Selected Acquisition Report (SAR)

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

Amphibious Combat Vehicle Phase 1 Increment 1 (ACV 1.1)

As of FY 2020 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator information is available at this time.

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 Phase 1 Increment 1 (ACV 1.1)

DoD Component
Navy

Responsible Office

Col Kirk Mullins
2200 Lester Street
Quantico, VA 22135-6050

kirk.mullins@usmc.mil

Phone: 703-784-1383
Fax: 703-784-1062
DSN Phone:
DSN Fax:
Date Assigned: July 1, 2018

References

SAR Baseline (Development Estimate)

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated May 26, 2016

Approved APB

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

Mission and Description

The mission of the Amphibious Combat Vehicle Phase 1 Increment 1 (ACV 1.1) is to land and maneuver the surface assault elements of the landing force utilizing shore-to-shore water mobility during amphibious operations to seize inland objectives and to conduct armored vehicle operations in subsequent actions ashore. The ACV 1.1's expeditionary design will permit full integration into naval amphibious and Maritime Prepositioning Force shipping, and will support ship-to-shore connector requirements. The ACV 1.1 will provide protected mobility to embarked infantry and will possess sufficient lethality to deliver precision support-by-fire effects to dismounted infantry in the attack. The ACV 1.1's mobility will allow it to operate effectively with M1A1 Main Battle Tanks, as well as conduct mounted security operations in urban or restrictive terrain alongside other wheeled vehicles of the Marine Air-Ground Task Force. It will possess a communication and network capability that ensures mounted forces have Command and Control, as well as current situational and battle-space awareness. The ACV 1.1 will operate as part of maneuver task forces built around the Marine infantry battalion and will facilitate maneuver throughout a given operating area, to include the mobility to cross rivers and inland waterways.

Executive Summary

Program Highlights Since Last Report

Milestone C approval was granted June 18, 2018 and the down-selected contract for LRIP Lot 1 was awarded to BAE Systems on June 19, 2018. BAE hosted three days of Post Award Conferences June 26-28, 2018. Production is currently underway in York, PA.

The Amphibious Combat Vehicle (ACV) Team, New Equipment Training Team (NETT), and BAE Systems conducted summit focus group sessions at Camp Pendleton, CA, July 17-18, 2018. The sessions allowed the NETT operators to communicate recommended areas of improvement for the ACV to the Government and BAE Systems engineers. A hands-on walk through and vehicle swim were executed. The output of the meeting was a prioritized list of changes the Government would like to be incorporated. A follow-on Technical Interchange Meeting was held in August 2018 where BAE Systems presented design and implementation plans to correct issues identified during the Operational Assessment. Program Manager Advanced Amphibious Assault (PM AAA) has subsequently received Engineering Change Proposals (ECPs) for six necessary improvements to LRIP Lot 1 vehicles. The ECPs will improve the crew's overall situational awareness.

The ACV High Surf Test concluded on October 11, 2018 and the requirement was met.

LRIP Lot 2 was awarded on December 6, 2018.

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

History of Significant Developments Since Program Initiation

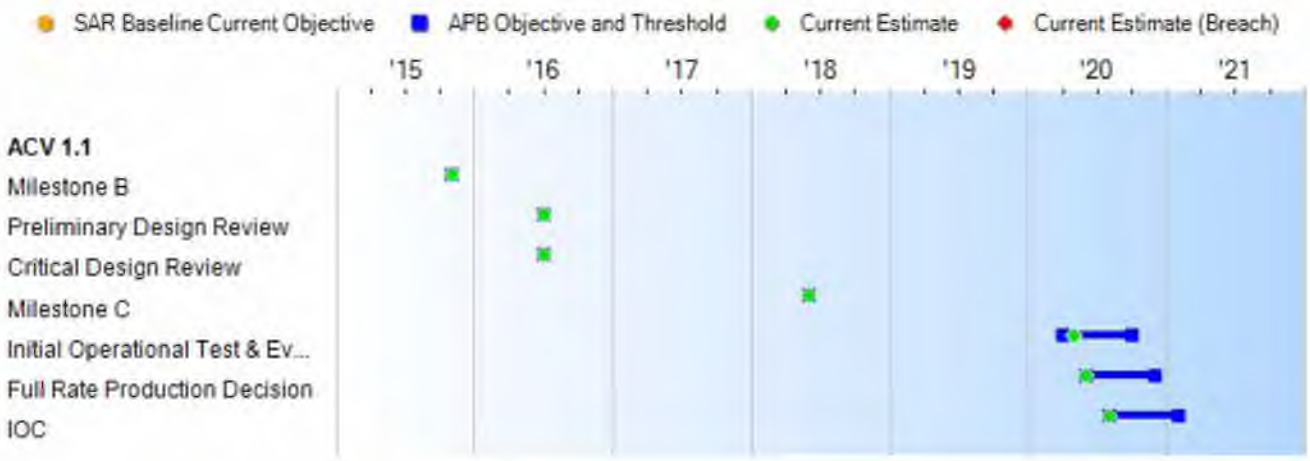
History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
June 2014	Materiel Development Decision milestone achieved with the ADM authorizing entry into the acquisition process at Milestone B.
March 2015	Development Request For Proposal (RFP) Release Decision 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 Capability Production Document for ACV 1.1

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

Schedule



Schedule Events					
Events	SAR Baseline Development 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	May 2020	(Ch-1)
Full Rate Production Decision	Jun 2020	Jun 2020	Dec 2020	Jun 2020	
IOC	Aug 2020	Aug 2020	Feb 2021	Aug 2020	

Change Explanations

(Ch-1) Estimate changed from April 2020 to May 2020 due to negotiated vehicle deliveries.

Performance

Performance Characteristics				
SAR Baseline Development Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Net Ready (NR)				
The Amphibious Combat Vehicle (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 Platform Integration Information Table (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%.	74%; 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 miles per	An ACV shall achieve at least 1.6 mpg	An ACV shall achieve at least 1.28 mpg	Demonstrated 1.6 mpg (mission	1.6 mpg (mission profile); 1.54 gph

gallon (mpg) across the land portion of the mission profile. ACV shall consume less than 0.80 gallons per hour (gph) while stationary and providing 5.6 kilowatt (kW) to power battle-command systems, weapon systems, and other key onboard systems.	across the land portion of the mission 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.	across the land portion of the 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.	profile); 1.54 gph (idle)	(idle)
Sea Connectors				
The ACV at gross vehicle weight (GVW), without preparation, shall be transportable via Sea Connectors to the beach, through the surf zone. Two ACVs shall be transportable on the Ship to Shore Connector (SSC) 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 Gross Vehicle Weight (GVW) shall be capable of ship-to-shore maneuver from distances of 12 Nautical Miles (NM) in water conditions up through 3 feet (ft.) Significant Wave Height (SWH) to land	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 shore-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.

an infantry company ashore.					
Payload					
ACV shall carry a crew and infantry with full combat loads (which includes 1st Day of Supply (DoS)), additional 2nd and 3rd DoS and Combat Essential Equipment (CEE).	ACV shall carry a crew (3) and infantry (13) with full combat loads (which includes 1st Day of Supply (DoS)), additional 2nd and 3rd DoS and CEE.	ACV shall carry a crew (3) and infantry (10) with full combat loads (which includes 1st DoS), additional 2nd DoS and CEE.	Accommodated crew of 3 and 13 Infantry with required loads.	Accommodate crew of 3 and 13 Infantry with 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 Assault Amphibious Vehicle (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					
N/A	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.	(Ch-1)

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

(Ch-1) New KPP added to the CPD for Milestone C.

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

RDT&E

Appn		BA	PE	
Navy	1319	04	0603611M	
	Project		**Name**	
	0025		New Amphibious Vehicles	(Sunk)
Navy	1319	05	0605611M	
	Project		**Name**	
	0025		MC AVS Development & Demonstration	

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.

Additionally, ACV 1.2 RDT&E funding was separated into a separate Project Unit and BA. ACV 1.2 Funding is not included in the totals shown above.

Amounts shown reflect PB-20 budget.

Procurement

Appn		BA	PE
Navy	1109	02	0206211M
	Line Item		**Name**
	2025		AMPHIBIOUS COMBAT VEHICLE
	7000		Spares and Repair Parts

Notes

ACV 1.1 and ACV 1.2 have been separated into two programs in the budget; shown above are amounts for ACV 1.1 only.

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 are included in the PMC amounts above.

Amounts shown reflect PB-20 budget.

MILCON

Appn		BA	PE
Navy	1205	01	0202176M

Project	Name	
11901	AAV-ACV Maintenance & Warehouse Facility	(Shared)

Navy 1205 01 0216496M

Project	Name
11483	ACV Maintenance Facility Upgrades
11903	ACV Covered Storage/Parking
91236	ACV Maintenance Facility Upgrades

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. The ACV 1.1 portion will not exceed the ICE of $24.9M (TY$).

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

Amounts shown reflect PB-20 funding by MCICOM.

Acq O&M

Appn	BA	PE
Navy	1106	01 0708012M

Subactivity Group	Name
1A2A	Field Logistics

Notes

Amounts shown reflect PB-20 budget.

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2014 $M			BY 2014 $M	TY $M		
	SAR Baseline Development Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Production Objective	Current Estimate
RDT&E	764.3	769.3	846.2	758.7	810.5	804.4	795.4
Procurement	1015.5	1035.9	1139.5	1028.4	1168.4	1171.9	1174.8
Flyaway	--	--	--	899.8	--	--	1028.2
Recurring	--	--	--	878.3	--	--	1003.9
Non Recurring	--	--	--	21.5	--	--	24.3
Support	--	--	--	128.6	--	--	146.6
Other Support	--	--	--	94.1	--	--	107.3
Initial Spares	--	--	--	34.5	--	--	39.3
MILCON	21.2	21.4	23.5	19.5	24.9	24.9	22.7
Acq O&M	25.9	9.1	10.0	9.0	28.0	9.6	9.6
Total	1826.9	1835.7	N/A	1815.6	2031.8	2010.8	2002.5

Current APB Cost Estimate Reference

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

Cost Notes

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 Development Estimate	Current APB Production	Current Estimate
RDT&E	36	36	36
Procurement	204	204	204
Total	240	240	240

Quantity Notes

RDT&E quantities 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 grand total of 36 RDT&E-funded vehicles.

Procurement quantities consist of 204 vehicles.

Cost and Funding

Funding Summary

Appropriation Summary FY 2020 President's Budget / December 2018 SAR (TY$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	729.6	42.4	23.3	0.1	0.0	0.0	0.0	0.0	795.4
Procurement	162.3	173.6	332.0	506.9	0.0	0.0	0.0	0.0	1174.8
MILCON	0.0	11.1	11.6	0.0	0.0	0.0	0.0	0.0	22.7
Acq O&M	5.4	1.4	1.4	1.4	0.0	0.0	0.0	0.0	9.6
PB 2020 Total	897.3	228.5	368.3	508.4	0.0	0.0	0.0	0.0	2002.5
PB 2019 Total	805.0	228.5	326.2	530.2	0.0	0.0	0.0	0.0	1889.9
Delta	92.3	0.0	42.1	-21.8	0.0	0.0	0.0	0.0	112.6

Funding Notes

Based on the PB-20 budget submission.

Quantity Summary FY 2020 President's Budget / December 2018 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	36	0	0	0	0	0	0	0	0	36
Production	0	26	30	56	92	0	0	0	0	204
PB 2020 Total	36	26	30	56	92	0	0	0	0	240
PB 2019 Total	36	26	30	52	96	0	0	0	0	240
Delta	0	0	0	4	-4	0	0	0	0	0

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	--	--	--	--	--	--	80.6
2014	--	--	--	--	--	--	31.6
2015	--	--	--	--	--	--	98.7
2016	--	--	--	--	--	--	195.0
2017	--	--	--	--	--	--	131.3
2018	--	--	--	--	--	--	150.4
2019	--	--	--	--	--	--	42.4
2020	--	--	--	--	--	--	23.3
2021	--	--	--	--	--	--	0.1
Subtotal	36	--	--	--	--	--	795.4

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	--	--	--	--	--	--	80.7
2014	--	--	--	--	--	--	31.2
2015	--	--	--	--	--	--	96.3
2016	--	--	--	--	--	--	186.8
2017	--	--	--	--	--	--	123.5
2018	--	--	--	--	--	--	138.7
2019	--	--	--	--	--	--	38.3
2020	--	--	--	--	--	--	20.6
2021	--	--	--	--	--	--	0.1
Subtotal	36	--	--	--	--	--	758.7

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. ACV 1.2 Funding is not included in the totals shown above.

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	109.5	32.3	2.8	144.6	17.7	162.3
2019	30	122.2	18.9	2.3	143.4	30.2	173.6
2020	56	220.7	46.7	17.5	284.9	47.1	332.0
2021	92	366.0	87.6	1.7	455.3	51.6	506.9
Subtotal	204	818.4	185.5	24.3	1028.2	146.6	1174.8

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	99.7	29.4	2.6	131.7	16.1	147.8
2019	30	109.1	16.9	2.1	128.1	26.9	155.0
2020	56	193.2	40.8	15.3	249.3	41.3	290.6
2021	92	314.1	75.1	1.5	390.7	44.3	435.0
Subtotal	204	716.1	162.2	21.5	899.8	128.6	1028.4

ACV 1.1 and ACV 1.2 are currently separate programs in the budget; shown above are amounts for ACV 1.1 only.

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 are 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	11.6
Subtotal	22.7

Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	BY 2014 $M Total Program
2019	9.6
2020	9.9
Subtotal	19.5

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. The ACV 1.1 portion will not exceed the ICE of $24.9M (TY$). ACV 1.2 projects are not included against the ICE value of $24.9M (TY$).

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	1.4
2020	1.4
2021	1.4
Subtotal	9.6

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	1.3
2020	1.2
2021	1.2
Subtotal	9.0

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	11/19/2015	6/19/2018
Approved Quantity	56	56
Reference	Milestone B ADM	Milestone C ADM
Start Year	2018	2018
End Year	2020	2020

The Current Total LRIP Quantity is more than 10% of the total production quantity to ensure an efficient ramp up to FRP with no break in production. Twenty one vehicles are required to support IOT&E and 35 vehicles will be used for initial fielding and to meet IOC requirements.

Foreign Military Sales

None

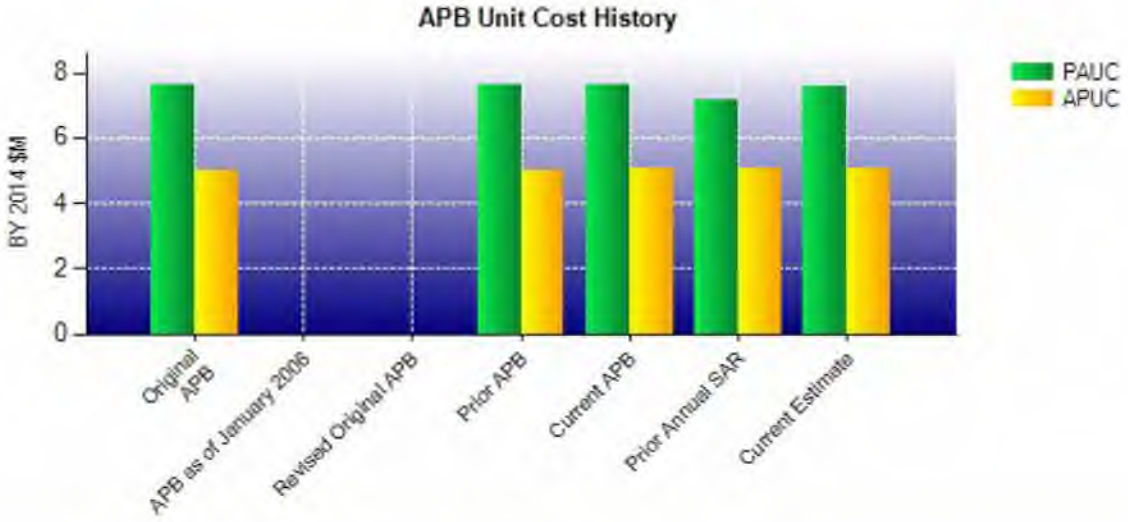
Nuclear Costs

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 2018 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1835.7	1815.6	
Quantity	240	240	
Unit Cost	7.649	7.565	-1.10
Average Procurement Unit Cost			
Cost	1035.9	1028.4	
Quantity	204	204	
Unit Cost	5.078	5.041	-0.73

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 2018 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1826.9	1815.6	
Quantity	240	240	
Unit Cost	7.612	7.565	-0.62
Average Procurement Unit Cost			
Cost	1015.5	1028.4	
Quantity	204	204	
Unit Cost	4.978	5.041	+1.27



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 2017	7.152	5.034	7.875	5.696
Current Estimate	Dec 2018	7.565	5.041	8.344	5.759

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
8.466	-0.038	0.000	-0.010	-0.098	0.125	0.000	-0.101	-0.122	8.344

Current SAR Baseline to Current Estimate (TY $M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
5.727	-0.028	0.000	-0.012	0.000	0.191	0.000	-0.119	0.032	5.759

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	N/A	Nov 2015
Milestone C	N/A	Jun 2018	N/A	Jun 2018
IOC	N/A	Aug 2020	N/A	Aug 2020
Total Cost (TY $M)	N/A	2031.8	N/A	2002.5
Total Quantity	N/A	240	N/A	240
PAUC	N/A	8.466	N/A	8.344

Cost Variance

Summary TY $M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Development Estimate)	810.5	1168.4	24.9	28.0	2031.8
Previous Changes					
Economic	-5.7	-16.9	-0.1	-0.1	-22.8
Quantity	--	--	--	--	--
Schedule	--	-2.2	--	--	-2.2
Engineering	-23.6	--	--	--	-23.6
Estimating	-97.5	-28.0	-1.4	-7.0	-133.9
Other	--	--	--	--	--
Support	--	+40.6	--	--	+40.6
Subtotal	-126.8	-6.5	-1.5	-7.1	-141.9
Current Changes					
Economic	+2.3	+11.2	+0.1	+0.1	+13.7
Quantity	--	--	--	--	--
Schedule	--	-0.3	--	--	-0.3
Engineering	--	--	--	--	--
Estimating	+109.4	+66.9	-0.8	-11.4	+164.1
Other	--	--	--	--	--
Support	--	-64.9	--	--	-64.9
Subtotal	+111.7	+12.9	-0.7	-11.3	+112.6
Adjustments	--	--	--	--	--
Total Changes	-15.1	+6.4	-2.2	-18.4	-29.3
CE - Cost Variance	795.4	1174.8	22.7	9.6	2002.5
CE - Cost & Funding	795.4	1174.8	22.7	9.6	2002.5

Summary BY 2014 $M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Development Estimate)	764.3	1015.5	21.2	25.9	1826.9
Previous Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	--	--	--	--	--
Engineering	-21.2	--	--	--	-21.2
Estimating	-93.8	-22.8	-1.1	-5.8	-123.5
Other	--	--	--	--	--
Support	--	+34.2	--	--	+34.2
Subtotal	-115.0	+11.4	-1.1	-5.8	-110.5
Current Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	+109.4	+57.9	-0.6	-11.1	+155.6
Other	--	--	--	--	--
Support	--	-56.4	--	--	-56.4
Subtotal	+109.4	+1.5	-0.6	-11.1	+99.2
Adjustments	--	--	--	--	--
Total Changes	-5.6	+12.9	-1.7	-16.9	-11.3
CE - Cost Variance	758.7	1028.4	19.5	9.0	1815.6
CE - Cost & Funding	758.7	1028.4	19.5	9.0	1815.6

Previous Estimate: December 2017

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+2.3
Revised estimate to align to the June 12, 2018 NCCA Milestone C Component Cost Position. (Estimating)	+137.8	+140.2
Revised estimate due to Congressional reduction in FY2018 for excess Corrective Action Modifications. (Estimating)	-19.3	-21.0
Revised estimate for Small Business Innovative Research initiatives and economic withholds. (Estimating)	-5.8	-6.3
Funding realignment to Amphibious Vehicle Test Branch for High Surf Testing. (Estimating)	-0.7	-0.8
Revised estimate due to miscellaneous internal United States Marine Corps realignments. (Estimating)	-0.5	-0.5
Adjustment for current and prior escalation. (Estimating)	-2.1	-2.2
RDT&E Subtotal	+109.4	+111.7

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+11.2
Acceleration of procurement buy profile due to the restoring of funding for additional four vehicles in FY 2020. (Schedule)	0.0	-0.3
Revised estimate to align to the June 12, 2018 NCCA Milestone C Component Cost Position. (Estimating)	+64.5	+74.4
Revised estimate due to Congressional reduction in FY2018 for excess program management. (Estimating)	-2.9	-3.2
Revised estimate due to Congressional reduction in FY2018 for training devices ahead-of-need. (Estimating)	-1.5	-1.7
Adjustment for current and prior escalation. (Estimating)	-2.2	-2.6
Adjustment for current and prior escalation. (Support)	-0.6	-0.5
Decrease in Other Support due to alignment with the June 12, 2018 NCCA Milestone C Component Cost Position. (Support)	-55.6	-64.2
Decrease in Initial Spares estimate. (Support)	-0.2	-0.2
Procurement Subtotal	+1.5	+12.9

MILCON	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+0.1
Additional funding from Marine Corps Installations Command for construction estimate refinement for P11483 (Camp LeJeune). (Estimating)	+5.6	+6.6
Revised estimate from Marine Corps Installations Command for projects P91236 (29 Palms) and P91234 (29 Palms) which were consolidated and shifted to ACV 1.2. (Estimating)	-6.1	-7.3
Adjustment for current and prior escalation. (Estimating)	-0.1	-0.1
MILCON Subtotal	-0.6	-0.7

Acq O&M	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+0.1
Realignments to adjust to the NCCA Component Cost Position at Milestone C, 12 Jun 2018. (Estimating)	-11.1	-11.4
Acq O&M Subtotal	-11.1	-11.3

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.

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: RDT&E
Contract Name: ACV 1.1
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	3197.0	3332.0	714	3197.0	3197.0

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 Option for Low Rate Initial Production Lot 1 was exercised in June 2018.

NOTE: The Current Quantity includes 490 Option priced ACV 1.2 vehicles. The 714 quantity includes 16 EMD, 4 FUSL, and 204 ACV 1.1 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). LRIP Lot 2 was exercised in December 2018.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	32	32	36	88.89%
Production	0	0	204	0.00%
Total Program Quantity Delivered	32	32	240	13.33%

Expended and Appropriated (TY $M)

Total Acquisition Cost	2002.5	Years Appropriated	8
Expended to Date	660.0	Percent Years Appropriated	80.00%
Percent Expended	32.96%	Appropriated to Date	1125.8
Total Funding Years	10	Percent Appropriated	56.22%

The above data is current as of March 11, 2019.

Notes

Planned Development deliveries consist of 16 test vehicles ordered to date from each vendor, for a total of 32 vehicles.

Additionally, 4 Full-Up System Level (FUSL) test vehicles and 26 Low Rate Initial Production (LRIP) Lot 1 vehicles were ordered at the end of June 2018, and 30 LRIP Lot 2 vehicles were ordered in December 2018 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.

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.

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 2019), the Logistics Demonstration (4Q FY 2019), the Level of Repair Analysis (LORA) (1Q FY 2020), and the component-level
Depot-level Source of Repair Analysis (DSOR) (3Q FY 2020) (dates are approximate).

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 ACV 1.1 includes only a Personnel variant.

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 1.1 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 1.1			Assault Amphibious Vehicle (AAV) (P-Variant Only) (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	2835.5	3100.0	2835.5	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 = $2,835.5M / 204 / 20 = $0.695M

O&S Cost Variance

Category	BY 2014 $M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 SAR	2867.8	
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	2835.5	

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.

Disposal Estimate Details

Date of Estimate: June 12, 2018

Source of Estimate: SCP

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

N/A