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The Marine Corps' Amphibious Combat Vehicle (ACV)

Background

According to the Marine Corps:

The Amphibious Combat Vehicle (ACV) is the Corps' next-generation vehicle designed to move Marines from ship to shore (**Figure 1**). Designed to replace the Corps' aging Amphibious Assault Vehicle (AAV – in service since 1972), the ACV will be the primary means of tactical mobility for the Marine infantry battalion at sea and ashore (**Figure 2**). The ACV will possess ground mobility and speed similar to the M1A1 tank during sustained operations ashore and have the capability to provide organic, direct fire support to dismounted infantry in the attack. The ACV will support expeditionary mobility capability and capacity with balanced levels of performance, protection and payload.

There are currently four ACV variants planned: (1) a Personnel Variant, which can carry three crew members with 13 Marines and two days of combat equipment and supplies; (2) a Command and Control Variant; (3) a Recovery Variant; and (4) a 30-mm Gun Variant. The Marines intend for the ACV to provide effective land and tactical water mobility (ship-to-shore and shore-to-shore), precise supporting fires, and high levels of force protection intended to protect against blasts, fragmentation, and kinetic energy threats.

Figure 1. Amphibious Combat Vehicle in Ship-to-Shore Mode



Source: <https://www.baesystems.com/en-us/multimedia/amphibious-combat-vehicle-11-acv-11>, accessed February 3, 2021.

Figure 2. Amphibious Combat Vehicle Ashore



Source: <https://www.baesystems.com/en-us/multimedia/amphibious-combat-vehicle-11-acv-1-1->, accessed February 3, 2021.

Current Program Status

In June 2018, the ACV entered Low-Rate Initial Production (LRIP) with BAE Systems selected for the first 30 vehicles to be delivered in fall 2019. In November 2020, the ACV achieved Initial Operational Capability (IOC). In December 2020, a Full-Rate Production (FRP) decision was reportedly made by the Marine Corps after having been delayed from September 2020 due to issues related to Coronavirus Disease 2019. The current planned acquisition objective of 632 ACVs would replace AAVs in Assault Amphibian battalions. The previous acquisition objective of 1,122 ACVs was reduced in accordance with Marine Corps Force Design 2030 modernization efforts (see CRS Insight IN11281, *New U.S. Marine Corps Force Design Initiatives*, by Andrew Feickert). Reportedly, ACV production is to take place at BAE Systems facilities in Virginia, California, Michigan, South Carolina, and Pennsylvania.

Low-Rate Initial Production (LRIP) is a programmatic decision made when manufacturing development is completed and there is an ability to produce a small-quantity set of articles. It also establishes an initial production base and sets the stage for a gradual increase in the production rate to allow for Full-Rate Production (FRP) upon completion of Operational Test and Evaluation (OT&E).

Full-Rate Production (FRP) is a decision made that allows for government contracting for economic production quantities following stabilization of the system design and validation of the production process.

Initial Operational Testing Observations

During Marine Corps initial operational test and evaluation (IOT&E) conducted from June to September 2020, the Department of Defense Director of Operational Test and Evaluation (DOT&E) noted the following:

- The ACV demonstrated water mobility and the ability to self-deploy from the beach, cross the surf zone, enter the ocean, and embark aboard amphibious shipping. The

infantry rifle company equipped with the ACV was able to deploy from amphibious shipping, maneuver on the beach, and conduct subsequent offensive and defensive operations ashore.

- While the ACV demonstrated good operational availability and maintainability during IOT&E, it did not meet its 69-hour mean time between operational mission failures (MTBOMF) threshold. The government-furnished Remote Weapons System (RWS)—an internally controlled, exterior-mounted MK 19 automatic grenade launcher or M2 .50 caliber heavy machine gun was the source of the largest number of operational mission failures (OMFs). The government-furnished RWS reliability issue was reported by the Government Accountability Office (GAO) in 2019.
- The ACV accommodated three crew and 13 embarked infantry. Due to the placement and number of blast mitigating seats, interior space within the ACV is limited, making rapid ingress and egress difficult.
- Infantry Marines noted that the troop seats were not contoured to fit body armor configurations, leading to discomfort during long range ship-to-objective missions.

Budgetary Information

Table 1. FY2021 Navy Budget Request—ACV

Funding Category	Total Request (\$M)	Total Request (Qty)
RDT&E	41.8	—
Procurement	478.9	72
TOTAL	520.7	72

Source: Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, Program Acquisition Cost by Weapon System: United States Department of Defense Fiscal Year 2021 Budget Request, February 2020, p. 3-11.

Notes: RDT&E = Research, Development, Test & Evaluation; \$M = U.S. Dollars in Millions; Qty = FY2021 Procurement Quantities.

Table 2. FY2021 Defense Authorizations and Appropriations—ACV

Funding Category	Authorized (\$M)	Approp. (\$M)
RDT&E	41.8	41.8
Procurement	456.3	436.8
TOTAL	498.1	478.6

Source: Authorized: William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (P.L. 116-283) Conference Report to Accompany H.R. 6395, H.Rept. 116-617, December 2, 2020. **Appropriated:** Explanatory statement to accompany the Department of Defense Appropriations Act, 2021 (Division C of P.L. 116-260), *Congressional Record*, daily edition, vol. 166 (December 21, 2020).

Foreign Military Sales

There are no reported Foreign Military Sales actions associated with the ACV.

Potential Issue for Congress

Ability to Egress a Floundering ACV at Sea

As previously noted in DOT&E's 2020 Annual Report, "interior space within the ACV is limited, making rapid ingress and egress difficult." This, combined with problems accommodating full-equipped infantry Marines also noted in the report, suggests a suboptimal situation that could raise potential safety concerns. A 2014 academic study on AAV safety noted the following:

A 2014 Naval Postgraduate School study of Marine Corps assault amphibian vehicle emergency egress scenarios found the more Marines put into the back of the AAV, the longer it will take for them to egress from the vehicle due to the lack of maneuverability afforded by their body armor and other essential gear.

This concern is heightened by the August 2020 incident off San Clemente Island, CA, when an AAV floundered at sea during training, killing nine sailors and Marines, reportedly the AAV's deadliest training incident in its history.

Because of the noted safety implications, Congress might wish to examine this particular aspect of the ACV's design. Potential areas for examination could include the following:

- How much more or less survivable is the ACV in its present configuration than an AAV when it flounders at sea?
- How was "egress at sea" tested by BAE and the Marines during the ACV's design and development? Is such testing done by simulation, or are live tests conducted under controlled conditions with actual test subjects?
- What, if any, ACV design solutions are under consideration to improve emergency egress at sea?
- What additional personal protective equipment (PPE) solutions might be available to Marines to enhance their survivability in the event of floundering at sea?
- What, if any, nonmaterial solutions, such as revised loading or operational procedures or limitations on numbers of embarked Marines, are under consideration?

For a more detailed historical discussion of the ACV Program, see CRS Report R42723, *Marine Corps Amphibious Combat Vehicle (ACV): Background and Issues for Congress*, by Andrew Feickert.

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