RCS: DD-A&T(Q&A)823-472

Amphibious Combat Vehicle Family of Vehicles (ACV FoV)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name
Amphibious Combat Vehicle Family of Vehicles (ACV FoV)

DoD Component
Navy

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References

SAR Baseline (Production Estimate)

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated September 28, 2018

Approved APB

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated September 28, 2018

Mission and Description

On January 8, 2019, an ADM was approved to combine the Amphibious Combat Vehicle (ACV) 1.1 Personnel Carrier program and the future ACV 1.2 program into one MDAP. The recommendation was based on the demonstrated performance of the ACV 1.1 program meeting key requirements for the ACV 1.2 such as ship-to-shore capability. The Milestone C ADM also directed the continued development of ACV Mission Role Variants (MRVs). Thus, the vehicles reflected in the ACV Family of Vehicles (FoV) program are a personnel carrier variant (ACV-P), a command and control variant (ACV-C), a medium caliber cannon variant (ACV-30), and a maintenance/recovery variant (ACV-R). The ACV-C provides a modernized, armor protected tactical-echelon command post for the regiment or battalion. The ACV-30 mounts a stabilized, medium caliber weapon system capable of supporting dismounted maneuver while still embarking Marines, and the ACV-R provides field maintenance, recovery, and repair capabilities to the assault amphibian (AA) companies and battalion in support of the Marine division.

The ACV serves as the near-term means to modernize Marine Corps AA battalions and provides the Marine Corps' Ground Combat Element with expeditionary, protected mobility, and will replace the legacy Assault Amphibian Vehicle (AAV). The ACV is capable of negotiating water obstacles, including use of the sea as maneuver space within the littoral operating area. The ACV provides protected mobility to embarked infantry, and possesses increased lethality to deliver accurate support-by-fire in support of dismounted infantry. The ACV's versatile land mobility allows it to operate effectively as part of the Ground Combat Element's (GCE) maneuver task force, as well as conduct mounted security operations in urban or restrictive terrain alongside other wheeled vehicles of the Marine Air Ground Task Force (MAGTF).

Executive Summary

Program Highlights Since Last Report

ACV Cold weather Operational Testing (OT) was successfully completed at Fort Greely, Alaska, the week of March 11, 2019. One vehicle and a squad of infantry Marines participated in the event which consisted of day and night missions. No issues were reported. Marine Corps Operational Test and Evaluation Activity will process the data and provide a report. Next climatic test events are scheduled in FY 2021 and will be conducted at Yuma, AZ, and the Tropics Regions Test Center in Panama.

BAE Systems experienced manufacturing delays on ACV LRIP Lot 1. BAE continues to mature their production processes and work on the improvement plan. This is especially evident in the build duration in the hull fabrication and assembly areas. BAE met their target of shipping three vehicles in October 2019, November 2019, and December 2019. Through Continuous Process Improvement (CPI) efforts, BAE has improved the fidelity of Process Work Instructions (PWIs), and in-line Quality Checks to increase efficiencies and reduce production schedules. The Program Management Office continues to manage risks and assess schedule impacts through daily production meetings with BAE, onsite representation by Program Office Subject Matter Experts (SMEs), the standing up of a monthly manufacturing meeting for senior leadership, and DCMA's expertise at the York facility to evaluate BAE's progress. BAE has currently delivered 13 vehicles (4 Full Up System Level (FUSL), 9 LRIP).

An ADM was signed on July 12, 2019 to allow an ACV LRIP Lot 3 of 56 vehicles. This increased the total LRIP quantity to 116 vehicles and removed the production gap between LRIP and FRP.

FUSL is ongoing at Aberdeen Test Center. The test series includes 26 events using 4 LRIP and 3 EMD ACVs to support the survivability evaluation of the ACV and its crew in projected combat scenarios. Fifteen of the 26 planned events have been completed on schedule. Overall, the vehicle is performing as expected. One KPP Threshold shot did not meet expectations. Analysis by combat developers continue concurrent with minor design modification that will increase likelihood of meeting requirement. A planned retest is scheduled in late February - March 2020.

The ACV Logistics Demonstration was completed on December 20, 2019. The Logistics Demonstration evaluated the supportability of the materiel design, determined adequacy of maintenance planning, evaluated Technical Publications content (Operator, Operator Maintenance, and Organizational Maintenance Tasks), evaluated suitability and availability of maintenance training devices, evaluated suitability and availability of Test Measurement and Diagnostic Equipment (TMDE), evaluated Maintenance Allocation Chart (MAC) content, and evaluated the adequacy of the Repair Parts and Special Tools Lists (RPSTL). The ACV Technical Manual verification was conducted on the Operator/Operator Maintenance Manual and the Field Level Maintenance Manual. One Hundred percent of the Operator/Operator Maintenance Manual (TM 13133A-10/1) was successfully verified. Thirty-five percent of the Field Level Maintenance Manual (TM 13133A-24) was successfully verified. The Field Level Maintenance Manual tasks that were verified consisted of Organizational Level Maintenance tasks and Diagnostics tasks. Verification of the remaining ACV Field Level Maintenance Manual tasks will continue through the end of FY 2020.

The on-site portion of the ACV Physical Configuration Audit (PCA) has been completed at BAE Systems York. The government team is in process of consolidating findings. No major issues were identified. After the conclusion of the PCA, the government will take ownership of the vehicle configuration baseline.

The first phase (30 vehicles) of LRIP Lot 3a was awarded on October 29, 2019 with Continuing Resolution funds. The remaining 26 vehicles for LRIP Lot 3b are planned for award February 2020.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
June 2014	Materiel Development Decision milestone achieved with the ADM authorizing entry into the acquisition process at Milestone B.
March 2015	Development Request For Proposal (RFP) Release Decision Point achieved with the ADM authorizing the release of the RFP for the EMD contract.
November 2015	Milestone B was achieved with the ADM authorizing entry into the EMD phase.
November 2015	Two competitive EMD contracts were awarded to BAE Systems Land & Armaments and Science Applications International Corporation. Each contract was comprised of Fixed Price Incentive Firm Target, Firm Fixed Priced, and Cost Plus Fixed Fee CLINs.
December 2015	General Dynamics filed a protest with the Government Accountability Office (GAO) resulting in Stop Work Orders being issued to both BAE Systems Land & Armaments and Science Application International Corporation which delayed the approval of the Milestone B APB.
March 2016	The GAO dismissed the protest and the Stop Work Orders were lifted allowing production to continue on the vehicle builds.
March 2017	Developmental Testing began.
October 2017	EMD vehicle deliveries from both competitors complete.
November 2017	Production Readiness Review was held.
December 2017	Marine Requirements Oversight Council approved the CPD for ACV 1.1
June 2018	Milestone C approval was granted.
July 2018	Summit focus group was held at Camp Pendleton, CA. Output was a prioritized list of changes the government would like to be incorporated in the design.
August 2018	Technical Interchange Meeting was held where BAE Systems presented design and implementation plans to correct issues identified during Operational Assessment. The approved ECPs will improve the crew's overall situational awareness.
October 2018	ACV High Surf Test concluded and requirement was met.
December 2018	LRIP Lot 2 was awarded.
January 2019	ADM combining ACV 1.1 and ACV 1.2 into ACV Family of Vehicles (with additional variants).
July 2019	ADM approved LRIP Lot 3 to address production gap before full rate production.

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☑
	Procurement	☑
	MILCON	☑
	Acq O&M	☑
O&S Cost		☐
Unit Cost	PAUC	☐
	APUC	☐

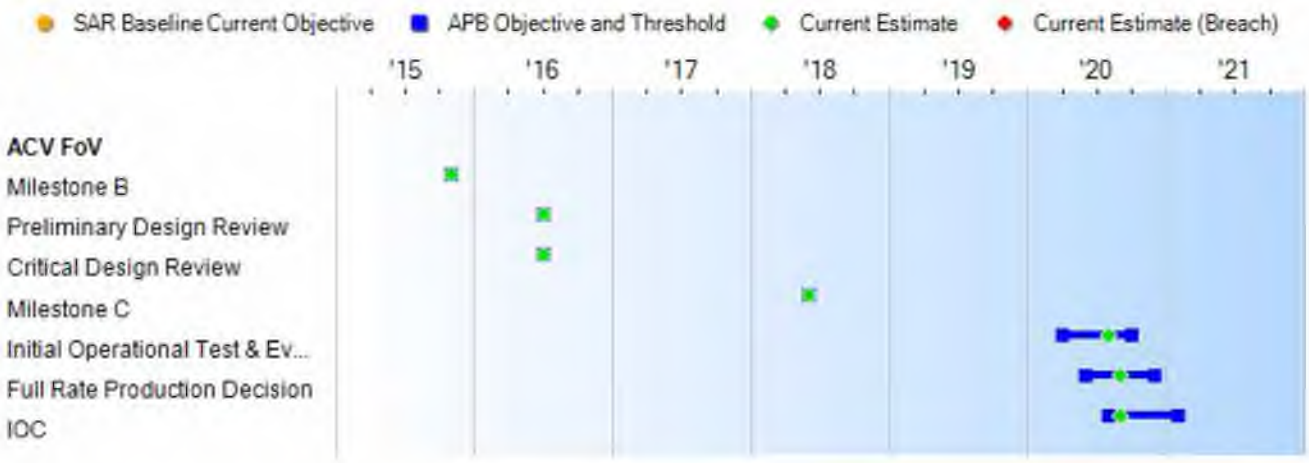
Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Explanation of Breach

RDT&E, Procurement, MILCON, and Acq O&M: In an ADM dated January 9, 2019, ASN(RD&A) authorized Program Executive Officer, Land Systems (PEOLS) to combine the ACV 1.1 and 1.2 programs into a single ACV Family of Vehicles (FOV) that continues the phased development and procurement approach and directed that acquisition documentation reflecting this change shall be updated as part of the FRP Milestone Decision approval process. In an ADM dated July 12, 2019, ASN(RD&A) authorized a third lot of LRIP consisting of 56 vehicles.

The merger effectively added considerable quantities of vehicles and budgetary resources to the program in terms of RDT&E, Procurement, MILCON, and O&M, making the program breach the APB established solely for ACV 1.1. Both the merger and the additional lot of LRIP are departures from the approved APB. All acquisition documentation (including the APB) will be updated at FRP.

Schedule



Schedule Events					
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	
Milestone B	Nov 2015	Nov 2015	Nov 2015	Nov 2015	
Preliminary Design Review	Jul 2016	Jul 2016	Jul 2016	Jul 2016	
Critical Design Review	Jul 2016	Jul 2016	Jul 2016	Jul 2016	
Milestone C	Jun 2018	Jun 2018	Jun 2018	Jun 2018	
Initial Operational Test & Evaluation	Apr 2020	Apr 2020	Oct 2020	Aug 2020	(Ch-1)
Full Rate Production Decision	Jun 2020	Jun 2020	Dec 2020	Sep 2020	(Ch-1)
IOC	Aug 2020	Aug 2020	Feb 2021	Sep 2020	(Ch-1)

Change Explanations

(Ch-1) Due to late vehicle deliveries, IOT&E, FRP, and IOC changed from May 2020, June 2020, and August 2020 to August 2020, September 2020, and September 2020 respectively. All were re-planned within the APB.

Acronyms and Abbreviations

IOT&E - Initial Operational Test & Evaluation

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Net Ready (NR)				
The ACV shall enable a Net-Centric military capability through the integration of C4I devices which are secure, interoperable and operationally effective. The ACV shall support the execution of joint information/system exchanges using C4I devices listed in the PIIT.	The ACV shall enable a Net-Centric military capability through the integration of C4I devices which are secure, interoperable and operationally effective. The ACV shall support the execution of joint information/system exchanges using C4I devices listed in the PIIT.	(T=O) The ACV shall enable a Net-Centric military capability through the integration of C4I devices which are secure, interoperable and operationally effective. The ACV shall support the execution of joint information/system exchanges using C4I devices listed in the PIIT.	Demonstrated PIIT with limitations for simultaneous transmissions.	The ACV shall enable a Net-Centric military capability through the integration of Command, Control, Communications, Computers, and Intelligence (C4I) devices which are secure, interoperable and operationally effective. The ACV shall support the execution of joint information/system exchanges using C4I devices listed in the PIIT.
Sustainment Materiel Availability				
The ACV shall have a Materiel Availability of 90% defined as "operational end items/total population".	The ACV shall have a Materiel Availability of 90% defined as "operational end items/total population".	The ACV shall have a Materiel Availability of 75% defined as "operational end items/total population".	86%	86%
Sustainment Operational Availability				
ACV shall have an Operational Availability of 90%.	ACV shall have an Operational Availability of 90%.	ACV shall have an Operational Availability of 81%.	71%; PM's Estimate is currently low risk to meet the Threshold value (below RGT curve, final verification at IOT&E).	ACV shall have an Operational Availability of 81%.
Energy				
An ACV shall achieve at least 1.6 mpg across the land portion of the mission	An ACV shall achieve at least 1.6 mpg across the land portion of the mission	An ACV shall achieve at least 1.28 mpg across the land portion of the	Demonstrated 1.6 mpg (mission profile); 1.54 gph (idle)	1.6 mpg (mission profile); 1.54 gph (idle)

profile. ACV shall consume less than 0.80 gph while stationary and providing 5.6 kW to power battle-command systems, weapon systems, and other key onboard systems.	profile. ACV shall consume less than 0.80 gph while stationary and providing 5.6 kW to power battle-command systems, weapon systems, and other key onboard systems.	mission profile. ACV shall consume less than 1.9 gph while stationary and providing 5.6 kW to power battle-command systems, weapon systems, and other key onboard systems.		
Sea Connectors				
The ACV at GVW, without preparation, shall be transportable via Sea Connectors to the beach, through the surf zone. Two ACVs shall be transportable on the Landing Craft Air Cushioned (LCAC) 100 at GVW.	The ACV at GVW, without preparation, shall be transportable via Sea Connectors to the beach, through the surf zone. Two ACVs shall be transportable on the Landing Craft Air Cushioned (LCAC) 100 at GVW.	(T=O) The ACV at GVW, without preparation, shall be transportable via Sea Connectors to the beach, through the surf zone. Two ACVs shall be transportable on the LCAC 100 at GVW.	Accommodated 2 ACV 1.1 with LCAC operational limitation for weight.	Accommodate 2 ACV 1.1 with LCAC operational limitation for weight.
System Survivability: Egress Kill Zone/Protected Fuel				
Given ballistic penetration damage to the fuel system external to the engine compartment, the ACV shall be capable of maneuvering for 25 miles on level primary roads without manual manipulation of any fuel system components or repair.	Given ballistic penetration damage to the fuel system external to the engine compartment, the ACV shall be capable of maneuvering for 25 miles on level primary roads without manual manipulation of any fuel system components or repair.	Given ballistic penetration damage to the fuel system external to the engine compartment, the ACV shall be capable of maneuvering for 5 miles on level primary roads without manual manipulation of any fuel system components or repair.	Demonstrated 86.3 miles.	86.3 miles
Water Mobility				
ACV up to GVW shall be capable of ship-to-shore maneuver from distances of 12 NM in water conditions up through 3 ft. SWH to land an infantry company ashore.	ACV up to GVW shall be capable of ship-to-shore maneuver from distances of 12 NM in water conditions up through 3 ft. SWH to land an infantry company ashore.	ACV up to GVW shall be capable of shore-to-shore maneuver from distances of 3 NM in water conditions up through 2 ft. SWH to land an infantry company ashore.	Demonstrated 12 NM ship-to-shore in required conditions.	12 NM ship-to-shore maneuver in water conditions up through 3 ft. SWH to land an infantry company ashore.
Payload				
ACV shall carry a crew (3) and infantry (13) with full combat	ACV shall carry a crew (3) and infantry (13) with full combat	ACV shall carry a crew (3) and infantry (10) with full combat	Accommodated crew of 3 and 13 Infantry with	Accommodate crew of 3 and 13 Infantry with required loads

loads (which includes 1st Day of Supply (DoS)), additional 2nd and 3rd DoS and CEE.	loads (which includes 1st Day of Supply (DoS)), additional 2nd and 3rd DoS and CEE.	loads (which includes 1st DoS), additional 2nd DoS and CEE.	required loads.	
Training				
The ACV and ACV training systems shall be designed such that the time to train a single ACV operator or ACV maintainer is 20% less than the AAV equivalent course.	The ACV and ACV training systems shall be designed such that the time to train a single ACV operator or ACV maintainer is 20% less than the AAV equivalent course.	The ACV and ACV training systems shall be designed such that the time to train a single ACV operator or ACV maintainer is no longer than the AAV equivalent course.	Final courses will be developed after down-select; initial courses meet threshold.	The ACV and ACV training systems shall be designed such that the time to train a single ACV operator or ACV maintainer is no longer than the AAV equivalent course.
Cyber Survivability				
The ACV will prevent, mitigate, and recover from cyber-attacks. The ACV shall prevent unauthorized external physical access to ports which connect to automotive Controller Area Network (CAN) bus (ses) and J1939 network(s). The ACV shall allow only authorized users to update firmware and software on the system. The ACV shall not possess wireless capability beyond the C4I-related Government Furnished Equipment (GFE) systems. The ACV should counter attempted malicious data injection, other corruption, and denial of service activities.	The ACV will prevent, mitigate, and recover from cyber-attacks. The ACV shall prevent unauthorized external physical access to ports which connect to automotive Controller Area Network (CAN) bus (ses) and J1939 network(s). The ACV shall allow only authorized users to update firmware and software on the system. The ACV shall not possess wireless capability beyond the C4I-related Government Furnished Equipment (GFE) systems. The ACV should counter attempted malicious data injection, other corruption, and denial of service activities.	The ACV will prevent, mitigate, and recover from cyber-attacks. The ACV shall prevent unauthorized external physical access to ports which connect to automotive CAN bus (ses) and J1939 network(s). The ACV shall allow only authorized users to update firmware and software on the system. The ACV shall not possess wireless capability beyond the C4I-related GFE systems.	All cyber security requirements were successfully tested and evaluated in a Cooperative Vulnerability Identification (CVI)/Adversarial Cybersecurity Developmental Test (ACDT) and Cooperative Vulnerability Penetration Assessment conducted as part of the ACV cyber security test program. Details are provided in classified reports.	The ACV will prevent, mitigate, and recover from cyber-attacks. The ACV shall prevent unauthorized external physical access to ports which connect to automotive CAN bus (ses) and J1939 network(s). The ACV shall allow only authorized users to update firmware and software on the system. The ACV shall not possess wireless capability beyond the C4I-related GFE systems.

Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

CPD Version 5.0 (JROC Approved) dated June 15, 2018

Change Explanations

None

Acronyms and Abbreviations

AAV - Assault Amphibious Vehicle
ACV - Amphibious Combat Vehicle
C4I - Command, Control, Communications, Computers, and Intelligence
CEE - Combat Essential Equipment
DoS - Day of Supply
gph - gallons per hour
GVW - Gross Vehicle Weight
kW - kilowatt
mpg - miles per gallon
O - Objective
PIIT - Platform Integration Information Table
SSC - Ship to Shore Connector
SWH - Significant Wave Height
T - Threshold

Track to Budget

General Notes

In an ADM dated January 8, 2019, ASN(RD&A) authorized the Program Executive Officer, Land Systems (PEOLS) to combine the ACV 1.1 and ACV 1.2 programs into a single ACV Family of Vehicles (FOV) that continues the phased development and procurement approach. Accordingly, program resources for the merged program will be depicted in Project Unit 0025 starting in FY 2021 and beyond and program resources budgeted for ACV 1.2 in fiscal years FY 2019 through FY 2020 will continue to be shown in Project Unit 0026.

RDT&E

Appn	BA	PE
Navy	04	0603611M

Project	Name	
0025	New Amphibious Vehicles	(Sunk)
Notes:	FY2017 and prior years only	

Appn	BA	PE
Navy	05	0605611M

Project	Name
0025	MC AVS Development & Demonstration
Notes:	Amphibious Combat Vehicle Family of Vehicles
0026	MC AVS Development & Demonstration
Notes:	Amphibious Combat Vehicle 1.2

Notes

In FY 2017, ACV 1.1 RDT&E was split into two BAs and two PEs, as follows:

BA 04, PE 0603611M for FY 2017 and prior years;

BA 05, PE 0605611M for FY 2018 and subsequent years.

The yearly totals shown above are the summation of both of these BAs/PEs.

Originally, ACV 1.2 RDT&E funding was separated into a separate Project Unit and BA and was not included in the APB for ACV 1.1. However, based on the 8 Jan 2019 ADM which authorized the merger of the ACV 1.1 and 1.2 programs, program resources for both 1.1 and 1.2 programs have been included in the RDT&E summary.

Procurement

Appn	BA	PE
Navy	02	0206211M

Line Item	Name
2025	Amphibious Combat Vehicle Family of Vehicles

7000 Spares and Repair Parts

Notes

Originally, ACV 1.1 and ACV 1.2 were separated into two programs in the budget and only ACV 1.1 program resources were included in the APB. However, since the January 8, 2019 ADM authorized combining ACV 1.1 and ACV 1.2 into a single ACV Family of Vehicles program, the Procurement resources depicted herein include both ACV 1.1 and 1.2 funding.

Additionally, ACV 1.1 PMC was split into two separate BLIs (2025 and 7000) in order to properly identify initial spares for the program. Both BLIs are included in the PMC amounts above.

MILCON

Appn	BA	PE
Navy	1205 01	0202176M

Project	Name	
11901	AAV-ACV Maintenance & Warehouse Facility	(Shared) (Sunk)
Notes:	Split b/w AAV and ACV	

Appn	BA	PE
Navy	1205 01	0216496M

Project	Name	
11483	ACV Maintenance Facility Upgrades	(Shared)
Notes:	Split b/w AAV and ACV	
11903	ACV Covered Storage/Parking	
Notes:	Project deleted	
18373	ACV Maintenance Facility	
91234	ACV Intermediate Maintenance Facility	
91236	ACV Maintenance Facility Upgrades	
Notes:	Project deleted	

Notes

ACV 1.1 will operate out of existing Assault Amphibious Vehicle (AAV) operational sites. Currently, several efforts are underway to repair and improve AAV operational facilities--some of which are identified for AAV and some of which are identified for ACV. The projects are frequently combined in funding as single project efforts.

Amounts shown reflect PB-21 funding provided by MCICOM for ACV.

Acq O&M

Appn	BA	PE
Navy	1106 01	0708012M

Subactivity Group	Name

1A2A Field Logistics

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2014 $M			BY 2014 $M	TY $M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	769.3	769.3	846.2	1022.1[1]	804.4	804.4	1108.1
Procurement	1035.9	1035.9	1139.5	3152.1[1]	1171.9	1171.9	3776.7
Flyaway	--	--	--	2679.9	--	--	3215.2
Recurring	--	--	--	2622.3	--	--	3147.4
Non Recurring	--	--	--	57.6	--	--	67.8
Support	--	--	--	472.2	--	--	561.5
Other Support	--	--	--	372.4	--	--	442.6
Initial Spares	--	--	--	99.8	--	--	118.9
MILCON	21.4	21.4	23.5	68.8[1]	24.9	24.9	84.9
Acq O&M	9.1	9.1	10.0	13.1[1]	9.6	9.6	14.7
Total	1835.7	1835.7	N/A	4256.1	2010.8	2010.8	4984.4

[1] *APB Breach*

Current APB Cost Estimate Reference

NCCA Component Cost Position (CCP) for Milestone C dated June 12, 2018

Cost Notes

CAPE Cost Risks: No cost estimate for the program has been completed in the previous year.

The program risks identified in the Component Cost Position Milestone C estimate are provided in the Significant Schedule and Technical Risks section of the Enhanced SAR.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	36	36	46
Procurement	204	204	636
Total	240	240	682

Quantity Notes

RDT&E quantities for the Personnel variant, ACV-P, consist of 16 EMD prototypes from each vendor for a total of 32 vehicles plus 4 Full-Up System Level (FUSL) vehicles from the down-selected vendor for a total of 36 RDT&E-funded vehicles. RDT&E quantities through FY 2025 include the addition of 3 Command variants (ACV-C) in FY 2019, 3 Lethality variants (ACV-30) in FY 2022, and 4 Maintenance/Recovery variants (ACV-R) in FY 2025.

Procurement quantities from FY 2018 through FY 2025 consist of 636 vehicles, broken out as follows:

ACV-P: 598 vehicles

ACV-C: 38 vehicles

Cost and Funding

Funding Summary

Appropriation Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)									
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
RDT&E	792.6	50.1	41.8	81.1	49.2	57.7	35.6	0.0	1108.1
Procurement	334.9	314.9	492.5	536.9	676.8	692.5	728.2	0.0	3776.7
MILCON	11.1	5.0	0.0	0.0	68.8	0.0	0.0	0.0	84.9
Acq O&M	6.0	1.4	1.4	1.4	1.5	1.5	1.5	0.0	14.7
PB 2021 Total	1144.6	371.4	535.7	619.4	796.3	751.7	765.3	0.0	4984.4
PB 2020 Total	1125.8	368.3	508.4	0.0	0.0	0.0	0.0	0.0	2002.5
Delta	18.8	3.1	27.3	619.4	796.3	751.7	765.3	0.0	2981.9

Funding Notes

Based on the PB-21 budget submission.

In an ADM dated January 8, 2019, ASN(RD&A) authorized Program Executive Officer, Land Systems (PEOLS) to combine the ACV 1.1 and 1.2 programs into a single ACV Family of Vehicles (FOV) that continues the phased development and procurement approach and directed that acquisition documentation reflecting this change shall be updated as part of the FRP Milestone Decision approval process. In an ADM dated July 12, 2019, ASN(RD&A) authorized a third lot of LRIP consisting of 56 vehicles.

The merger effectively added considerable quantities of vehicles and budgetary resources to the program in terms of RDT&E, Procurement, MILCON, and O&M, making the program breach the APB established solely for ACV 1.1. Both the merger and the additional lot of LRIP are departures from the approved APB.

Quantity Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	46	0	0	0	0	0	0	0	0	46
Production	0	56	56	72	92	120	120	120	0	636
PB 2021 Total	46	56	56	72	92	120	120	120	0	682
PB 2020 Total	36	56	56	92	0	0	0	0	0	240
Delta	10	0	0	-20	92	120	120	120	0	442

Cost and Funding

Annual Funding By Appropriation

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	--	--	--	--	42.0
2013	--	--	--	--	--	--	79.9
2014	--	--	--	--	--	--	31.6
2015	--	--	--	--	--	--	98.7
2016	--	--	--	--	--	--	195.0
2017	--	--	--	--	--	--	130.7
2018	--	--	--	--	--	--	150.4
2019	--	--	--	--	--	--	64.3
2020	--	--	--	--	--	--	50.1
2021	--	--	--	--	--	--	41.8
2022	--	--	--	--	--	--	81.1
2023	--	--	--	--	--	--	49.2
2024	--	--	--	--	--	--	57.7
2025	--	--	--	--	--	--	35.6
Subtotal	46	--	--	--	--	--	1108.1

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2014 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	--	--	--	--	42.5
2013	--	--	--	--	--	--	80.0
2014	--	--	--	--	--	--	31.2
2015	--	--	--	--	--	--	96.3
2016	--	--	--	--	--	--	186.9
2017	--	--	--	--	--	--	123.0
2018	--	--	--	--	--	--	138.2
2019	--	--	--	--	--	--	58.0
2020	--	--	--	--	--	--	44.3
2021	--	--	--	--	--	--	36.2
2022	--	--	--	--	--	--	68.9
2023	--	--	--	--	--	--	41.0
2024	--	--	--	--	--	--	47.1
2025	--	--	--	--	--	--	28.5
Subtotal	46	--	--	--	--	--	1022.1

In FY 2017, ACV 1.1 RDT&E was split into two BAs and two PEs, as follows:

BA 04, PE 0603611M for FY 2017 and prior years;

BA 05, PE 0605611M for FY 2018 and subsequent years.

The yearly totals shown above are the summation of both of these BAs/PEs.

Additionally, ACV 1.2 RDT&E funding was separated into a separate Project Unit and BA.

Annual Funding 1109 | Procurement | Procurement, Marine Corps							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2018	26	102.0	35.5	5.1	142.6	19.7	162.3
2019	30	115.9	22.3	5.5	143.7	28.9	172.6
2020	56	210.1	38.8	2.6	251.5	63.4	314.9
2021	72	290.9	56.1	21.9	368.9	123.6	492.5
2022	92	380.0	66.8	9.1	455.9	81.0	536.9
2023	120	506.2	83.0	8.3	597.5	79.3	676.8
2024	120	522.1	85.5	7.6	615.2	77.3	692.5
2025	120	545.0	87.2	7.7	639.9	88.3	728.2
Subtotal	636	2672.2	475.2	67.8	3215.2	561.5	3776.7

Annual Funding 1109 | Procurement | Procurement, Marine Corps							
Fiscal Year	Quantity	BY 2014 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2018	26	93.0	32.3	4.7	130.0	18.0	148.0
2019	30	103.6	19.9	4.9	128.4	25.9	154.3
2020	56	184.2	34.0	2.3	220.5	55.5	276.0
2021	72	250.0	48.2	18.8	317.0	106.3	423.3
2022	92	320.2	56.2	7.7	384.1	68.3	452.4
2023	120	418.1	68.6	6.9	493.6	65.5	559.1
2024	120	422.8	69.2	6.2	498.2	62.6	560.8
2025	120	432.7	69.3	6.1	508.1	70.1	578.2
Subtotal	636	2224.6	397.7	57.6	2679.9	472.2	3152.1

Prior to this submission, ACV 1.1 and ACV 1.2 were separate programs in the budget, and the APB for ACV 1.1 included only ACV 1.1. Additionally, ACV 1.1 PMC was split into two separate BLIs (2025 and 7000) in order to properly identify initial spares for the program. Both were included in the PMC amounts above.

Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	TY $M Total Program
2019	11.1
2020	5.0
2021	--
2022	--
2023	68.8
Subtotal	84.9

Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	BY 2014 $M
	Total Program
2019	9.6
2020	4.2
2021	--
2022	--
2023	55.0
Subtotal	68.8

ACV 1.1 will operate out of existing Assault Amphibious Vehicle (AAV) operational sites. Currently, several efforts are underway to repair and improve AAV operational facilities--some of which are identified for AAV and some of which are identified for ACV. The projects are frequently combined in funding as single project efforts.

MILCON is funded by Marine Corps Installations Command (MCICOM) and is not controlled by the Program Office.

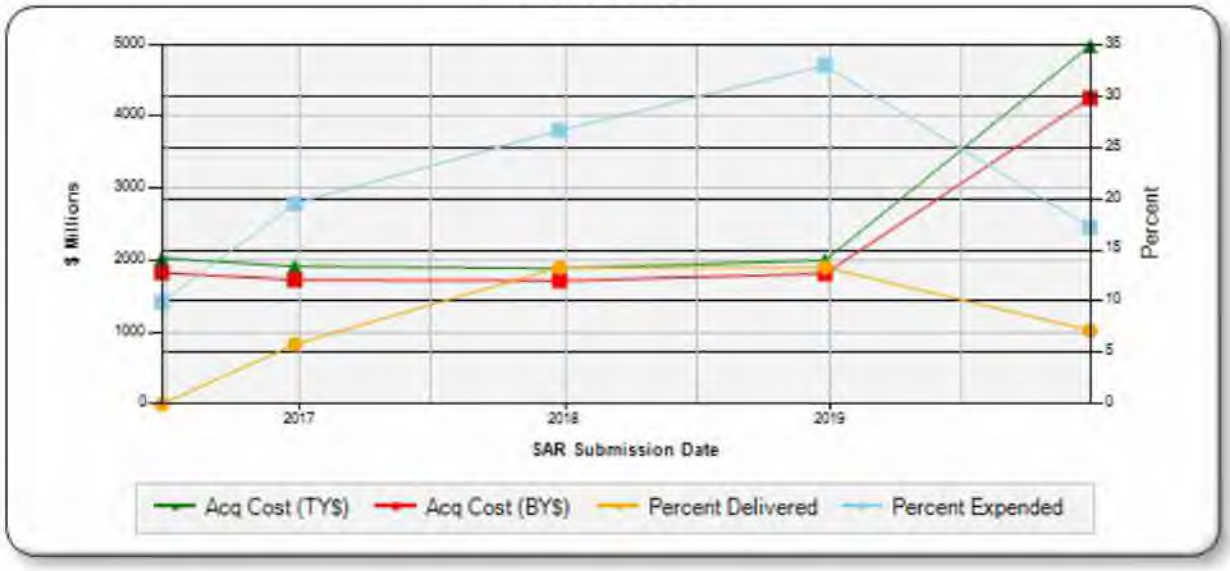
Annual Funding 1106 | Acq O&M | Operation and Maintenance, Marine Corps	
Fiscal Year	TY $M
	Total Program
2013	0.5
2014	0.4
2015	1.3
2016	1.0
2017	0.8
2018	1.4
2019	0.6
2020	1.4
2021	1.4
2022	1.4
2023	1.5
2024	1.5
2025	1.5
Subtotal	14.7

Annual Funding 1106 | Acq O&M | Operation and Maintenance, Marine Corps	
Fiscal Year	BY 2014 $M
	Total Program
2013	0.5
2014	0.4
2015	1.3
2016	1.0
2017	0.8
2018	1.3
2019	0.5
2020	1.2
2021	1.2
2022	1.2
2023	1.3
2024	1.2
2025	1.2
Subtotal	13.1

Charts

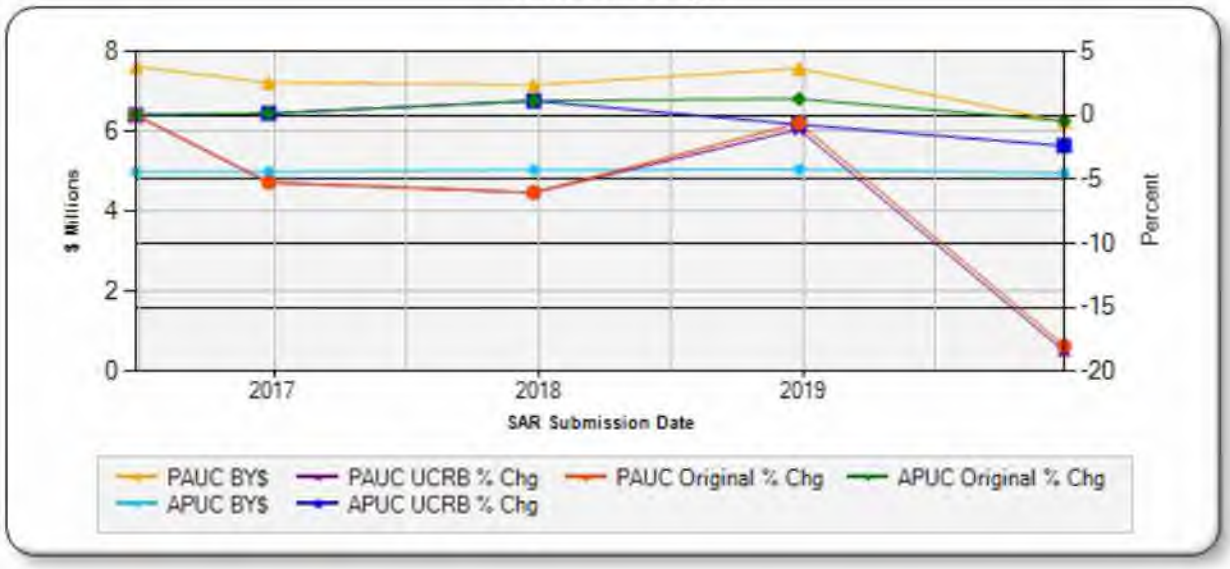
ACV FoV first began SAR reporting in June 2016

Program Acquisition Cost - ACV FoV
Base Year 2014 $M



Quantity - ACV FoV

Unit Cost - ACV FoV
Base Year 2014 $M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
	Current Estimate (December 2019)
1.	Schedule: If the selected contractor cannot increase their production capacity for Full Rate Production (FRP) due to facilities and personnel deficiencies, then vehicle delivery delays will impact the fielding plan. Mitigation: 1) Review vendor proposed delivery schedule. (Complete) 2) Program Office onsite monitoring at York. (In Process) 3) Assembly line has been designed to expand from 4 (EMD) to 8 (LRIP) stations. (In Process) 4) BAE Systems implements proposed capital investments to achieve FRP capability. 5) BAE Systems completes additional staffing process to support increased level of production.
2.	Performance: If sufficient driver's/vehicle commander's closed-hatch day and night vision and situational awareness in open seas cannot be provided, then waterborne operations in open seas and in multi-vehicle formations will be challenged in support of IOT&E conducted against the ACV FoV mission profile. Mitigation: 1) Approval and implementation of ACV-ECP-0011 to improve aided vision. (Complete) 2) Government testing of ECP's improvements prior to IOT&E. (In Process)

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (September 2018)	
1.	The current baseline remains unchanged. It is the component cost position developed in support of the 2018 MS C decision. A revision to the program office estimate for the family of vehicles (aka ACV FoV Program Office Estimate (POE)) will be completed to support the FY 2020 full rate production (FRP) decision. The ACV FoV POE and an ICE to be prepared by CAPE will be offered for consideration as the FRP component cost position. PM ACV expects these life cycle cost estimates will not vary significantly from the current baseline. The current baseline approximates the 50th percentile cost estimate, i.e. it is equally likely that the estimate will prove too high or too low. The ACV FoV POE is being prepared with an industry standard cost estimating tool (ACEIT) that incorporates cost risk and uncertainty. The cost uncertainty distribution graph (aka S-curve) and it's coefficient of variation will indicate the overall sensitivity of the ACV FoV POE. Individual cost drivers will be identified and their sensitivities will be analyzed as well. While rigorous cost driver, cost risk, and cost sensitivity analyses are incomplete, the following ACV cost topics will be closely monitored: • BAE Assembly Line Production Rate • Annual Procurement Quantity Profile and Variant Mix • Engineering Change Proposal Definitization • 30mm Gun Variant (ACV-30mm) Development and Modifications Cost • Infrastructure, Logistics, and Maintenance Implementation Costs
Original Baseline Estimate (May 2016)	
1.	The Current Baseline Estimate (May 2016) is ACV's Original Baseline Estimate (November 2015).
Revised Original Estimate (N/A)	
1.	Not applicable.
Current Procurement Cost (December 2019)	
1.	The Current Procurement Cost risk is the same as the Current Baseline Estimate risk.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	11/19/2015	6/19/2018
Approved Quantity	56	116
Reference	Milestone B ADM	ADM dated July 12, 2019
Start Year	2018	2018
End Year	2020	2020

The Current Total LRIP Quantity is more than 10% of the total production quantity to remove the gap in production leading into full rate production. The gap would negatively impact BAE's skilled labor force and the planned ramp up for full rate production. It was noted that this additional quantity exceeded 10% of the ACV Family of Vehicles Program AAO (1122 vehicles).

Foreign Military Sales

None

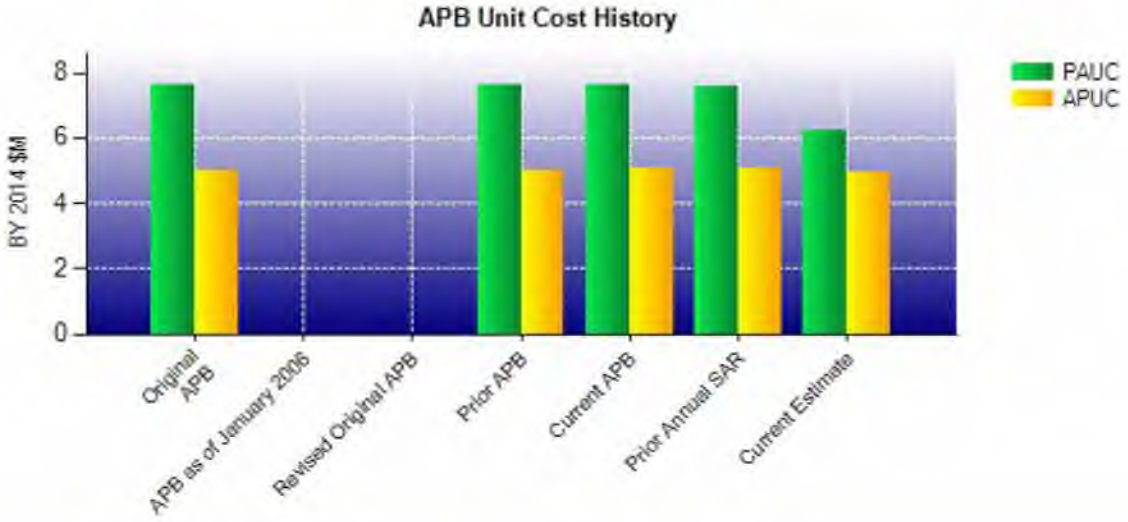
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2014 $M Current UCR Baseline (Sep 2018 APB)	BY 2014 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1835.7	4256.1	
Quantity	240	682	
Unit Cost	7.649	6.241	-18.41
Average Procurement Unit Cost			
Cost	1035.9	3152.1	
Quantity	204	636	
Unit Cost	5.078	4.956	-2.40

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2014 $M Original UCR Baseline (May 2016 APB)	BY 2014 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1826.9	4256.1	
Quantity	240	682	
Unit Cost	7.612	6.241	-18.01
Average Procurement Unit Cost			
Cost	1015.5	3152.1	
Quantity	204	636	
Unit Cost	4.978	4.956	-0.44



APB Unit Cost History					
Item	Date	BY 2014 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	May 2016	7.612	4.978	8.466	5.727
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	May 2016	7.612	4.978	8.466	5.727
Current APB	Sep 2018	7.649	5.078	8.378	5.745
Prior Annual SAR	Dec 2018	7.565	5.041	8.344	5.759
Current Estimate	Dec 2019	6.241	4.956	7.309	5.938

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
8.466	-0.097	0.000	-0.010	-0.098	0.228	0.000	-0.111	-0.088	8.378

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
8.378	0.019	-2.753	0.002	1.193	-0.142	0.000	0.612	-1.069	7.309

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
5.727	-0.084	0.000	-0.012	0.000	0.244	0.000	-0.130	0.018	5.745

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
5.745	0.016	-1.126	0.003	0.755	-0.111	0.000	0.656	0.193	5.938

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	Nov 2015	Nov 2015	Nov 2015
Milestone C	N/A	Jun 2018	Jun 2018	Jun 2018
IOC	N/A	Aug 2020	Aug 2020	Sep 2020
Total Cost (TY $M)	N/A	2031.8	2010.8	4984.4
Total Quantity	N/A	240	240	682
PAUC	N/A	8.466	8.378	7.309

Cost Variance

Summary TY $M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Production Estimate)	804.4	1171.9	24.9	9.6	2010.8
Previous Changes					
Economic	+2.3	+11.5	+0.2	+0.1	+14.1
Quantity	--	--	--	--	--
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	-11.3	-10.9	-2.4	-0.1	-24.7
Other	--	--	--	--	--
Support	--	+2.3	--	--	+2.3
Subtotal	-9.0	+2.9	-2.2	--	-8.3
Current Changes					
Economic	+0.4	-1.6	+0.1	--	-1.1
Quantity	+58.3	+1766.9	--	--	+1825.2
Schedule	--	+1.6	--	--	+1.6
Engineering	+333.6	+479.9	--	--	+813.5
Estimating	-79.6	-59.9	+62.1	+5.1	-72.3
Other	--	--	--	--	--
Support	--	+415.0	--	--	+415.0
Subtotal	+312.7	+2601.9	+62.2	+5.1	+2981.9
Total Changes	+303.7	+2604.8	+60.0	+5.1	+2973.6
Current Estimate	1108.1	3776.7	84.9	14.7	4984.4

Summary BY 2014 $M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Production Estimate)	769.3	1035.9	21.4	9.1	1835.7
Previous Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	-10.6	-9.4	-1.9	-0.1	-22.0
Other	--	--	--	--	--
Support	--	+1.9	--	--	+1.9
Subtotal	-10.6	-7.5	-1.9	-0.1	-20.1
Current Changes					
Economic	--	--	--	--	--
Quantity	+49.2	+1440.5	--	--	+1489.7
Schedule	--	--	--	--	--
Engineering	+285.2	+389.4	--	--	+674.6
Estimating	-71.0	-49.8	+49.3	+4.1	-67.4
Other	--	--	--	--	--
Support	--	+343.6	--	--	+343.6
Subtotal	+263.4	+2123.7	+49.3	+4.1	+2440.5
Total Changes	+252.8	+2116.2	+47.4	+4.0	+2420.4
Current Estimate	1022.1	3152.1	68.8	13.1	4256.1

Previous Estimate: December 2018

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+0.4
Addition of three (3) ACV-C Command & Control variant Production Representative Test Vehicles upon merger of ACV 1.1 and 1.2 programs. (Quantity)	+14.9	+16.5
Addition of three (3) ACV-30 Improved Lethality variant Production Representative Test Vehicles upon merger of ACV 1.1 and 1.2 programs. (Quantity)	+15.4	+18.1
Addition of four (4) ACV-R Maintenance/Recovery variant Production Representative Test Vehicles upon merger of ACV 1.1 and 1.2 programs. (Quantity)	+18.9	+23.7
Merger of ACV 1.1 and 1.2 programs (Engineering)	+285.2	+333.6
Realignment for Small Business Innovative Research and economic withholds. (Estimating)	-0.8	-0.9
Congressional reduction for Project 0026 excess concurency (-$26M), ACV 1.2 training devices early to need (-$2.3M), unjustified management services (-$1.7M), and unjustified program support (-$1.7M). (Estimating)	-29.0	-32.1
Congressional reduction for ACV-30 variants early to need (-$18.5M), design concurrency for additional variants (-$7.0M), and technical support acceleration (-$1.7M). (Estimating)	-24.1	-27.2
Service reduction for availability of prior year execution balances. (Estimating)	-15.5	-17.8
Adjustment to actual costs in prior years (Estimating)	-1.2	-1.2
Adjustment for current and prior escalation. (Estimating)	-0.4	-0.4
RDT&E Subtotal	+263.4	+312.7

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-1.6
Total Quantity variance resulting from an increase of 432 vehicles from 204 to 636 due to merger of ACV 1.1 and 1.2 programs. (Subtotal)	+1405.9	+1724.4
Quantity variance resulting from an increase of 432 vehicles from 204 to 636 due to merger of ACV 1.1 and 1.2 programs. (Quantity)	(+1440.5)	(+1766.9)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(-34.6)	(-42.5)
Adjustment of procurement acquisition profile to reflect realistic production ramp. (Schedule)	0.0	+1.6
Realignment of program resources to reflect merger of ACV 1.1 and 1.2 programs. (Engineering)	+389.4	+479.9
Congressional reduction: forward financing. (Estimating)	-13.1	-15.0
Congressional reduction: unit cost growth. (Estimating)	-1.8	-2.0
Budget realignment to fund Battle Command Situational Awareness (Joint Battle Command - Platform) for Lots 1 & 2 for 56 vehicles. (Estimating)	-0.9	-1.0
Adjustment for current and prior escalation. (Estimating)	+0.6	+0.6
Adjustment for current and prior escalation. (Support)	+0.2	+0.3
Increase in Other Support due to merger of ACV 1.1 and 1.2 programs. (Support)	+278.2	+335.3
Increase in Initial Spares due to merger of ACV 1.1 and 1.2 programs. (Support)	+65.2	+79.4
Procurement Subtotal	+2123.7	+2601.9

(QR) Quantity Related

MILCON	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+0.1
Adjustments in MILCON funding from MCICOM; separation of AAV and ACV 1.1 portions of related project. (Estimating)	-5.6	-6.6
Adjustments in MILCON funding from MCICOM due to merger of ACV 1.1 and 1.2. (Estimating)	+55.0	+68.8
Adjustment for current and prior escalation. (Estimating)	-0.1	-0.1
MILCON Subtotal	+49.3	+62.2

Acq O&M	$M	
Current Change Explanations	Base Year	Then Year
Realignment to merge ACV 1.1 and 1.2 programs. (Estimating)	+4.1	+5.1
Acq O&M Subtotal	+4.1	+5.1

Contracts

General Notes

The ACV 1.1 was competitively down-selected to BAE Systems. The Contract Option for LRIP Lot 1 was awarded in June 2018. SAIC's EMD contract is being closed out.

The Program Office received a waiver of EVM on March 19, 2015 prior to Milestone B based on the limited duration of work to be performed in which EVM would apply. The cost of certifying an EVM System at multiple sites versus the benefit achieved due to the low level of residual risk after the application of alternative management controls was not beneficial nor did it produce actionable results. However, the Program Office receives monthly Integrated Program Management Reports (IPMR) including Schedule Risk Assessments, Cost Schedule Data Reports (CSDR), and Contract Funding Status Reports (CFSR) from the prime contractor in order to track and manage cost, schedule and performance.

Contract Identification

Appropriation: RDT&E

Contract Name: ACV 1.1

Contractor: Science Applications International Corporation

Contractor Location: 1710 SAIC Drive
McLean, VA 22102

Contract Number: M67854-16-C-0007

Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP), Cost Plus Fixed Fee (CPFF)

Award Date: November 24, 2015

Definitization Date: November 24, 2015

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
260.0	268.0	16	262.0	270.0	16	262.0	262.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a $4M decrease on P00029 for CLIN 0003 Delivery Incentive because the requirement for the Delivery Incentive was not met by SAIC. In addition to the $4M decrease, the Current Contract Price Target increased $5.5M on P00049 for CLIN 1002 EMD Test Support due to a cost overrun.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FPIF/FFP/CPFF) contract.

Notes

The Initial and Current Contract Price information includes all the CLINs for the entire EMD Phase. Some of the options will not be awarded, but they are included in the complete EMD information.

Contract Identification

Appropriation: Procurement

Contract Name: ACV Family of Vehicles

Contractor: BAE Systems Land and Armaments LP

Contractor Location: 34201 Van Dyke Avenue
Sterling Heights, MI 78312

Contract Number: M67854-16-C-0006

Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP), Cost Plus Fixed Fee (CPFF)

Award Date: November 24, 2015

Definitization Date: November 24, 2015

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
234.0	249.0	16	3272.0	3402.0	717	3272.0	3272.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to BAE Systems winning the down-select competition, the incorporation of Engineering Change Proposals, and the modification award of the MRV Undefinitized Contract Action (UCA) for design and development of the ACV-Command and Control (C) and ACV-30 Phase I Mission Role Variants (MRVs). The Option for LRIP Lot 1 was exercised in June 2018. The Option for LRIP Lot 2 was exercised in December 2018. The Option for LRIP Lot 3A was exercised in October 2019.

NOTE: The Current Quantity includes 490 Option priced MRVs. The 717 quantity includes 16 EMD, 4 FUSL, 204 ACV-Personnel (P), and 3 ACV-C Production Representative Test (PRT) vehicles in addition to those 490 vehicles mentioned.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FPIF/FFP/CPFF) contract.

Notes

The Initial Contract Price includes all the CLINs for the entire EMD Phase. The Current Contract Price includes all options and information for all phases (EMD, LRIP, and FRP) and the MRV UCA.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	36	36	46	78.26%
Production	13	13	636	2.04%
Total Program Quantity Delivered	49	49	682	7.18%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	4984.4	Years Appropriated	9
Expended to Date	858.8	Percent Years Appropriated	64.29%
Percent Expended	17.23%	Appropriated to Date	1516.0
Total Funding Years	14	Percent Appropriated	30.41%

The above data is current as of February 10, 2020.

Notes

Planned Development deliveries consist of 16 Personnel-variant (ACV-P) test vehicles ordered to date from each vendor, for a total of 32 vehicles, plus 4 Full-Up System Level (FUSL) test vehicles from the down-selected prime contractor. 26 Low Rate Initial Production (LRIP) Lot 1 Vehicles were ordered at the end of June 2018. To date, thirteen (13) have were scheduled to be delivered by the report date and have been included above; all thirteen (13) were delivered as planned.

Additionally, 30 LRIP Lot 2 vehicles were ordered in December 2018, and 30 LRIP Lot 3A vehicles were ordered in October 2019 from the competitively down-selected prime contractor but are not included in the "Planned to date" quantity above because they were not scheduled to be accepted by the "as of" date of this report. LRIP Lot 3 was authorized in an ADM dated July 12, 2019 for 56 vehicles, but the production lot was split into Lots 3A (30 vehicles) and 3B (26 vehicles) due to the Continuing Resolution.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	June 12, 2018
Source of Estimate:	SCP
Quantity to Sustain:	204
Unit of Measure:	Vehicle
Service Life per Unit:	20.00 Years
Fiscal Years in Service:	FY 2020 - FY 2042

Quantity to sustain is 204 vehicles because the 36 Development vehicles will not be fielded.

O&S cost estimate does not reflect the merger of ACV 1.1 and 1.2 program; will be updated as part of Full Rate Production (FRP) decision.

Sustainment Strategy

During EMD, contractors were required to perform all maintenance on their vehicles. Since the down-select and the LRIP options exercised, PM Advanced Amphibious Assault has begun executing all actions required to establish organic support for the FRP decision. Once established, the ACV will be maintained utilizing uniformed Marines and the maintenance program structure outlined in Marine Corps Order 4790.23 Ground Equipment Maintenance Program (GEMP). The GEMP defines that structure utilizing a Field (which includes Organic and Intermediate level maintenance) and Depot capability.

Field Maintenance Capability: Field maintenance is performed by specially trained and equipped operators, crews, mechanics, and technicians within established organizations and activities. These include requisite advanced Military Occupational Specialty training for intermediate maintenance operations in either a direct or general support capacity. In most cases, field maintenance will be performed by uniformed Marine personnel within organizational maneuvering and intermediate supporting units. Field maintenance is aligned to funding, reporting, and sustainment strategies for best lifecycle management practices. It is preventative and corrective in nature and is divided into two distinct categories: organizational and intermediate.

> Organizational: Units will identify and perform field level tasks on their organic and/or assigned items, equipment, and materiel authorized per their respective Table of Organization and Equipment. A unit's field capabilities are constrained by mission, tactical situation, time available, personnel, skill set, logistical lift, stock positioning of inventory/spares, and authorized tooling. Organizational maintenance includes recovery, assessment, fault diagnosis and isolation, inventorying, cleaning, inspecting, preserving, lubricating, adjustment, testing, collecting data, and replacement of parts.
>
> Intermediate: Maintenance actions beyond organizational capabilities will be conducted by the Marine Logistics Group (MLG) or Logistics Combat Element in accordance with established command relationships in a Direct Support or General Support capability/capacity as defined within support structures MLG or supporting establishment's logistics support network. Intermediate maintenance includes intermediate fault diagnosis and isolation, modification, replacement, fabrication, component/sub-component/assembly/sub-assembly repair or rebuild, calibration and repair of Test, Measurement and Diagnostic Equipment, software maintenance, precision machining, welding, evacuation, disposal, salvage, and demilitarization of equipment or materiel. Intermediate maintenance capabilities include battle damage assessment, recovery and repair operations, overflow and on-site maintenance services, and technical assistance through maintenance contact or support teams.

Depot Maintenance Capability: Depot maintenance can be conducted by the Marine Corps' organic depots, other service

depots, commercial industrial facilities, Original Equipment Manufacturers, or a combination thereof throughout the logistics chain framework. Depot capabilities include: major repairs; overhaul; and complete rebuild of equipment or materiel, components/sub-components/assemblies/sub-assemblies, software, and parts. Other capabilities include manufacturing, conversion, reclamation, or fabrication of parts. Maintenance performed within depot capabilities is supported through program/product support management efforts.

The specific details of the ACV Maintenance strategy are pending the completion of several logistics-related supportability analyses that follow the competitive down-select decision, such as the Integrated Logistics Assessment (ILA) (3Q FY 2020) and the Logistics Demonstration (1Q FY 2020). These details will continue to be updated with the Mission Role Variants.

Antecedent Information

The Antecedent System is the Assault Amphibious Vehicle (AAV). It is important to note that the AAV program included multi-role variants such as a Personnel, Command & Control, and Recovery variant, whereas the estimate for ACV 1.1 includes only a Personnel variant. Now that the ACV 1.1 and 1.2 programs have been merged, future estimates will reflect Personnel, Command & Control, Lethality, and Recovery variants for ACV thus allowing for a better basis of comparison.

Unitized cost for AAV is based on estimated cost for 180 AAV Reliability, Availability, and Maintainability/Return to Standard (RAM/RS) vehicles configured as Personnel-variants based on a 20 year service life. AAV costs were estimated because a complete set of actual cost does not exist for AAV.

Annual O&S Costs BY2014 $M		
Cost Element	**ACV FoV Average Annual Cost Per Vehicle**	**Assault Amphibious Vehicle (AAV) (P-Variant Only) (Antecedent) Average Annual Cost Per Vehicle**
Unit-Level Manpower	0.222	0.287
Unit Operations	0.041	0.023
Maintenance	0.162	0.232
Sustaining Support	0.211	0.240
Continuing System Improvements	0.037	0.054
Indirect Support	0.019	0.019
Other	--	--
Total	0.692	0.855

Item	Total O&S Cost $M			
	ACV FoV			Assault Amphibious Vehicle (AAV) (P-Variant Only) (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	2835.5	3100.0	2803.2	3079.8
Then Year	3938.9	N/A	3938.9	N/A

Disposal Cost is included in the Operating and Support Cost of the current APB objective and threshold for this program.

Equation to Translate Annual Cost to Total Cost

Average annual cost per vehicle = Total O&S cost / number of vehicles / service life per vehicle = $2,803.2M / 204 / 20 = $0.687M

O&S Cost Variance		
Category	**BY 2014 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2018 SAR	2835.5	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	-32.3	MSB APB OSD-CAPE ICE methodology vice MSC APB Navy SCP and POE methodology.
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	-32.3	
Current Estimate	2803.2	

The Milestone B (MSB) Acquisition Performance Baseline (APB) estimate was based on the OSD-CAPE Independent Cost Estimate (ICE) methodology. Milestone C (MSC) APB estimate was based on the Naval Center for Cost Analysis (NCCA) Service Cost Position (SCP) which utilized the Program Office Cost Estimate (POE) methodology. The POE methodology changed from the Milestone B estimate. A portion of the POE O&S estimate previously based on a bottoms -up engineering estimate was updated using Stryker actuals.

Disposal Estimate Details

Date of Estimate: June 12, 2018

Source of Estimate: SCP

Disposal/Demilitarization Total Cost (BY 2014 $M): 12.7

N/A