

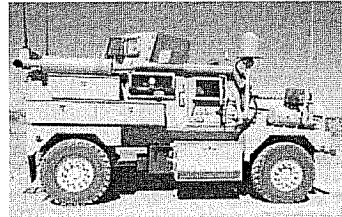
# Mine Resistant Ambush Protected (MRAP) Family of Vehicles

## Executive Summary

- DOT&E evaluated the Maxx Pro and RG-33L Mine Resistant Ambush Protected (MRAP) Ambulance variants as operationally effective, suitable, and survivable.
- The DOT&E will evaluate the Cougar Independent Suspension System (ISS) vehicle during the MRAP-All Terrain Vehicle IOT&E in December 2009.
- The MRAP program should continue to ensure that adequate test and evaluation plans are developed, executed, and sufficient resources are allocated to support future upgrades to MRAP vehicles such as armor improvements or other Engineering Change Proposal (ECPs) applied to existing MRAPs.

## System

- MRAP vehicles are a family of vehicles designed to provide increased crew protection and vehicle survivability against current battlefield threats, such as IEDs, mines, and small arms. DoD initiated the MRAP program in response to an urgent operational need to meet multi-Service ground vehicle requirements. MRAP vehicles provide improved vehicle and crew survivability over the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) and are employed by units in current combat operations in the execution of missions previously executed with the HMMWV.
- This report covers two types of MRAP vehicles and the MRAP-Ambulance variant. The MRAP Category I (CAT I) vehicle is designed to transport six persons and the MRAP Category II (CAT II) vehicle is designed to transport 10 persons. The MRAP Ambulance variant vehicle is designed to transport up to three litter casualties and from three to six ambulatory casualties. MRAP vehicles incorporate current Service command and control systems and counter-IED systems. MRAP vehicles contain gun mounts with gunner protection kits capable of mounting a variety of weapons systems such as the M240B medium machine gun, the M2 .50 caliber heavy machine gun, and the MK-19 grenade launcher. The program has developmental efforts underway to integrate improved armor protection against Explosively Formed Penetrators (EFPs) on existing MRAP vehicles.
- Five vendors have been awarded ongoing production contracts for MRAP CAT I and CAT II vehicles: Force Protection Industries, Inc. (FPI), General Dynamics Land Systems Canada (GDLS-C), NAVISTAR Defense, BAE-Tactical Vehicle Systems (BAE-TVS), and BAE Systems (BAE). Six CAT I and CAT II variants have been purchased:
  - FPI Cougar CAT I
  - FPI Cougar CAT II



FPI Cougar Category I



FPI Cougar Category II



IMG MaxxPro Category I



BAE RG-33L Category II



GDLS RG-31A2 Category I



BAE TVS Caiman Category I



NAVISTAR Ambulance Cat. I



BAE Ambulance Category II

- NAVISTAR Defense MaxxPro CAT I vehicle and Ambulance variant
- BAE RG-33L CAT II and Ambulance variant
- GDLS-C RG-31A2 CAT I
- BAE TVS Caiman CAT I

## Mission

- Units equipped with the MRAP CAT I vehicles will conduct small unit combat operations such as mounted patrols and reconnaissance. Many of these operations are conducted in urban areas. Units equipped with MRAP CAT II vehicles

# DOD PROGRAMS

conduct ground logistics operations including convoy security, troop and cargo transportation, and medical evacuation. The MRAP Ambulance variant supports the conduct of medical treatment and evacuation.

- MRAP vehicles support multi-Service missions and are fielded to units based upon priorities established by the operational commander.

## Activity

- The MRAP program has procured the total Service and Special Operations Command (SOCOM) requirement for 21,482 MRAP vehicles. The majority of this procurement has been fielded to operating forces in Iraq and Afghanistan.
- The Army Test and Evaluation Command (ATEC) completed the operational test of two MRAP Ambulance variants, the MaxxPro and RG-33L. Test data and the operational test report were delivered January 2009.
- In June 2009, the Marine Corp Operational Test Activity conducted a Cougar ISS Comparative Evaluation Report to evaluate Marine driver's opinions regarding the mobility of the Cougar CAT I and II with the ISS compared to the Medium Tactical Vehicle Replacement (MTVR) Program and the Baseline Cougar CAT I and II with solid suspension. The evaluation was conducted at two sites: Aberdeen Proving Ground, Maryland, and Twentynine Palms, California.
- As of September 2009, the MRAP program purchased 1,283 ISS kits to integrate on Marine Corps Cougar and SOCOM RG-33 MRAP vehicles as a major ECP to provide improved off-road mobility capability over current MRAP vehicles in Afghanistan.
- The MRAP program initiated a capabilities insertion program in FY09 to acquire, test, and assess enhanced capabilities and solutions to be integrated across MRAP Family of Vehicles. The major capability insertions are: Command, Control, and Communication Suite; Common Remote Weapon Station; and Gunner Protective Kit Overhead Protective Cover. The MRAP Joint Program Officer is managing the capability insertions efforts through ECPs. These capabilities insertions are undergoing developmental, live fire, and operational testing to assess their contribution to MRAP vehicle effectiveness, suitability, and survivability.
- LFT&E vulnerability of block upgrades and engineering changes to MRAP I vehicles continued throughout FY09. This testing focused on EFP armor, fire suppression technologies, and major structural modifications.
- ATEC completed LFT&E of MaxxPro and Caiman MRAP CAT I block upgrades.
- ATEC completed integrated developmental and Live Fire testing of the Cougar CAT I and CAT II ISS vehicles.
- Operational and Live Fire testing of MRAP vehicles was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan and test plans.

## Prime Contractors

- Force Protection Industries, Inc., Ladson, South Carolina
- General Dynamics Land Systems Canada, Ontario, Canada
- NAVISTAR Defense, Warrenville, Illinois
- BAE-TVS, Rockville, Maryland
- BAE Systems, Santa Clara, California

## Assessment

- Based upon analyses of the operational tests conducted for the two MRAP Ambulance variants, DOT&E's assessment of the operational effectiveness, suitability, and survivability of these vehicles is the following:
  - MaxxPro MRAP Ambulance is operationally effective and suitable. It is survivable against the requirement threats.
  - RG-33L MRAP Ambulance is operationally effective and suitable. It is survivable against the requirement threats.
  - An ambulance-equipped unit with the MRAP Ambulance variants can accomplish the mission of protected transport of casualties and medical attendant personnel, load and treat wounded troops, and support advanced life-support transfer.
- MCOTEA concluded the demands on the driver and ride quality of the Cougar ISS are similar to the MTVR and is considerably improved over the baseline Cougar vehicles across all road types (primary, secondary, and cross-country). DOT&E will evaluate the effectiveness, suitability, and survivability of the Cougar ISS and MaxxPro Dash after completion of operational testing in December 2009.
- LFT&E demonstrated the effective performance of the passive fire suppression technology added to some MRAP vehicles during the block upgrade/engineering change process.
- Integrated developmental testing and Live Fire testing of the Cougar ISS were successful in supporting the vulnerability reduction design effort including modifications to the suspension and vehicle interior. LFT&E of the final design is planned for FY10.

## Recommendations

- Status of Previous Recommendations. The MRAP program continues to address all previous recommendations.
- FY09 Recommendation.
  1. The Services should continue to ensure that adequate test and evaluation plans are developed, executed, and sufficient resources are allocated to support future upgrades to MRAP vehicles such as armor improvements or other ECPs applied to existing MRAPs.