Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0206629M *I Amphibious Assault Vehicle*							
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	237.913	5.324	6.469	7.551	-	7.551	-	-	-	-	-	-
2938: *Amphibious Assault Vehicle*	237.913	5.324	6.469	7.551	-	7.551	-	-	-	-	-	-

Note

Prior funding is reflected in PE 0206623M/Project 0021.

A. Mission Description and Budget Item Justification

The Assault Amphibious Vehicle (AAV) program provides life-cycle support to ensure cost-effective combat readiness for the AAV Family of Vehicles (FOV). This is accomplished through engineering changes resulting from continuous review of sub-systems to maintain system supportability, safety, reduce total ownership costs, improve fleet readiness, address obsolescence issues, and improve vehicle performance. The Recovery variant will provide recovery support and design tradeoffs for the ACV until an ACV Recovery variant is fielded. Improvements to the fleet reduce total ownership costs and improve sustainability. The AAV Modifications Line procures modernized components and subsystems that impact safe and reliable use of the AAV such as the Water Egress Capability (WEC), Tactical Communication Modernization (TCM) to meet NSA's cryptographic modernization mandates, quarterly technical refresh of servers and laptops for Command-variant (C-Variant), and associated production support for the AAV FOV. Funding for the AAV FOV is critical to maintaining the amphibious capability of the USMC until the Amphibious Combat Vehicle (ACV) is fully fielded and operational.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	5.476	6.469	9.486	-	9.486
Current President's Budget	5.324	6.469	7.551	-	7.551
Total Adjustments	-0.152	0.000	-1.935	-	-1.935
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.055	0.000			
• SBIR/STTR Transfer	-0.097	0.000			
• Rate/Misc Adjustments	0.000	0.000	-1.935	-	-1.935

Change Summary Explanation

The increase from FY 2021 to FY 2022 ($1.082M) is attributed to increased funding for Command and Control (C2) hardware and software technology refreshes required to continue operating the Command variant of AAV, government and contractor engineering services required to evaluate engineering change proposal

modifications, systems integration of a tactical situational awareness solution, and additive manufacturing and science and technology test events, in order to maintain modern amphibious assault capabilities within the legacy AAV Fleet.

Full funding in FY 2022 supports the programs ability to provide critical hardware and software technology refreshes to continue operating the Command variant, provide obsolescence support and engineering services needed to address performance and safety issues, provide lifecycle management to maintain fleet configuration, and test Additive Manufacturing effects for potential form/fit/function replacement of legacy components.

The FY 2022 funding request was adjusted by $1.729M to account for the availability of prior year execution balances.

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 0206629M / *Amphibious Assault Vehicle*	Project (Number/Name) 2938 / *Amphibious Assault Vehicle*	

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
2938: *Amphibious Assault Vehicle*	237.913	5.324	6.469	7.551	-	7.551	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

The increase from FY 2021 to FY 2022 ($1.082M) is attributed to increased funding for Command and Control (C2) hardware and software technology refreshes required to continue operating the Command variant of AAV, government and contractor engineering services required to evaluate engineering change proposal modifications, system integration of the next generation battlefield situational awareness solution, reverse engineering efforts of critical parts and shortages, and test and evaluation of additive manufacturing components, in order to maintain modern amphibious assault capabilities within the legacy AAV Fleet.

A. Mission Description and Budget Item Justification

The Assault Amphibious Vehicle (AAV) program provides life-cycle support to ensure cost-effective combat readiness for the AAV Family of Vehicles (FOV). This is accomplished through engineering changes resulting from continuous review of sub-systems to maintain system supportability, safety, reduce total ownership costs, improve fleet readiness, address obsolescence issues, and improve vehicle performance. The Recovery variant will provide recovery support and design trade offs for the ACV until an ACV Recovery variant is fielded.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Product Development	1.150	2.284	3.081	0.000	3.081
Articles:	-	-	-	-	-
Description: This cost element provides funding for design and development engineering for the AAV Modifications Line. The AAV Modifications Line provides Nonrecurring Engineering (NRE) and design for AAV safety, obsolescence, and performance improvement engineering for the AAV Family of Vehicles (FOV).					
FY 2021 Plans: -Continue legacy Platform Command and Control (C2) design and integration efforts to include C2 software/ hardware tech refresh. The C2 design and integration effort continues due to the Command-variant requiring quarterly software releases each year to maintain the vehicles security certification.					
FY 2022 Base Plans: -Continue legacy Platform Command and Control (C2) design and integration efforts to include C2 software/ hardware tech refresh. The C2 design and integration effort continues due to the Command-variant requiring quarterly software releases each year to maintain the vehicles security certification.					

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 0206629M / *Amphibious Assault Vehicle*	**Project (Number/Name)** 2938 / *Amphibious Assault Vehicle*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Initiate order of hardware/software and system integration of next generation battlefield situational awareness system (replacement for Joint Battle Command-Platform (JBC-P system). -Initiate reverse engineering efforts for critical parts and shortages. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** - The increase in System Design and Development from FY 2021 to FY 2022 ($0.797M) is attributed to continued legacy Platform Command and Control (C2) design and integration, initiation of integration efforts for next generation battlefield situational awareness system, reverse engineering efforts for critical parts and shortages, and design/integration of C2 hardware and software to be used with the Assured Position Navigation and Timing (APNT) system. The C2 design and integration effort continues due to the Command-variant requiring quarterly software releases each year to maintain the vehicles security certification.					
Title: Support	2.667	3.064	2.829	0.000	2.829
Articles:	-	-	-	-	-
Description: Provide government engineering and technical support for AAV safety, obsolescence, and performance modifications. ***FY 2021 Plans:*** - Continue Assault Amphibious Vehicle (AAV) C7 Software updates using government engineering support subject matter experts (SME). - Continue to provide technical and engineering services in support of AAV obsolescence and performance modifications. - Continue utilizing the Enterprise Product Lifecycle Management Tool (ePLM) Integrated Decision Environment (IDE) to support analyses of the legacy AAV. - Continue to provide material and travel associated with these efforts. ***FY 2022 Base Plans:*** - Continue Assault Amphibious Vehicle (AAV) C7 Software updates using government engineering support subject matter experts (SME). - Continue to provide technical and engineering services in support of AAV obsolescence and performance modifications. - Continue utilizing the Enterprise Product Lifecycle Management Tool (ePLM) Integrated Decision Environment (IDE) to support analyses of the legacy AAV.					

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 0206629M / *Amphibious Assault Vehicle*	**Project (Number/Name)** 2938 / *Amphibious Assault Vehicle*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Continue to provide material and travel associated with these efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The decrease from FY 2021 to FY 2022 ($0.235M) is attributed to completion of the Deployable Supplemental Buoyancy Egress Device (DSBED) engineering effort in FY 2021 (0.224M) and due to a decrease in travel ($0.011M) which is the result of reduced travel requirements in support of RWS installations.					
Title: Test and Evaluation ***Articles:*** ***Description:*** Developmental, Operational and Live Fire Test and Evaluation of safety improvements, upgrades, modifications and fact of life changes to ensure operational suitability and effectiveness of the AAV family of vehicles. ***FY 2021 Plans:*** -N/A ***FY 2022 Base Plans:*** - Initiate Developmental Test & Evaluation (DT&E) of Additive Manufacturing (AM) efforts to test manufactured parts for form/fit/function replacement of legacy components which are obsolete and hard to replace. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** - The increase in Developmental Test and Evaluation from FY 2021 to FY 2022 ($0.506M) is attributed to test and evaluation of Additive Manufacturing (AM) efforts to test manufactured parts for form/fit/function replacement of legacy components which are obsolete and hard to replace.	0.000 -	0.000 -	0.506 -	0.000 -	0.506 -
Title: Management and Engineering Technical Services ***Articles:*** ***Description:*** Management support services and technical support for program office and field activities. ***FY 2021 Plans:***	1.507 -	1.121 -	1.135 -	0.000 -	1.135 -

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 0206629M / *Amphibious Assault Vehicle*	**Project (Number/Name)** 2938 / *Amphibious Assault Vehicle*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Continue support of ECP development, trade studies and analyses, supply chain and government property management in support of AAV sustainment modification efforts. -Continue logistic support for systems integration efforts. ***FY 2022 Base Plans:*** -Continue support of ECP development, trade studies and analyses, supply chain and government property management in support of AAV sustainment modification efforts. -Continue logistic support for systems integration efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The increase in Management and Engineering Technical Services from FY 2021 to FY 2022 ($0.014M) is attributed to the normal rate of inflation.					
Accomplishments/Planned Programs Subtotals	5.324	6.469	7.551	0.000	7.551

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• PMC/2021: *AAV Product Improvement Program*	39.495	87.476	36.836	-	36.836	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The AAV Modifications Line includes government and contractor life-cycle support to ensure cost-effective combat readiness for the AAV Family of Vehicles (FOV). This is accomplished through continuous review of sub-systems to maintain system supportability and safety, procurement of replacement systems for obsolescence, and fielding of Engineering Change Proposals (ECP). The improvements to the fleet reduce total ownership costs and improve sustainability. The AAV Modifications Line procures modernized components and subsystems that impact safe and reliable use of the AAV such as Tactical Communication Modernization (TCM) to meet NSA's cryptographic modernization mandates, quarterly technical refresh of servers and laptops for Command-variant (C-Variant), and associated production support for the AAV FOV. The AAV FOV is expected to continue to be in service until 2028 as it is replaced by ACV.

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 0206629M / *Amphibious Assault Vehicle*	Project (Number/Name) 2938 / *Amphibious Assault Vehicle*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Syst Design & Dev / EMD	C/FFP	MCSC/SAIC : Charleston, SC	138.072	0.000		0.000		0.000		-		0.000	-	-	-
Syst Design & Dev	C/FFP	Various : Various	10.248	1.150	Feb 2020	2.284	Feb 2021	3.081	Feb 2022	-		3.081	-	-	-
Other Product Development	C/BA	Various : Various	6.514	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	154.834	1.150		2.284		3.081		-		3.081	-	-	N/A

Remarks

The increase in System Design and Development from FY 2021 to FY 2022 ($0.797M) is the result of continued legacy Platform Command and Control (C2) design and integration, initiation of system integration efforts for the next generation battlefield situational awareness system, reverse engineering efforts for critical parts and shortages, and design/integration for C2 hardware and software to be used with the Assured Position Navigation and Timing System. The C2 design and integration effort continues due to the Command-variant requiring quarterly software releases each year to maintain the vehicles security certification.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Various	Various : Various	1.075	0.057	Oct 2019	0.048	Oct 2020	0.037	Sep 2022	-		0.037	-	-	-
In-House Technical Support	Various	Various : Various	23.594	2.610	Feb 2020	3.016	Feb 2021	2.792	Feb 2022	-		2.792	-	-	-
		Subtotal	24.669	2.667		3.064		2.829		-		2.829	-	-	N/A

Remarks

The decrease in Travel from FY 2021 to FY 2022 ($0.011M) is the result of reduced travel requirements in support of RWS installations.
The decrease in In-House Technical Support from FY 2021 to FY 2022 ($0.224M) is attributed to completion of the Deployable Supplemental Buoyancy Egress Device (DSBED) engineering effort in FY 2021.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing (DT)	Various	Various : Various	18.490	0.000		0.000		0.506	Apr 2022	-		0.506	-	-	-

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 0206629M / *Amphibious Assault Vehicle*	Project (Number/Name) 2938 / *Amphibious Assault Vehicle*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Testing (OT)	WR	MCOTEA : Quantico, VA	1.022	0.000		0.000		0.000		-		0.000	-	-	-
Live Fire Test and Evaluation (LFT&E)	Various	Various : Various	8.639	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	28.151	0.000		0.000		0.506		-		0.506	-	-	N/A

Remarks

The increase in Developmental Testing from FY 2021 to FY 2022 ($0.506M) results from initiation of test and evaluation of Additive Manufacturing (AM) efforts to test manufactured parts for form/fit/function replacement of legacy components which are obsolete and hard to replace.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Support Svcs	C/FFP	MCSC : Quantico, VA	13.972	0.000		0.000		0.000		-		0.000	-	-	-
Engineering and Technical Services	Various	Various : Various	16.287	1.507	Mar 2020	1.121	Mar 2021	1.135	Mar 2022	-		1.135	-	-	-
		Subtotal	30.259	1.507		1.121		1.135		-		1.135	-	-	N/A

Remarks

The increase in Engineering and Technical Services from FY 2021 to FY 2022 ($0.014M) is attributed to the normal rate of inflation.

	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	237.913	5.324		6.469		7.551		-		7.551	-	-	N/A

Remarks

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 0206629M / *Amphibious Assault Vehicle*	**Project (Number/Name)** 2938 / *Amphibious Assault Vehicle*

AAV MODIFICATIONS PB-22 SCHEDULE

As of: 12 April 2021

FISCAL YEAR			FY20				FY21				FY22			
Quarter			1	2	3	4	1	2	3	4	1	2	3	4
AAV Intercom (ICS) Modernization			Procure & Install 451 Intercom Mods											
	Total	451		18				44				0		
	P	376			18				36				0	
	C	40			0				5				0	
	R	35			0				3				0	
AAV Radio Modernization (TCM)							Procure & Install 305 Radio Mods							
				Vehicle Integration & Test					ECP Approval					
	Total	446						305				141		
	P	403							262				141	
	C	18							18				0	
	R	25							25				0	
AAV Assured Position, Navigation, and Timing (APNT)			Design & Eng											
				Testing			Procure & Install 389 APNT Systems							
					DEMO						ECP Approval			
	Total	389		64				0				12		
	P	322				52			0				0	
	C	35				12			0				0	
	R	32				0			0				12	
AAV Hydraulics Modernization							Procure & Install 389 Hydraulic Mods							
										ECP Approval				
	Total	389		65				0				85		
	P	322			51				0				64	
	C	35			11				0				11	
	R	32			3				0				10	

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 0206629M / *Amphibious Assault Vehicle*	**Project (Number/Name)** 2938 / *Amphibious Assault Vehicle*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2938				
Hydraulics Modernization - ECP Approval	4	2021	4	2021
TCM Integration & Test	2	2020	2	2020
TCM - ECP Approval	3	2021	3	2021
APNT - Integration Testing	2	2020	4	2020
APNT - ECP Approval	4	2021	4	2021