

## Mine Resistant Ambush Protected (MRAP) Family of Vehicles (FoV) – Marine Corps

### Executive Summary

- In FY16, the Marine Corps completed live fire testing of the Mine Resistant Ambush Protected (MRAP) Cougar Category (CAT) II A1 with the Seat Survivability Upgrade (SSU). Preliminary analysis of the data indicates that the upgraded seats provide improved survivability over previous variants; the SSU provides force protection at the MRAP Capability Production Document (CPD) 1.1 objective level. DOT&E will provide a more comprehensive force protection/survivability evaluation in a final report in FY17.
- The program integrated approximately 100 SSU kits on CAT II A1 vehicles out of a planned total of 300.
- The Marine Corps is planning to retrofit all retained Cougar variants with egress upgrades, which will include power-assisted front and rear doors, redesigned rear steps, and a reconfigured exhaust system.
- In FY16, the Marine Corps completed live fire testing of the egress upgrades. The Cougar's power-assisted front doors did not function as designed post-event against CPD 1.1 objective-level threats; the vehicle's doors jammed during live fire testing. The program is investigating the vehicle structure to determine an appropriate solution.

### System

- The MRAP Family of Vehicles (FoV) consists of medium-armored, all-wheel drive, tactical wheeled vehicles designed to provide protected mobility for personnel in a threat environment. Relative to the High Mobility Multi-purpose Wheeled Vehicle, MRAPs provide improved crew protection and vehicle survivability against current battlefield threats, such as IEDs, mines, small arms fire, rocket-propelled grenades, and explosively formed penetrators.
- The Marine Corps is retrofitting Cougar CAT II A1 vehicles with an SSU for improved survivability. The SSU integrates energy attenuating seats into the rear crew compartment and reconfigures the Automatic Fire Extinguishing System and internally stowed equipment.



- The Marine Corps is assessing egress upgrades to the Cougar FoV. The egress upgrade consists of new power-assisted front and rear doors, redesigned rear steps, and a reconfigured exhaust system.
- The Marine Corps will retain 2,500 MRAP vehicles in its enduring fleet: 68 Buffalo, 1,727 Cougar (CAT I, CAT II, and Ambulance), and 705 MRAP – All Terrain Vehicle. The Marine Corps will remain the Primary Inventory Control Activity for all Cougar platforms, including those vehicles divested to the Navy and Air Force.

### Mission

Commanders will employ Marine units equipped with the MRAP Cougar to conduct mounted patrols, convoy protection, reconnaissance, communications, and command and control missions to support combat and stability operations in highly-restricted rural, mountainous, and urban terrain.

### Major Contractor

General Dynamics Land Systems – Ladson, South Carolina

### Activity

- The program completed the Cougar CAT II A1 with SSU live fire testing at Aberdeen Test Center (ATC), Maryland, in June 2016 in accordance with the DOT&E-approved test plan.
- The program completed five live fire egress test events along with exploitation testing, on a range of Cougar variants, at ATC from June through August 2016. These tests were completed in accordance with the DOT&E-approved test plan.
- In FY16, the program integrated approximately 100 SSU kits on CAT II A1 vehicles out of a planned total of 300.
- The program is investigating solutions to the floor and hull to further improve Cougar CAT II A1 survivability/force protection by modifying the structural response of the vehicle. The effort is using modeling and simulation to select potential designs.

## Assessment

- The preliminary analysis of live fire test data indicate the Cougar CAT II A1 with the SSU provides force protection at the MRAP CPD 1.1 objective level. The upgraded seats demonstrated improved protection over previous variants against underbody mines while not degrading performance relative to other previously tested threats such as fragmenting IEDs, indirect fire, small arms fire, rocket-propelled grenades, and explosively-formed penetrators. DOT&E will provide a more comprehensive force protection/survivability evaluation in a final report to Congress in FY17.
- The Cougar's power-assisted doors did not function as designed post-event against CPD 1.1 objective-level threats. The vehicle's doors jammed during live fire testing. The

program is investigating the vehicle structure to determine an appropriate the solution.

## Recommendations

- Status of Previous Recommendations. The program has addressed the previous recommendation regarding upgrading the seats in the Cougar A1 vehicles.
- FY16 Recommendations.
  1. The Marine Corps should implement a fix to the front door problem encountered during egress upgrade testing at the contract threshold level, and conduct a follow-on event to verify threshold-level performance.