

# Mine Resistant Ambush Protected (MRAP) Vehicles

## Executive Summary

- The Mine Resistant Ambush Protected (MRAP) Joint Program Office, led by the Marine Corps Systems Command, was established in November 2006.
- DOT&E approved the MRAP Test and Evaluation Master Plan (TEMP) in 2007.
- In July 2007, the MRAP program initiated a request for proposals for an MRAP II vehicle. The MRAP II is intended to provide increased ballistic protection against Explosively Formed Penetrators (EFPs). Additionally, the program also has developmental efforts underway to integrate armor protection against EFPs on existing MRAP vehicles.

## System

- MRAP vehicles are a family of vehicles designed to provide increased crew protection and vehicle survivability against current battlefield threats, such as improvised explosive devices (IEDs), mines, and small arms. The DoD initiated the MRAP program in response to an urgent operational need to meet multi-Service ground vehicle requirements. MRAP vehicles are to replace the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) in current combat operations, providing improved vehicle and crew survivability.
- There are two basic types of MRAP vehicles. The MRAP Category I (CAT I) vehicle is designed to transport no less than six persons while the MRAP Category II (CAT II) vehicle is designed to transport no less than 10 persons. An ambulance variant of the MRAP vehicle is also being developed.
- MRAP vehicles will incorporate current Service command and controls systems and counter-IED systems. Additionally, MRAP vehicles will incorporate gun mounts with gunner protection kits capable of mounting a variety of weapons systems such as the M2 .50 caliber machine gun and the MK-19 grenade launcher. Also, the program has developmental efforts underway to integrate armor protection against EFPs on existing MRAP vehicles.
- Five commercial vendors have been awarded ongoing production contracts for MRAP CAT I and CAT II vehicles:



MRAP Category I



MRAP Category II

Force Protection Industries, General Dynamics Land Systems-Canada, International Military and Government, BAE-Tactical Vehicle Systems (formerly Armor Holdings), and BAE. Additionally, DoD purchased an initial 160 CAT I vehicles from Oshkosh Truck and Protected Vehicles; however, no subsequent purchases have been made from these two vendors.

- As of September 2007, DoD identified an initial overall procurement objective of approximately 8,000 MRAP CAT I and Cat II vehicles. This procurement objective is expected to rise to approximately 16,000 vehicles.
- In July 2007, the MRAP program initiated a request for proposals for an MRAP II vehicle. The MRAP II is intended to provide increased ballistic protection against EFPs. Initial test and evaluation of MRAP II candidates is currently scheduled to begin in October to November 2007.

## 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 will be conducted in urban areas. Units equipped with MRAP CAT II will conduct ground logistics operations including convoy security, troop and cargo transportation, and medical evacuation.
- MRAP vehicles will support multi-Service missions and will be fielded to units based upon priorities established by the operational commander.

## Activity

- The MRAP Joint Program Office led by the Marine Corps Systems Command was established in November 2006.
- DOT&E approved the MRAP TEMP in 2007.
- The essential elements of the MRAP T&E program are:
  - Developmental Test (DT) phase one (DT-C1) was designed to conduct initial threshold testing of candidate vehicles. Marine Corps Operational Test and Evaluation Agency (MCOTEA) and Army Test and Evaluation Command

(ATEC) conducted DT-C1 in June 2007. It consisted of automotive and ballistic survivability testing and a limited user evaluation. The intent of DT-C1 was to provide an assessment of the capability of vendor candidate vehicles to meet MRAP system threshold requirements.

- DT phase 2 (DT-C2) will consist of safety testing, testing to assess key performance parameters and attributes, and

selected live fire testing. DT-C2 for the selected MRAP vehicles is ongoing.

- DT phase 3 (DT-C3) will consist of Full-up System Live Fire T&E as well as developmental test and evaluation to address any system requirements remaining from DT-C2.
- Each MRAP vehicle type by vendor will undergo an IOT&E. MCOTEA and ATEC will conduct a series of five IOT&E's. Each IOT&E will be vendor specific and will consist of CAT I and CAT II vehicles operated by both Marine Corps and Army units. The first IOT&E, consisting of vehicles from Force Protection Industries, is scheduled for early November 2007. The remaining vehicle variants will undergo IOT&E from January to April 2008. All IOT&E events will be conducted at Yuma Proving Ground, Arizona.

## Assessment

- As a result of DT-C1, the MRAP program selected candidate vehicles from five vendors – Force Protection Industries, General Dynamics Land Systems-Canada, International Military and Government, Armor Holdings, and BAE – to move on to DT-C2. Based upon the evaluation of results from DT-C1, candidate vehicles from Oshkosh Truck, Textron, and Protected Vehicles were not selected to move on to further testing due to identified shortfalls in ballistic survivability against threshold threats, automotive performance, and mission utility.

- Key DOT&E focus areas for the evaluation of MRAP effectiveness, suitability, and survivability include: overall capability of MRAP equipped forces to accomplish designated missions, automotive performance, vehicle reliability, human factors, effective integration of mission equipment, and ballistic survivability.
- The addition of EFP armor protection on existing MRAP vehicles will add significant weight to these vehicles and potentially compromise other aspects of vehicle performance.

## Recommendations

- Status of Previous Recommendations. No previous report was submitted for the MRAP program.
- FY07 Recommendations.
  1. DoD should continue to ensure that an effective T&E program remains in place that balances the need for rapid fielding and deployment of MRAPs with the need to identify and fix significant vehicle performance shortfalls prior to deployment.
  2. The program should ensure that adequate T&E plans are developed and executed to support the development of MRAP II, EFP armor, and any additional vehicle upgrades which may be implemented.