

Expeditionary Fighting Vehicle (EFV)

Executive Summary

- The prime contractor continues to construct seven redesigned prototype Expeditionary Fighting Vehicles (EFVs) (“SDD-2” vehicles) to support developmental and operational testing that is scheduled for FY10 through FY14.
- None of the planned operational testing in the Test and Evaluation Master Plan (TEMP) was accomplished in FY10 due to delayed development of the modified hardware and software.
- Poor reliability has been the EFV program’s greatest challenge, and delays in delivering SDD-2 vehicles with the required software have postponed reliability growth testing.

System

- The EFV is an amphibious combat vehicle for the Marine Corps.
- The Marines intend the EFV to be capable of high-speed water transit at over 20 knots and have land mobility capabilities comparable to the M1A1 tank after transitioning out of the water.
- The EFVC (command variant) is operated by a crew of three and transports a commander and a staff of eight Marines.
- The EFVP (personnel variant) is operated by a crew of three and carries a reinforced rifle squad of 17 Marines.
- The EFVP has a stabilized 30 mm chain gun and coaxial 7.62 mm machine gun in the turret.

Mission

- Units equipped with EFVs will transport elements of an amphibious assault force from ships over the horizon to inland objectives.

Activity

- The Marine Corps did not accomplish any of the planned EFV operational testing specified in the TEMP in FY10.
- The prime contractor, General Dynamics Land systems, continues to construct seven redesigned prototype EFVs (“SDD-2” vehicles) to support developmental and operational testing that is scheduled for FY10 through FY14. These vehicles have been delivered and are in developmental testing.
- The Marine Corps conducted ballistic testing using two early prototype vehicles (“SDD-1” vehicles) during FY10. Threats included roadside and underbody mines and IEDs representing threats encountered in current combat operations. The testing provided valuable insights on the response of the vehicle and crew to these and other large overmatching threats.
- The program conducted System Data Exchange testing on two SDD-1 vehicles in support of Net-Ready certification.



- Commanders will use the:
 - Personnel variant as an armored fighting vehicle ashore in support of land combat, providing transportation, protection, and direct fire support.
 - Command variant to provide command, control, and communications capabilities to support ground combat tactical command posts.

Major Contractor

General Dynamics Land Systems – Woodbridge, Virginia

- The EFV Program Office announced its intention to incorporate a new, different aluminum alloy in the hull structure of the vehicle. This design change will be introduced in the first low-rate initial production (LRIP) vehicles. The hull alloy redesign is being undertaken as an effort to absorb more energy and address crew/vehicle response to emerging underbody threats.

Assessment

- Continuing delays in the modification of SDD-1 vehicles to support testing, the production of SDD-2 vehicles, and the fielding of vehicle software updates significantly delayed/reduced testing in FY10. The program cancelled all SDD-1 vehicle testing on September 23, 2010. Developmental testing continues on SDD-1 vehicles with Marine Corps Operational

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Test and Evaluation Activity observing. The program tested day/night multi-vehicle directional stability and control, and the effectiveness of an exhaust system redesign.

- Poor reliability has been the EFV program's greatest challenge, and delays in delivering SDD-2 vehicles with the required software have postponed reliability growth testing. Although there has been no system-level reliability testing since CY06 and none will start until 1QFY11, component-level testing and other "design for reliability" efforts are ongoing. The program is required to demonstrate a mean time between operational mission failure of 22 hours or higher using SDD-2 vehicles before the Milestone C LRIP decision. The user-required mean time between operational mission failure for full-rate production vehicles is 43.5 hours.
- A TEMP-specified developmental testing event using SDD-2 vehicles to examine high-angle firing engagements (such as those that might be required during fighting in urban areas) was not conducted due to lack of availability of a suitable test site. Information from this event was needed to support DOT&E's operational assessment for the LRIP decision. The program continues to seek a feasible test site for the event.
- Three developmental/operational test events that the program planned to conduct in FY09 using modified SDD-1 vehicles were postponed until FY10. The three events had been expected to provide information to reduce risk for the SDD-2 vehicle design, but will not do so. One of these three postponed events – a Hot Weather developmental/operational test to examine corrective fixes associated with the ammunition feed system, the environmental control system, and specific electronic subsystems – was cancelled in FY10 because of problems uncovered during the preceding developmental test. The other two deferred developmental/operational test events, which will assess weapon station performance and waterborne directional stability, were postponed again until 1QFY11.

- The FY11 start date for the next operational assessment (which will use three SDD-2 personnel variants and one command and control variant) continues to slip several additional months, but is still expected to be completed within the Acquisition Program Baseline's specified schedule window.
- Introduction of a new hull alloy during LRIP poses risk of unforeseen fabrication and structure durability issues. This change also reaffirms the necessity for use of production-representative LRIP test articles in the IOT&E and LFT&E program.

Recommendations

- Status of Previous Recommendations. The EFV Program Office did not address the first FY09 recommendation concerning the need to demonstrate the weapon system's capability in the water in order to meet the user requirement to support forcible entry operations. In response to the second FY09 recommendation, the Program Office has begun designing a protective underbody appliqué for installation and use during land operations in order to provide increased protection against IEDs and mines. Given the possible impact of an underbody appliqué on other aspects of the vehicle's performance, the design, construction, integration, and testing of the appliqué should be completed as soon as possible and adequately tested.
- FY10 Recommendations.
 1. The program should demonstrate the water gunnery capability before the Milestone C LRIP decision.
 2. Deferred FY10 OT&E events should be completed as soon as possible and before the FY11 operational assessment. Implementing this recommendation requires the successful completion of planned prerequisite developmental testing.