
- Conduct and Support Developmental Testing & Operational Testing (DT/OT).					
FY 2022 Base Plans:					
LCAC:					
- Continue to improve reliability and maintainability of the LCAC Hull, Mechanical & Electrical (HM&E) systems.					
- Maintain compliance with cybersecurity directives and mandates.					
LCU:					
- Conduct risk reduction efforts, which support Life Cycle/Total Ownership Cost (TOC) reductions for the class.					

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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 0204413N / <i>Amphibious Tactical Supt Units</i>	Project (Number/Name) 2231 / LCAC / LCU 1700

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Conduct and Support Developmental Testing & Operational Testing (DT/OT). FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Increase in requirement from FY21 to FY22 supports the developmental testing, demonstration, and operational assessment test events to certify the LCU 1700 program for IOTE and IOC following craft arrival at Assault Craft Unit (ACU) 2.					
Accomplishments/Planned Programs Subtotals	1.033	0.975	1.158	0.000	1.158

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN 0970: LCAC	3.392	6.758	21.314	-	21.314	-	-	-	-	-	-
• SCN 5139: LCAC SLEP	0.000	56.461	32.712	-	32.712	-	-	-	-	-	-
• SCN 5100: LCU 1700	83.670	87.395	67.928	-	67.928	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Multiple contracts and Field Activities are involved to complete the various projects.

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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 0204413N / <i>Amphibious Tactical Supt Units</i>	Project (Number/Name) 2231 / LCAC / LCU 1700
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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			
LCAC - Component Development	WR	NSWC CD : Philadelphia, PA	8.325	0.000		0.000		0.000		-		0.000	-	-	-
LCAC - Systems Engineering	WR	NSWC : Various	7.673	0.244	Jan 2020	0.200	Jan 2021	0.184	Jan 2022	-		0.184	-	-	-
LCU - Special Studies	Various	Various : Various	3.840	0.000		0.000		0.000		-		0.000	-	-	-
LCU - Ship Design	WR	NSWC : Various	18.768	0.227	Jan 2020	0.000		0.061	Dec 2021	-		0.061	-	-	-
Subtotal			38.606	0.471		0.200		0.245		-		0.245	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LCAC - Technical Engineering Services	WR	NSWC PCD : Panama City, FL	12.700	0.000		0.000		0.000		-		0.000	-	-	-
LCU - Research Studies	Various	Various : Various	0.565	0.000		0.091	Jan 2021	0.125	Dec 2021	-		0.125	-	-	-
Subtotal			13.265	0.000		0.091		0.125		-		0.125	-	-	N/A

Test and Evaluation (\$ 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			
LCAC - Developmental Test & Evaluation	WR	Various : Various	0.287	0.000		0.000		0.000		-		0.000	-	-	-
LCAC - Operational Test & Evaluation	WR	NSWC PCD : Panama City, FL	2.047	0.000		0.000		0.000		-		0.000	-	-	-
LCAC - Test Assets	WR	NSWC PCD : Panama City, FL	0.850	0.000		0.000		0.000		-		0.000	-	-	-
LCU - Developmental Test & Evaluation	WR	Various : Various	0.508	0.334	Jan 2020	0.320	Jan 2021	0.396	Dec 2021	-		0.396	-	-	-
LCU - Operational Test & Evaluation	WR	Various : Various	0.325	0.228	Jan 2020	0.228	Jan 2021	0.250	Nov 2021	-		0.250	-	-	-

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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 0204413N / <i>Amphibious Tactical Supt Units</i>	Project (Number/Name) 2231 / LCAC / LCU 1700
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 2231</i>				
LCAC - Technology Initiatives	1	2020	4	2022
LCU 1700 - Integrated Developmental / Operational Testing	1	2020	4	2022
LCU 1700 - C4N Turnkey Solution	2	2020	4	2020
LCU 1700 - Sustainment Technology Initiatives	2	2021	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 0204413N / <i>Amphibious Tactical Supt Units</i>				Project (Number/Name) 2477 / <i>NECC Additive Manufacturing</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
2477: <i>NECC Additive Manufacturing</i>	0.000	0.000	0.497	0.499	-	0.499	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This is a new start in FY 2021.

In accordance with the National Defense Strategy (NDS), A Design for Maintaining Maritime Superiority 2.0, and Navy Facility Command (NAVFAC) Strategic Design 2.0, this program provides the Navy with new capabilities to enable resilient and agile logistics thru additive manufacturing (AM). Investing in AM enhances the fleet's ability to conduct operational logistics in a contested environment, and ensures logistics supportability across the austere distributed battlespace. AM technology results in increased operational availability, on demand production of critical systems, and supply chain cost savings. This effort will identify critical parts suitable for AM production in the field; identify AM systems appropriate to produce and certify critical parts in the field; analyze and identify AM system implications across doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P); conduct end-user training, field experimentation, and fleet exercise technology insertion to validate AM system capability and systems integration issues.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: NECC Additive Manufacturing	0.000	0.497	0.499	0.000	0.499
Articles:	-	-	-	-	-
FY 2021 Plans: FY21 will fund user evaluation of AM capabilities at each stage of the supply chain including design, data transmission, printing, part validation, installation, and operational mobilization. Test plans will be developed to support operational evaluation. Analysis of the user evaluation data will be performed.					
FY 2022 Base Plans: -Continue to evaluate AM part approval and qualification processes, and AM systems integration issues and impacts across DOTMLPF, as well as ongoing end user evaluations and experimentation.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: decrease of .002 from FY21 to FY22 due to NWCF rate adjustment.					
Accomplishments/Planned Programs Subtotals	0.000	0.497	0.499	0.000	0.499

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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204413N / <i>Amphibious Tactical Supt U nits</i>	Project (Number/Name) 2477 / <i>NECC Additive Manufacturing</i>

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

N/A

Remarks

D. Acquisition Strategy

The projects identified in this budget have been carefully selected to respond to a series of extended user evaluations of commercial off the shelf (COTS) equipment by the warfighter with the goal of developing requirements for future additive manufacturing capabilities that will meet unique logistics alternatives. This effort will be executed by members of the expeditionary programs office in collaboration with various naval warfare centers and partners in the expeditionary additive manufacturing community of practice, and in conjunction with end users at the appropriate Type Commands. By working through the previously described sequence of analysis and experimental validation, we will identify the appropriate systems for in-field additive manufacturing while simultaneously informing end-user requirements development and program office acquisition plans..

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2477				
Operational Evaluation	1	2021	4	2022
Test Plan and Analysis	1	2021	4	2022

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Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0204413N / <i>Amphibious Tactical Supt Units</i>				Project (Number/Name) 2909 / <i>Amphibious Lighterage Development</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
2909: <i>Amphibious Lighterage Development</i>	6.691	4.544	0.234	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Amphibious Lighterage Development, which will be the Lighter Amphibious Resupply Cargo, 5 ton (LARC-V) Replacement, provides amphibious equipment and personnel transport as well as near shore salvage and diving capability. A system of systems approach is being researched as an alternative to a direct LARC-V Replacement. The capability required is vital for the execution of the Naval Beach Group (NBG) and Underwater Construction Team (UCT) missions of Ship to shore transport and near shore salvage.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: LARC-V Replacement	4.544	0.234	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2021 Plans: FY 2021 RDT&E funding will be used to complete user assessments of COTS prototype acquired during FY20.					
FY 2022 Base Plans: Project ends FY21					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.234 due to efforts are being transition to another project.					
Accomplishments/Planned Programs Subtotals	4.544	0.234	0.000	0.000	0.000

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

N/A

Remarks

D. Acquisition Strategy

RDT&E funding is required to develop a replacement amphibious vehicle to support Operational Plan and Required Operational Capability/Potential Operating Environment (ROC/POE) requirements of the Naval Beach Groups and Underwater Construction Teams. Technology investigation began in FY15. In FY19, a one

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for one like in kind replacement of the LARC-V was determined not affordable. An alternative system of systems approach is now being pursued with a near term focus being on two of the seven original capabilities. The two capabilities are (1)boat lane preparation and (2)personnel and equipment transport. Requirements documentation and other such documentation efforts are largely being accomplished with in house resources. Procurement of prototypes accomplished via competitive other transaction authority (OTA).

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

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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			
LARC-V Replacement	WR	Naval Surface Warfare Center Carderock Division (N : West Bethesda, MD)	3.713	0.000		0.000		0.000		-		0.000	-	-	-
Boat Lane Preparation	Various	EDRC : Duck, North Carolina	0.000	2.670	Mar 2020	0.000		0.000		-		0.000	-	-	-
Personnel Transport	C/BA	Denfense Innovation Unit : Mountview, CA	2.800	1.500	Apr 2020	0.000		0.000		-		0.000	-	-	-
Subtotal			6.513	4.170		0.000		0.000		-		0.000	-	-	N/A

Test and Evaluation (\$ 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			
Operational Testing	WR	EXWC : Port Hueneme, CA	0.000	0.300	Oct 2020	0.234	Jul 2021	0.000		-		0.000	-	-	-
Subtotal			0.000	0.300		0.234		0.000		-		0.000	-	-	N/A

Remarks
 Contract delay was due to meeting requirements between NAVFAC and NAVSEA PMs to review the Statement of Work (SOW) related to the prototype testing. The testing of this prototype is mandatory in order to assess the capabilities and any shortcomings of the design. The SOW is currently in house for review and funding requirement. Estimated contract award date is mid-July 2021.

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			
In house Program Management	Sub Allot	Not Specified : Not Specified	0.178	0.074	Mar 2020	0.000		0.000		-		0.000	-	-	-
Subtotal			0.178	0.074		0.000		0.000		-		0.000	-	-	N/A

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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 0204413N / <i>Amphibious Tactical Supt Units</i>	Project (Number/Name) 2909 / <i>Amphibious Lighterage Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2909				
Boat Lane Preparation: Ariel Bathometry Mapping Technology Demonstration	1	2020	4	2021
Boat Lane Preparation: Prototype Development	1	2020	4	2021
Boat Lane Preparation: Test and Evaluate Prototype	1	2021	4	2021
Personnel and Equipment Transport: Prototype Procurement	1	2020	4	2021
Personnel and Equipment Transport: Prototype Development	2	2020	4	2021
Personnel and Equipment Transport: Test and Evaluate Prototype	1	2021	4	2021