

# ADVANCED AMPHIBIOUS ASSAULT

BY SCOTT R. GOURLEY

// An AAV7A1 amphibious assault vehicle from 3rd Assault Amphibian Battalion, 1st Marine Division, lands on a beach at Camp Pendleton, Calif., during a bilateral training exercise with various Marine units from Southern California and more than 180 soldiers of the Japanese Ground Self-Defense Force. The AAV7 fleet will undergo upgrades to extend service life and maintain capability while awaiting development of the new Amphibious Combat Vehicle that will replace it.



**A**dvanced Amphibious Assault upgrades the venerable AAV7A1 while developing the new Amphibious Combat Vehicle and Marine Personnel Carrier.

In his 2012 "Report to Congress on the Posture of the United States Marine Corps," Commandant of the Marine Corps Gen. James F. Amos identified the programmatic priority for Marine Corps ground forces as "the seamless maneuver of Marines from the sea to conduct operations ashore, whether for training, humanitarian assistance, or combat."

A key to that seamless maneuver is the Marine Corps Ground Combat Tactical Vehicle (GCTV) Strategy. The strategy is focused on achieving the right mix of assets, while balancing performance, payload, survivability, fuel efficiency, transportability, and cost across the Marine Corps combat platform fleets. Key elements of that strategy include the new Joint Light Tactical Vehicle (JLTV), the Amphibious Combat Vehicle (ACV), and the Marine Personnel Carrier (MPC).

Two of those three systems – ACV and MPC – are found in the Program Management Office for Advanced Amphibious Assault (PM AAA).

In the aftermath of the cancellation of the Marine Corps Expeditionary Fighting Vehicle (EFV) program in early 2011, the service took a fresh look at how it could ensure the nation's ability to "conduct operations ashore whether for training, humanitarian assistance, or combat." That fresh look resulted in a three-pronged strategy focusing on the ACV and MPC noted above, as well as complementary enhancements to the aging Amphibious Assault Vehicle (AAV) fleet that performed such remarkable service in the ground assault on Baghdad during the initial phase of Operation Iraqi Freedom.

"Throughout 2011 and informed by cost, we conducted a comprehensive systems engineering review of amphibious vehicle operational requirements," Amos noted in the 2012 posture statement. "The review evaluated the requirements for water mobility, land mobility, lethality and force protection of the future environment. The identification of essential

requirements helped to drive down both the production and the sustainment costs for the amphibious vehicles of the future."

## ACV

The Amphibious Combat Vehicle, for example, is a new start, pre-Major Defense Acquisition Program (pre-MDAP) that will provide an advanced generation, armored, amphibious combat vehicle. The ACV will be the primary means of tactical mobility for the Marine rifle squad – both at sea and ashore – and will autonomously deliver the assault echelon from amphibious shipping at launch distances at or beyond the visual horizon, with speed to enable the rapid buildup ashore, and provide combat-ready Marines at the objective. The ACV will possess superior ground mobility and speed to keep pace with the Marine Air-Ground Task Force (MAGTF) during sustained operations ashore and will provide organic, direct fire support to dismounted infantry in the attack. The ACV will protect the

Photograph by Gunnery Sgt. Scott Dumm

force during offensive and defensive operations, providing 360-degree protection against direct fire, indirect fire, mines, and improvised explosive device threats.

In his 2012 posture statement, Amos pointed to an ongoing "Analysis of Alternatives (AoA) on six ACV options, the results of which will help to inform the direction and scope of the ACV program."

Aspects of that AoA were first identified in a February 2011 request for information (RFI) that outlined "a collaborative approach with industry in order to produce a more affordable amphibious capability."

The announcement urged "interested partners" to "look at the Marine Corps amphibious requirements for an Amphibious Combat Vehicle, Marine Personnel Carrier and AAV legacy upgrades as discussed in this and the other amphibious RFIs as a Family of Systems. The Marine Corps would like to see industry focus on affordability by designing/proposing solutions that will reduce the operational and support costs over the life cycle and consider such things as commonality, modularity of proposed solutions and interoperability among Systems of Systems."

"These solutions should take into consideration emerging technologies and provide for growth over the next 15 years," the RFI stated. "Additionally, the Marine Corps is interested in hearing from industry strategies they would use to lower their procurement costs for their proposed solutions."

Acknowledging that "the Assault Amphibious Vehicle (AAV) fleet is aging," it cautioned, "Should the current AAV Family of Vehicles (FoV) not be replaced operations that assure access would become either single dimensional operations, relying entirely upon air assault of infantryman, or be required to use a mid-20th century means of surface transport that lacks needed capabilities such as firepower, autonomous ship to shore movement, ground mobility, and over the horizon range."

"The current AAV does not meet the needs of the tactics, techniques, and procedures (TTPs) developed in response to the emerging threat environment," it read. "Use of such equipment and tactics could result in unacceptable loss of life or mission failure."

"In response to a validated operational need and an aging fleet of assault amphibian vehicles, the Marine Corps requirement for an amphibious vehicle that will provide increased force protection, water speed, land mobility, lethality, and survivability, while balancing capacity, mobility, transportability and total ownership costs over the current AAV is enduring."



As these pages go to press, the ACV is in the Material Solution Analysis Phase of the Joint Capabilities Integration and Development System process. The recently completed AoA is being briefed to senior leadership, with formal results anticipated in late fall 2012. The scope of the AoA included development of life cycle cost estimates for each alternative considering major cost drivers, acquisition and sustainment strategies, and fully burdened cost of energy.

**// TOP AND ABOVE: Artist concept renderings of a notional Amphibious Combat Vehicle that would replace the aging AAV7.**

## AAV

Most observers anticipate that the AoA findings will match budgetary realities in depicting the ACV new start program as a much-needed capability, but with the reality that the current system will need to be upgraded as a bridge to the arrival of the ACV. Initially fielded in 1972 and subsequently upgraded to "A1" configurations in the late 1980s, the AAVs remain the primary general-support armor personnel carrier for Marine infantry.

The AAV FOV consists of the AAVP7A1 RAM/RS APC and two supporting mission-role variants: AAVC7A1 RAM/RS Command and AAVR7A1 RAM/RS Recovery. The AAV7A1 RAM/RS family of vehicles provides ship-to-shore-to-objective mobility as well as direct fire-support with organic weapons.

Programmed to be replaced by the new Amphibious Combat Vehicle, the AAV7A1 RAM/RS family of vehicles will continue to serve the Marine Corps until at least 2030.

Acknowledging that the AAV7A1 RAM/RS family of vehicles previously underwent a series of capability enhancements to improve mobility and reliability and to extend the platforms' service lives, program descriptions credit a future AAV Upgrade Program with further improving force protection and mobility of the AAV, serving as a capability bridge to fielding and replacement by a new amphibious combat vehicle.

This initiative will improve force protection and platform survivability by integrating technically mature upgrades into the existing hull.



// Industry competitors as represented here are poised to show their wares once an MPC Request for Proposals is launched. **LEFT:** Lockheed Martin/Patria Havoc 8x8 armored personnel carrier. **RIGHT:** BAE Systems/Iveco Defense Vehicles SuperAV 8x8 armored personnel carrier.

// **ABOVE:** ST Kinetics/Science Applications International Corporation (SAIC) Terrex 8x8. **BELOW:** General Dynamics Land Systems' MPC proposal.

These upgrades include belly and sponson armor, blast-mitigating seats, spall lining, and may also include fuel tank protection, deck liners, and automotive and suspension upgrades to maintain current land and water mobility characteristics albeit with increased weight growth.

These upgrades are slated for approximately 392 AAVP7A1 RAM/RS, with potential select upgrades applied to the Command and Recovery variants.

As of this writing, the AAV Upgrade Program is expected to enter the acquisition life cycle at Milestone B during FY 2013 and begin the engineering, manufacturing, and development phase. Developmental testing is planned for late FY 2014. Milestone C, authorizing entrance into the production and deployment phase, is scheduled for late FY 2015 and IOC in late FY 2017.

**MPC**

In his 2012 Posture Statement, Amos identified the Marine Personnel Carrier program as “maturing as a wheeled armored personnel carrier and complements the ACV as a possible solution to the general support lift capacity requirements of Marine forces operating in the littorals.”

Program descriptions echo the characterization, stating the future MPC will be “effective across the range of military operations during sustained operations ashore and reinforce the assault echelon during forcible-entry operations. Both MPC and the new Amphibious Combat Vehicle will replace the legacy Amphibious Assault Vehicles in the Assault Amphibian (AA) Battalions of Marine divisions.”

MPC will field a base vehicle (MPC-P) and two supporting mission role variants (MRV): MPC-C (command) and MPC-R (recovery). Two

MPC-Ps lift a reinforced rifle squad. The MPC-C supports mobile battalion command echelon/fire-support coordination center functions, while the MPC-R fulfills mobile recovery and maintenance requirements.

Current concepts envision an MPC Company lifting an infantry battalion in conjunction with the infantry’s organic wheeled assets.

Operationally, the MPC will be employed to allow Marines to continue that inland fight toward the objective once the ACV has established an initial beachhead. Arriving as follow-on support assets, the MPCs will provide a very robust combat capability, with features ranging from MRAP level survivability to the amphibious ability to negotiate 2-foot significant wave height and 4-foot plunging surf survivability.

Moreover, the MPCs will support Marines across their spectrum of operations, including the ability to maneuver anywhere inland, on paved roads, and in urban environments.

In the spring of 2008, the Marine Requirements Oversight Council validated the MPC requirement and approved the solution as an advanced-generation eight-wheeled APC to be integrated into the AA Battalions. The MPC program, once launched, will rely on full and open competition throughout the developmental cycle.

August 2012 witnessed the award of four contracts to provide prototype/sample vehicles and hulls to be used for demonstrations of water mobility, blast protection and human factors engineering. The contracts were awarded to Lockheed Martin, SAIC, BAE Systems, and General Dynamics Land Systems.

Each of the contractors will provide a “full up” vehicle, with the first of those vehicles slated for delivery to the Amphibious Vehicle Test Branch at Camp Pendleton in January 2013. The deliveries will be staggered between the four contractors, meaning that only one system will be “on

the ramp” at any time and that testing will likely extend until October 2013.

The full up vehicles will be used to drive, to swim, and to validate human factors characteristics. The final area will focus on capabilities versus comfort levels and the types of equipment that can be carried by embarked Marines.

In addition to the performance vehicles the contractors will also provide two additional vehicles or vehicle hulls that are weighted internally to simulate the power train. These additional hulls and hull sections will be taken out to the Nevada Automotive Test Center (NATC) and subjected to live fire survivability testing.

Program planners note that the goal of the demonstrations is to validate the technologies and capabilities that industry currently possess that could meet the Marine Corps’ requirements going forward. Reiterating that the MPC is a complementary capability to whatever the ACV program will be, they highlight the criticality of the emerging ACV AoA in defining the strategy for both systems.



BAE Systems photo

Photo by Limkopi

Lockheed Martin photo

PEO Land Systems image