Why the Mine Resistant Ambush Protected Vehicle?

This article is dedicated to Sergeant Glen Hicks, Private First Class Jay-D Ornsby-Adkins, and Private Cole Spencer of the 3rd Brigade Combat Team, 3rd Infantry Division, Fort Benning, Georgia, who were killed in action in Iraq on April 28, 2007, when their HMMWV (high-mobility multipurpose wheeled vehicle) was attacked with an improvised explosive device (IED). Their deaths remind us how important our task is to get the Mine Resistant Ambush Protected (MRAP) vehicle in the hands of our deployed forces in significant numbers as quickly as possible.

Coalition operations in Iraq and Afghanistan have been characterized by the enemy’s creative use of IEDs. The majority of Americans are so familiar with the term “IED” that it does not need to be spelled out … it is now a part of our contemporary vocabulary.

In mid-2003, Coalition operations transitioned from traditional force-on-force close combat to conducting counterinsurgency operations and stabilizing a country in chaos from its rapid defeat. As our mission transitioned, our means for waging war shifted from heavily armored tracked combat vehicles to the thin-skinned benign HMMWV. In that regard, the role of the HMMWV shifted from general purpose transportation and maneuver support functions to personnel carriers for infantry squads and “gun trucks.”

As this trend of converting grew in momentum, our Soldiers quickly realized that a M998 HMMWV with canvas doors provided little in terms of protecting its occupants from a simple roadside IED and asked that we provide them with the latest in up-armored HMMWV (UAH). In that regard, the role of the HMMWV shifted from general purpose transportation and maneuver support functions to personnel carriers for infantry squads and “gun trucks.”

At this point we realized we had used all the excess capacity of the HMMWV and had reached the point of diminishing returns. Who would have thought that the superb vehicle that began replacing the M151 ¼ ton “Jeep” in the mid-1980’s would become an armored gun truck protecting its occupants against high velocity small arms fire and fragmentation from roadside bombs in 2004.

Early Introduction of MRAP-Like Vehicles

While the services continued to make force protection improvements to the HMMWV, both the Army and Marines were also fielding in very small numbers mine protected vehicles for use by explosive ordinance disposal (EOD) and other specialized combat engineer units. These mine protected vehicles go by names such as Cougar, Buffalo, and RG-31 and are characterized by a “V” shaped underbody, monocoque hull, and high ground clearance.

The use of the IED is not new to warfare and neither is the mine protected vehicle. IED is just a new term for an age old weapon. The mine protected vehicles that have now become known as MRAPs trace their origins back to the bush wars in South Africa during the late 1960’s and were slowly adopted by other nations conducting peacekeeping operations. The RG-31 is good example of this.

The Marines Push the Need for MRAP

What is new and unique about MRAP is the huge amount of attention it has generated and the unprecedented speed at which the Department of Defense (DoD) is pursuing the program and
buying vehicles. MRAP is a Joint program led by the Marine Corps with membership from the Army, Navy, Air Force, and U.S. Special Operations Command. In the acquisition world, Joint programs are known for their slow pace; however, the MRAP program is an anomaly in this regard. In less than nine months it went from concept development and approval by a senior Joint review panel to having thousands on order from several manufacturers. The DoD has declared MRAP its number one acquisition priority. Today, MRAP is among the largest DoD programs in terms of dollars budgeted and spent (more than $8 billion to date). In keeping with this priority, the Office of the Secretary of Defense has organized a Joint MRAP task force composed of senior Pentagon leaders to guide strategic decisions and ensure the unique requirements of each service are met.

**Operational Concept**

MRAP is really a new capability without a predecessor system. MRAP is not a new light tactical wheeled vehicle; not an interim replacement for the HMMWV fleet; or a bridge to the joint light tactical vehicle (JLTV), which is intended to eventually replace the HMMWV. Its mission role is similar to the Stryker in many respects. It will provide small units conducting typical counterinsurgency missions with protected mobility and mounted firepower. Squads and platoons will use MRAP to enable both mounted and dismounted missions. Typical mission sets supported by MRAP are cordon and search, raids, mounted combat patrol, traffic control points, convoy security, escort, medical evacuation (MEDEVAC), and protected transport. MRAPs will replace many UAHs currently used to conduct these missions; however, units will want to retain some UAH for operations in terrain where MRAPs are unsuitable.

MRAP is divided into three categories of vehicles based solely on the number of occupants the vehicle must hold. The Army will only field category I and II vehicles. Category I MRAP is a fire team-size vehicle designed to hold six occupants and category II MRAP is a squad-size vehicle designed to hold 10 occupants. (See photo below of typical category I and II MRAP vehicles). The number of occupants in both categories includes the driver, vehicle commander, and gunner. A category I MRAP provides units with a protected maneuver capability in urban areas and other restricted terrain. They primarily serve as armored personnel carriers for fire teams and weapons carriers for heavy machine guns and the TOW-Improved Target Acquisition System (ITAS) missile system. Reconnaissance units will use the category I MRAP to conduct mounted reconnaissance while employing the Long Range Scout Surveillance System from the vehicle. The category II MRAP is considered a multi-mission vehicle and provides units with protected transport between secure areas. Sapper squads and rifle squads will use the category II MRAP for protected maneuver and movement when it is necessary to mass Soldiers rapidly for a mission such as a quick reaction force. The category II will also be a special built armored ambulance for use by medical evacuation squads conducting ground MEDEVAC.

**Speed of Delivery Critical to Success**

Currently there are five primary (reduced from seven) manufacturers of MRAP vehicles. These vehicles all look

**Typical Category I (left) and II (right) MRAP Vehicles**

Courtesy photo
different, but provide the same capabilities and meet the same required level of protection for mounted occupants. The number of different manufacturers is a result of DoD quickly identifying that no one manufacturer had the production capacity to build and deliver several thousand vehicles in less than a year. This massive number of MRAP vehicles required by our operating forces in a very compressed timeframe is therefore driving the strategy of awarding multiple contacts. Major factors that will continue to influence this strategy are how fast the required number of MRAP vehicles can be produced, integrated, and fielded to the warfighter.

The DoD objective for the MRAP program is to rapidly provide protected, effective, and suitable tactical mobility to the deployed warfighter. Providing a rapid solution in less than 12 months meant that a development phase was out of the question. MRAP had to be a non-developmental item (NDI) which could be quickly produced in large quantities. MRAP’s most important and highest priority capabilities are force protection and survivability. With this heavy emphasis on protective capabilities, trades in other areas were required to ensure MRAP can provide the maximum protection possible. Transportability and off-road mobility are the primary areas affected by these trades.

**MRAP Capabilities**

MRAP will provide a significant increase in occupant protection from IEDs, mines and small arms fire when compared to a UAH. MRAP is designed with a series of protection mechanisms to enhance the survival and increase the mission effectiveness of its crew and passengers. These mechanisms combine geometric shape, ballistic armor, vehicle height, and injury mitigating systems to provide a superior level of protection and resiliency when compared to other vehicles. Although the MRAP provides a high degree of force protection, the vehicle occupants must still wear their personal protective equipment such as helmet, body armor, eye protection, and hearing protection to prevent the likelihood of injury.

Category I and II MRAP vehicles will have a protected turret able to traverse 360 degrees and mount crew-served weapons such as the M2 50-cal. machine gun, MK-19 grenade machine gun, and M240 medium machine gun. Some versions of category I MRAP vehicles will be equipped to mount the TOW missile system or Long Range Advanced Scout Surveillance System. MRAP vehicles can reach speeds of up to 65 mph on improved roads, 25 mph on secondary road and trails, and travel 300 miles on single tank of fuel. MRAP vehicles will come equipped with the Objective Gunner Protection Kit (OGPK), Drivers Vision Enhancer (DVE), Jammer, AN/VRC 92 dual long range radio system, Blue Force Tracker (BFT), vehicle intercom system, and Warrior Aid and Litter Kit (WALK).

Future improvements to MRAP are already in the works to provide enhanced survivability over those already being delivered. These improvements focus on providing the warfighter even greater protection against larger IED blasts, and the constantly evolving threats being faced in theater.

**Organizational Concept**

MRAP will be used by every subordinate unit in the infantry, heavy, and Stryker brigade combat teams. MRAP provides a brigade combat team with several additional capabilities:

- The brigade’s forward support companies will now have protected transport for personnel during tactical movement;
- Key leaders at brigade and battalion will have a protected command and control vehicle;
- Rifle, tank, engineer, and reconnaissance companies or troops have protected tactical mobility for the entire organization;

![Aberdeen Test Center](image)

*An MRAP variant undergoes a series of tests at the Aberdeen Test Center in Maryland. MRAP vehicles are designed with a series of protection mechanisms to enhance survival and increase mission effectiveness.*
Field artillery batteries have a protected platform for conducting nonstandard missions; and

Medical units have a protected MEDEVAC platform to replace the unarmored HMMWV frontline ambulance.

The infantry brigade combat team probably has the greatest need for MRAP capabilities because under its modified table of organization it has the smallest number of protected vehicles. The heavy brigade combat team, depending on the tactical situation, will employ MRAP in pure formations as well as mixed formations with tanks and Bradleys. The Stryker brigade combat team has less of a need for MRAP, but will employ them in subordinate units that are not assigned Stryker vehicles.

MRAP will also be used by the five types of support brigades (Fires, Aviation, Maneuver Enhancement, Sustainment, and Battlefield Surveillance) and echelons above brigade. The number of MRAP vehicles provided to a company-size element varies widely from as few as eight vehicles to as many as 27 vehicles. Table 1 is an example of recommended company-level basis of issue. Final distribution decisions will be made by HQDA in close coordination with commanders in the CENTCOM area of responsibility.

### MRAP Distribution at Company Level

<table>
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<th>Unit</th>
<th>IBCT</th>
<th>SBCT</th>
<th>HBCT</th>
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</tr>
<tr>
<td>Engineer Co</td>
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<td>5</td>
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</tr>
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</table>

MRAPs are not indestructible or immune to casualties. The design of MRAP capitalizes on its protective capabilities, but traded other important attributes to achieve that level of protection. The enemy will observe our operations, make changes to their TTPs, and adapt to our new levels of force protection.

To quote Admiral Edmund Giambastiani, former vice chairman of the Joint Chiefs of Staff, in an interview in June 2007 with InsideDefense.com:

“No matter how much armor you put out there, all of this stuff at one point or another can be defeated. What we don’t want to do is make the expectation out there that we’re going to save every single individual that we put in one of these vehicles because we’re putting a cocoon around them. You simply can’t do it. There are weapons and techniques that can be used to defeat literally everything, including M1 tanks, Bradleys and the rest of it. So that’s the bottom line.”

Accordingly, leaders and Soldiers alike must make sure that this boost in confidence doesn’t become overconfidence where needless chances are taken. Units who successfully employ MRAP vehicles against the enemy will do so by integrating MRAP protection with training, planning, smart tactics, and well-rehearsed drills.

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**One of the first shipments of MRAP vehicles arrive in Iraq.**

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**Sergeant Mark B. Matthews**

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**Thomas J. Stafford** is a combat developments specialist with the Mounted System Division, Directorate of Combat Developments, U.S. Army Infantry Center at Fort Benning, Georgia.