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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0206629M I (U)Amphibious Assault Vehicle							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	165.752	53.404	20.690	5.476	-	5.476	13.260	9.838	6.018	6.138	Continuing	Continuing
2938: Amphibious Assault Vehicle	165.752	53.404	20.690	5.476	-	5.476	13.260	9.838	6.018	6.138	Continuing	Continuing

Note

NOTE: Prior funding is reflected in P.E. 0206623M/Project 0021.

A. Mission Description and Budget Item Justification

This Program Element contains the Assault Amphibious Vehicle (AAV) Modifications Line and the terminated AAV Survivability Upgrade (AAV SU) program. The AAV Modifications Line 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 survivability and performance. The AAV SU program was designed to increase Personnel-Variant (P-variant) and Command-variant (C-Variant) survivability and force protection capabilities while maintaining the required land and water mobility performance.

The USMC decided to terminate the AAV Survivability Upgrade (AAV SU) program in order to better align to the National Defense Strategy; the remaining AAV SU funding will be utilized for program cancellation, which is expected to take from 12-24 months to complete. Funding to maintain and sustain the legacy AAV fleet will continue herein through the AAV Modifications Line.

B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	58.728	22.637	15.708	-	15.708
Current President's Budget	53.404	20.690	5.476	-	5.476
Total Adjustments	-5.324	-1.947	-10.232	-	-10.232
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.947			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.215	0.000			
• SBIR/STTR Transfer	-1.064	0.000			
• Program Adjustments	0.000	0.000	-10.202	-	-10.202
• Rate/Misc Adjustments	0.000	0.000	-0.030	-	-0.030
• Congressional Directed Reductions	-4.045	-	-	-	-
Adjustments					

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<p><u>Change Summary Explanation</u></p> <p>The decrease from FY2019 to FY2020 (\$15.214M) is primarily attributed to completion of nonrecurring engineering for Hydraulic Modernization, Remote Weapons Station (RWS) Integration Studies/Analyses/Engineering, and the Common Remotely Operated Weapons System (CROWS) Integration effort in FY2020.</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206629M / (U)Amphibious Assault Vehicle				Project (Number/Name) 2938 / Amphibious Assault Vehicle			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2938: Amphibious Assault Vehicle	165.752	53.404	20.690	5.476	-	5.476	13.260	9.838	6.018	6.138	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

The decrease from FY2019 to FY2020 (\$15.214M) is primarily attributed to completion of nonrecurring engineering for Hydraulic Modernization, Remote Weapons Station (RWS) Integration Studies/Analyses/Engineering, and the Common Remotely Operated Weapons System (CROWS) Integration effort in FY2020.

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 survivability and performance. The AAV program also included a Survivability Upgrade, which was designed to increase Personnel (P-Variant) and Command (C-Variant) survivability and force protection, while maintaining the required land and water mobility performance.

The USMC decided to terminate the Survivability Upgrade program in order to better align with the National Defense Strategy. Program life-cycle support for the AAV Family of Vehicles (FOV) will continue herein under the AAV Modifications Line.

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

	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Product Development	28.250	13.829	3.724	0.000	3.724
Articles:	3	-	-	-	-
<p>Description: This cost element provides funding for design and development engineering for the AAV Modifications Line and the AAV previous Survivability Upgrade program. 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). The AAV Survivability Upgrade (AAV SU) was designed to improve the legacy AAV Force Protection capability and included improvements such as upgraded underbelly protection, integrated blast mitigating seats, integrated spall liners, protected fuel storage, sponson armor, and selected improvements to maintain required water and land mobility.</p> <p>The USMC decided to terminate the AAV SU program in order to better align with the National Defense Strategy.</p> <p>FY 2019 Plans:</p>					

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Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206629M / (U)Amphibious Assault Vehicle		Project (Number/Name) 2938 / Amphibious Assault Vehicle		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<div>-Complete integration and engineering analyses for Remote Weapon Station (RWS).</div> <div>-Complete nonrecurring efforts for design, development, integration, and test for legacy vehicle Electrical Modernization.</div> <div>-Cancel prime contractor support for P-variant Reliability Growth Test (RGT) and Full-Up System Level Testing (FUSL) for Survivability Upgrade.</div> <div>-Complete Hydraulic Modernization nonrecurring engineering efforts.</div> <div>-Complete Integration Studies/Analysis/Engineering efforts for Remote Weapons Station (RWS) and the integration efforts for Common Remotely Operated Weapons System (CROWS).</div> <div>-Continue Recovery-variant nonrecurring engineering efforts.</div> <div>-Continue legacy Platform Command and Control (C2) design and integration efforts to include C2 software/hardware tech refresh.</div> <div>FY 2020 Base Plans:</div> <div>-Continue legacy Platform Command and Control (C2) design and integration efforts to include C2 software/hardware tech refresh.</div> <div>FY 2020 OCO Plans:</div> <div>N/A</div> <div>FY 2019 to FY 2020 Increase/Decrease Statement:</div> <div>The decrease from FY2019 to FY2020 (\$10.105M) is due to the completion of Hydraulic Modernization and integration and engineering analyses for the Remote Weapon Stations (RWS) and the integration efforts for Common Remotely Operated Weapons System (CROWS) in FY2019.</div>						
<div>Title: Support</div> <div>Articles:</div> <div>Description: Provide government engineering and technical support for AAV safety, obsolescence, and performance modifications, and the previous Survivability Upgrade program's support.</div> <div>FY 2019 Plans:</div> <div>- Continue modeling and simulation efforts for the Hydro-Dynamic analyses.</div> <div>- Continue Assault Amphibious Vehicle (AAV) C7 Software Updates.</div> <div>- Continue to provide technical and engineering services in support of AAV obsolescence and performance modifications.</div>		4.000 -	2.425 -	1.403 -	0.000 -	1.403 -

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Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206629M / (U)Amphibious Assault Vehicle		Project (Number/Name) 2938 / Amphibious Assault Vehicle		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<div>- Continue utilizing the Enterprise Product Lifecycle Management Tool (ePLM) Integrated Decision Environment (IDE) to support analyses of the legacy AAV.</div> <div>- Continue to provide material and travel associated with these efforts.</div> <div>FY 2020 Base Plans:</div> <div>- Continue modeling and simulation efforts for the Hydro-Dynamic effort.</div> <div>- Continue Assault Amphibious Vehicle (AAV) C7 Software Updates.</div> <div>- Continue to provide technical and engineering services in support of AAV obsolescence and performance modifications.</div> <div>- Continue utilizing the Enterprise Product Lifecycle Management Tool (ePLM) Integrated Decision Environment (IDE) to support analyses of the legacy AAV.</div> <div>- Continue to provide material and travel associated with these efforts.</div> <div>FY 2020 OCO Plans:</div> <div>N/A</div> <div>FY 2019 to FY 2020 Increase/Decrease Statement:</div> <div>The decrease from FY2019 to FY2020 (\$1.022M) reflects a reduction to engineering management and technical support for nonrecurring test and evaluation and logistic support for systems integration in the areas of Hydraulic Modernization, Intercom Modernization, Tactical Communication Modernization, and Remote Weapon Stations.</div>						
<div>Title: Test and Evaluation</div> <div>Articles:</div> <div>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.</div> <div>FY 2019 Plans:</div> <div>- Cancel Personnel-variant Reliability Growth Testing (RGT) for Survivability Upgrade.</div> <div>- Initiate and complete Operational Test & Evaluation/Environmental Electromagnetic Effects (E3) testing for RWS.</div> <div>FY 2020 Base Plans:</div> <div>- Initiate Recovery-variant Developmental Test & Evaluation.</div> <div>FY 2020 OCO Plans:</div>		14.583 -	1.357 -	0.349 -	0.000 -	0.349 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A													
FY 2019 to FY 2020 Increase/Decrease Statement: The decrease from FY2019 to FY2020 (\$1.008M) is primarily attributed to the completion of Operational Test & Evaluation (OT&E)/Environmental Electromagnetic Effects (E3) testing for RWS in FY2019.													
Title: Management and Engineering Technical Services <div>Articles:</div>									6.571 -	3.079 -	0.000 -	0.000 -	0.000 -
Description: Management support services and technical support for program office and field activities.													
FY 2019 Plans: - Continue program management services in support of ECP development, trade studies and analyses, supply chain and government property management in support of AAV sustainment modification efforts. - Continue nonrecurring logistic support for systems integration.													
FY 2020 Base Plans: - N/A													
FY 2020 OCO Plans: N/A													
FY 2019 to FY 2020 Increase/Decrease Statement: The decrease from FY2019 to FY2020 (\$3.079M) in In-House Technical Support is attributed to a reduction in management support services and technical support for the program office and field activities in light of the cancellation of the AAV Survivability Upgrade.													
Accomplishments/Planned Programs Subtotals									53.404	20.690	5.476	0.000	5.476
C. Other Program Funding Summary (\$ in Millions)													
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost		
• PMC/2021: AAV Product Improvement Program	85.362	96.836	39.495	-	39.495	94.300	88.779	39.483	40.269	67.889	1,620.187		
Remarks													

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<p><u>D. Acquisition Strategy</u></p> <p>The USMC competitively awarded two contracts in FY 2014 for development efforts in support of upgrading Personnel-variant (P-Variant) Assault Amphibious Vehicles Survivability Upgrade (AAV SU). Down-select to one contractor for manufacture of prototype vehicles occurred in February 2015. Milestone C was achieved in August 2017. The program's main focus was on improving Marine force protection capabilities. To support the required capabilities, the Survivability Upgrade program sought to incorporate Non-Developmental Items (NDI) and/or Commercial off the Shelf (COTS) solutions into the existing P-Variant and C-Variant Reliability, Availability, Maintainability/Rebuild to Standard (RAM/RS) configuration of AAV. The acquisition strategy sought to minimize cost and schedule, and maximize value, technology readiness, and commonality, while ensuring the selected manufacturer met the capability attributes established for the RAM/RS. RDT&E funded competitive designs and contract options for Engineering and Manufacturing Development (EMD). Initial Operational Capability (IOC) was scheduled for FY 2020; however, the USMC decided to terminate the program in order to better align with the National Defense Strategy. Program life-cycle support for the AAV Family of Vehicles (FOV) will continue herein under the AAV Modifications Line.</p> <p><u>E. Performance Metrics</u></p> <p>Milestone Reviews:</p> <p>Tactical Communications Modernization (TCM) Engineering Change Proposal (ECP) approval: 1QFY2020</p> <p>Recovery-variant ECP approval: 2QFY21</p>		

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 7						R-1 Program Element (Number/Name) PE 0206629M / (U)Amphibious Assault Vehicle				Project (Number/Name) 2938 / Amphibious Assault Vehicle					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Syst Design & Dev / EMD	C/FFP	MCSC/SAIC : Charleston, SC	110.706	27.366	Feb 2018	12.898	Feb 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Syst Design & Dev	C/FFP	Various : Various	0.000	0.000		0.000		3.478	Feb 2020	-		3.478	0.000	3.478	-
Other Product Development	C/BA	Various : Various	5.144	0.884	Mar 2018	0.931	Mar 2019	0.246	Mar 2020	-		0.246	Continuing	Continuing	Continuing
Subtotal			115.850	28.250		13.829		3.724		-		3.724	Continuing	Continuing	N/A
Remarks															
The decrease from FY2019 to FY2020 (\$10.105M) is due to the completion of Hydraulic Modernization and integration and engineering analyses for the Remote Weapon Stations (RWS) and the integration efforts for the Common Remotely Operated Weapons Station (CROWS) in FY2019.															
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Travel	Various	Various : Various	0.778	0.250	Oct 2017	0.047	Oct 2018	0.047	Oct 2019	-		0.047	Continuing	Continuing	Continuing
In-House Technical Support	Various	Various : Various	17.528	3.750	Feb 2018	2.378	Feb 2019	1.356	Feb 2020	-		1.356	Continuing	Continuing	Continuing
Subtotal			18.306	4.000		2.425		1.403		-		1.403	Continuing	Continuing	N/A
Remarks															
The decrease from FY2019 to FY2020 (\$1.022M) reflects a reduction to engineering management and technical support for nonrecurring test and evaluation and logistic support for systems integration in the areas of Hydraulic Modernization, Intercom Modernization, Tactical Communication Modernization, and Remote Weapon Stations.															
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 (DT)	Various	Various : Various	7.391	9.590	Feb 2018	0.000		0.349	Feb 2020	-		0.349	Continuing	Continuing	Continuing
Operational Testing (OT)	WR	MCOTEA : Quantico, VA	1.022	0.000		1.357	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing

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Appropriation/Budget Activity 1319 / 7						R-1 Program Element (Number/Name) PE 0206629M / (U)Amphibious Assault Vehicle				Project (Number/Name) 2938 / Amphibious Assault Vehicle					
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Live Fire Test and Evaluation (LFT&E)	Various	Various : Various	3.646	4.993	Mar 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			12.059	14.583		1.357		0.349		-		0.349	Continuing	Continuing	N/A
Remarks															
The decrease from FY2019 to FY2020 (\$1.008M) is primarily attributed to the completion of Operational Test & Evaluation (OT&E)/Environmental Electromagnetic Effects (E3) testing for RWS in FY2019.															
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Management Support Svcs	C/FFP	MCSC : Quantico, VA	6.802	5.174	Apr 2018	1.996	Apr 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Technical Services	Various	Various : Various	12.735	1.397	Mar 2018	1.083	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			19.537	6.571		3.079		0.000		-		0.000	Continuing	Continuing	N/A
Remarks															
The decrease from FY2019 to FY2020 (\$3.079M) in In-House Technical Support is attributed to a reduction in management support services and technical support for the program office and field activities in light of the cancellation of the AAV Survivability Upgrade.															
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			165.752	53.404		20.690		5.476		-		5.476	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy

Date: March 2019

Appropriation/Budget Activity

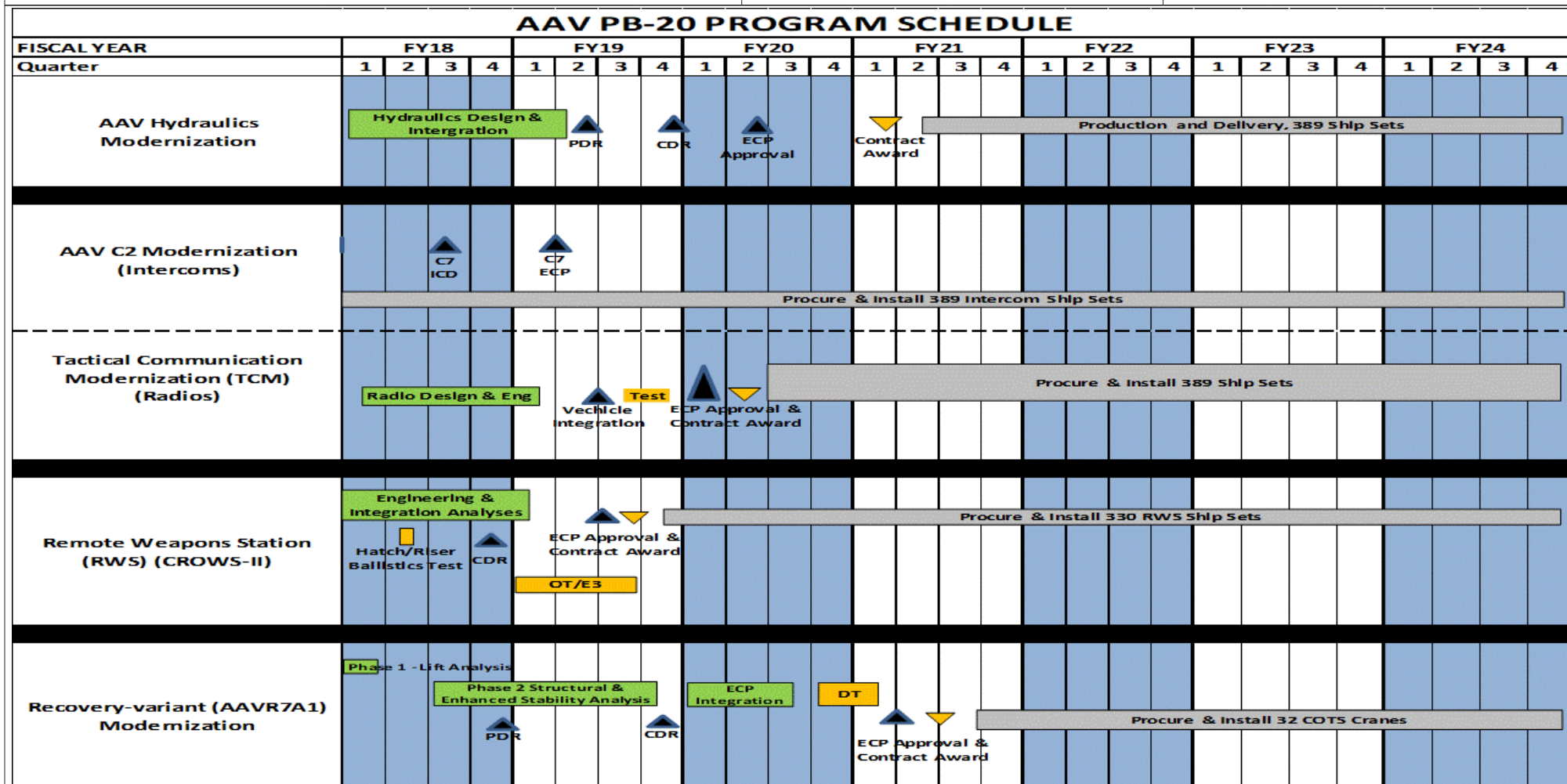
1319 / 7

R-1 Program Element (Number/Name)

PE 0206629M / (U)Amphibious Assault Vehicle

Project (Number/Name)

2938 / Amphibious Assault Vehicle



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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206629M / (U)Amphibious Assault Vehicle	Project (Number/Name) 2938 / Amphibious Assault Vehicle	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2938				
PDR - Hydraulics Modernization	2	2019	2	2019
CDR - Hydraulics Modernization	4	2019	4	2019
ECP Approval - Hydraulics Modernization	2	2020	2	2020
Tactical Communications Modernization (TCM) Design & Develop	1	2018	1	2019
TCM Integration & Test	2	2019	4	2019
TCM - ECP Approval	1	2020	1	2020
TCM - Contract Award	2	2020	2	2020
Remote Weapon Station (RWS) - Engineering & Integration Analyses	1	2018	1	2019
RWS - OT/E3	1	2019	3	2019
RWS - ECP Approval & Contract Award	3	2019	3	2019
Recovery-Variant (AAVR7) Modernization - Phase 2 Struct & Stab Analyses	3	2018	4	2019
CDR - AAVR7 Modernization	4	2019	4	2019
ECP Integration - AAVR7 Modernization	1	2020	3	2020
DT - AAVR7 Modernization	4	2020	1	2021
ECP Approval & Contract Award - AAVR7 Modernization	2	2021	2	2021