

Expeditionary Fighting Vehicle (EFV)

Executive Summary

- The Marine Corps is restructuring the Expeditionary Fighting Vehicle (EFV) program to include:
 - Extending System Development and Demonstration (SDD) by four years
 - Redesigning the vehicle for reliability
 - Building second-generation SDD prototype vehicles
- Prior to entering production, the program will conduct another Operational Assessment using the second-generation vehicles.

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 M1A1/2 tank after transitioning out of the water.
- The EFVC (command variant) is operated by a crew of three and transports a commander and his staff (nine Marines).
- The EFVP (personnel variant) is operated by a crew of three and carries a reinforced rifle squad of 17 Marines. The EFVP carries a stabilized 30 mm chain gun and coaxial 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. 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

Activity

- Subsequent to the Operational Assessment conducted in 2006, the Assistant Secretary of the Navy for Research, Development, and Acquisition convened an Independent Expert Panel to review the EFV program. The panel's review was a critical assessment of numerous aspects of the EFV program, including system engineering, contracting, program management, and oversight.
- In June 2007, the EFV program was restructured as a result of a Nunn-McCurdy cost breach, and because of effectiveness and suitability problems identified during the 2006 Operational Assessment.
 - Inadequate performance during the Operational Assessment provided evidence that the program was not ready to proceed into low-rate initial production and that a significant vehicle redesign was required.
 - The restructured plan delays the program's Milestone C low-rate initial production decision approximately 4-1/2 years (from January 2007 to August 2011) to allow

time to design and construct a second generation of SDD phase prototypes. The program will conduct a second operational assessment that would use these redesigned vehicles.

- The restructured program will provide production-representative vehicles for IOT&E and full-up system-level LFT&E.

Assessment

- The 2006 Operational Assessment was adequate to identify significant vehicle design shortfalls. Unexpectedly, poor vehicle reliability and availability prevented gaining expected operational insights into tactics, techniques, and procedures for the EFV-equipped units.
- The EFV did not demonstrate successful mission performance during the Operational Assessment. Low reliability and the resultant poor system availability were major contributing factors to the unsuccessful mission performance. Reliability,

availability, and maintainability were well below user requirements and program office predictions. The maintenance burden was very high, despite significant and unplanned levels of contractor maintenance personnel augmentation at the test site.

- Water performance and armor protection were compromised. Despite the removal of approximately 1,800 pounds of armor before the start of the Operational Assessment, EFVs often could not get on-plane when combat loaded unless drivers employed a hands-free technique, in which they did not steer while getting on-plane, which typically led to large, unpredictable turns in the water. This would be an unsafe condition for combat with multiple vehicles. The inability to demonstrate this critical performance characteristic without significant and impractical physical modifications to the vehicles and potentially unsafe and tactically unsound operating procedures highlighted a major performance concern.
- There was some encouraging performance in the Operational Assessment. The SDD-phase vehicles demonstrated the ability to keep pace with M1A1 tanks moving cross-country over challenging desert terrain. If poor reliability is fixed, the EFV's 30 mm cannon and thermal sight would provide a significant improvement in combat capability compared to the current amphibious assault vehicle.
- The EFVC's demonstrated reliability was comparable to the EFVP's during the execution of the operational mission attempted during the Operational Assessment. Because of reliability failures, the vehicle did not demonstrate that it could conduct its required over-the-horizon mission. The participating infantry battalion staff praised the installed collaborative software, the staff workstation configuration, and the potential capability to enhance the staff's ability to command and control, but considered that the current

number of installed radios was insufficient and that the vehicle's reliability had to be substantially improved. Poor auxiliary power unit reliability, inability to establish satellite communications or high-frequency communications while in the water, and low server reliability were discovered during the Operational Assessment and can be corrected by the program.

Recommendations

- Status of Previous Recommendations. With one exception, the Marine Corps took effective action on DOT&E's five FY06 recommendations. Although there are no plans to conduct a second Operational Assessment on the current SDD-phase vehicles (modified with planned reliability-related upgrades as DOT&E recommended) it is possible that these vehicles can be used to support developmental test/operational test events to assess design changes intended to address two major deficiencies found in the 2006 Operational Assessment: (1) inability to maintain directional stability while attempting to achieve high water speed and (2) poor weapon system reliability.
- FY07 Recommendation.
 1. The Marine Corps should conduct two developmental test/operational test events before the critical design review for the second generation SDD-phase vehicles and the following Defense Acquisition Board review; these two reviews are planned for late FY08/early FY09. The focus of one event should be to assess the effectiveness of design improvements planned to prevent EFVs from veering off course while attempting to achieve high water speed. The other event should be designed to assess the effectiveness of turret design modifications that are intended to improve the reliability of the EFVP weapon system.