

MRAP: A Limited Capability
EWS Contemporary Issue Paper
Submitted by Captain D.R. Stark
To
Major R.F. Revoir, CG 9
19 February 2008

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 19 FEB 2008		2. REPORT TYPE		3. DATES COVERED 00-00-2008 to 00-00-2008	
4. TITLE AND SUBTITLE MRAP: A Limited Capability				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) United States Marine Corps, Command and Staff College, Marine Corps University, 2076 South Street, Marine Corps Combat Development Command, Quantico, VA, 22134-5068				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 14	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

If a Marine was asked on the first day of Operation Iraqi Freedom (OIF), what the greatest threat confronting him was, it is unlikely he would have said the improvised explosive device (IED). However, the IED has accounted for 41% of all deaths or 1,594 US service-member deaths, making it the number one source of casualties.¹ To counter the threat of the IED, the Marine Corps is acquiring 2,225 Mine Resistant Ambush Protected (MRAP) vehicles.² However, the Marine Corps should limit MRAP's acquisition and planned use to what is urgently needed in Iraq because the MRAP vehicle has logistical problems, lacks maneuverability, and is irrelevant to tomorrow's battlefield.

Mine Resistant Ambush Protected Vehicles

The term MRAP refers to a family of fighting vehicles designed with a V-hull and raised chassis to withstand an IED attack. There are three categories of these vehicles. Category I is the smallest and lightest MRAP, carrying between 6-8 personnel. It is meant for small unit operations in urban environments. Category II is medium sized and carries 6-10 personnel. Its mission is troop transport and convoy

¹ *Iraq Coalition Casualty Count*, 12 December 2007, <<http://icasualties.org/oif/>>, (12 December 2007).

² Maj Mike Monroe, interview by Capt David Stark, 3 December 2007.

operations. Category III is the largest vehicle, and its task will be clearance of IEDs.³

The MRAP program began in February 2005 as a request from then Brigadier General Hejlik while he was Deputy Commander of I MEF. He sent an urgent request for MRAP capability to increase the survivability of Marines. Based on this request, the M1114 armored HMMWV was rushed to theater and armor kits were applied to those HMMWVs already in theater. These vehicles were insufficient to protect against IEDs that were detonated underneath the vehicle.⁴ The armored HMMWV's insufficiency in protecting against IEDs led to a requirement for a new family of vehicles. In May of 2007, Secretary of Defense Robert Gates stated the MRAP vehicle program was the highest priority for acquisition.⁵ Today the military is rushing MRAP vehicles into theater at the rate of 1,000 per month.⁶

Logistical Problems

There is a saying among military planners that "amateurs talk tactics, professionals talk logistics." It is in the

³ Scott Allen, Interview by Capt David Stark, 30 November 2007.

⁴ Tom Vanden Brook, "Marine leaders defend '05 decision on MRAPs", *USA Today*, 22 July 2007, <http://usatoday.com/news/military/2007-07-22-mrap-defense_N.htm>, (8 December 2007).

⁵ Lolita C. Baldor, "Marines to Cut Armored Vehicle Orders", *MSNBC*, 30 November 2007, <<http://www.msnbc.msn.com/id/22030978/>>, (12 December 2007).

⁶ Allen.

logistical realm that the MRAP has significant detrimental qualities in expeditionary capability, supply and maintenance requirements, and prohibitive cost. The Marine Corps must limit acquisition and use of MRAP to prevent these logistical problems from interfering with the ability to accomplish the mission.

Expeditionary Capability

MCDP 3 Expeditionary Operations states, "While all Services include units capable of expeditionary operations, the entire operating forces of the Marine Corps are specifically organized, equipped, and trained for expeditionary service."⁷ The Marine Corps has staked its survival as a military service on being able to conduct expeditionary operations with an amphibious capability. MRAP is unique among the combat vehicles in that it does not possess an expeditionary capability.

When Marine Corps forces deploy for expeditionary operations, they do so in amphibious shipping. MRAP is between 4 to 6 times heavier and takes up more cubic space than the HMMWV it is replacing. Naval ships that the Marine Corps deploys in can only hold a certain amount of weight and cubic space. Amphibious ships that are already at their limits of weight and cubic space will be unable to carry MRAP vehicles. Even if future amphibious ships have the capability to carry

⁷ *MCDP 3, Expeditionary Operations*, pg 36.

MRAPs aboard, once the MRAP gets to the beach it would sink into the sand due to its weight.

One of the great capabilities of the Marine Corps is the ability to lift light tactical vehicles with aircraft. Up to two HMMWVs can be transported by a CH-53E helicopter using external lift. External lift is not possible with the MRAP since even the lightest of MRAP vehicles greatly exceeds the CH-53E payload. Don't look to the MV-22 Osprey to solve this problem either. MV-22's maximum lift capability is a fraction of that required to lift a MRAP vehicle.⁸ Due to its size, the MRAP can not be transported in the Marine Corps' only other heavy lift aircraft the KC-130J, which currently can transport 2-3 HMMWVs. The only way MRAP vehicles can be transported to a theater is by C-5, C-17, and roll-on/roll-off shipping assets.⁹ Marine Corps planners must consider future expeditionary operations without MRAP capability. The Marine Corps should limit acquisition of MRAPs because of their lack of expeditionary capability.

Supply and Maintenance

Maintenance and supply will also be logistical hurdles for the MRAP. Five vendors are producing a total of eight variants

⁸ "V22", *NAVAIR*, < <http://www.navair.navy.mil/v22/index.cfm>>, (12 February 2008).

⁹ David Hansen, Interview by Capt David Stark, 30 November 2007.

of the MRAP. The great advantage of using multiple vendors is that the vehicles can be produced in mass quantities and rapidly pushed to the fleet. However, as Krepinevich and Wood point out, in their paper titled, "Of IEDs and MRAPs: Force Protection in Complex Irregular Operations," "The greater the number of models, the more complicated and costly sustainment efforts become."¹⁰

The problem is the vehicles are not common across manufacturers. All MRAP vehicles will have common tires, drive trains, government furnished equipment, and one of two engines.¹¹ While commonality of parts is characteristic of the largest items, the frame and other components are not common. Differing frames and other parts between vendors will require eight different parts blocks. Since the MRAP will mostly serve as a complementary capability to the HMMWV, these new parts blocks will be in addition to those already existing.

Increased fuel requirement for heavily armored vehicles is another problem. MRAPs, which burn nearly three times as much fuel as a HMMWV, will increase fuel costs and the amount of fuel sustainment operations necessary to sustain the armored force. Krepinevich and Wood suggest, more operations equals more

¹⁰ Andrew F. Krepinevich and Dakota L. Wood, "Of IEDs and MRAPs: Force Protection in Complex Irregular Operations", *Center for Strategic and Budgetary Assessments*, 17 October 2007, <http://www.csbaonline.org/4Publications/PubLibrary/R.20071017.Of_IEDs_and_MRAPs/R.20071017.Of_IEDs_and_MRAPs.pdf>, (13 November 2007), 40.

¹¹ Hansen.

personnel deployed and more fuel convoys that will have the effect of placing more personnel at risk.¹² Supply and maintenance issues give further credence to limiting MRAP acquisition and use.

Prohibitive Cost

At \$1,000,000 per vehicle, MRAPs are expensive. The vehicle it replaces, the HMMWV, costs approximately \$150,000.¹³ Ironically MRAPs have been fielded in response to a threat that costs almost nothing. The enemy is using IEDs. The only cost is a triggering mechanism and yet the US military response to the weapon is a \$1,000,000 vehicle. Much of the price of the MRAP is opportunity cost incurred for acquiring and fielding these vehicles so quickly.

The Joint Light Tactical Vehicle (JLTV) is the program of record to replace the HMMWV. Its target cost per vehicle is estimated at \$200,000 to \$250,000.¹⁴ To save money the Marine Corps should limit the purchase of MRAP vehicles and push to accelerate the JLTV. The JLTV will combine force protection characteristics of MRAP with the utility and mobility of HMMWV.

¹² Krepinevich and Wood, 45.

¹³ Allen.

¹⁴ "JLTV INDUSTRY DAY Questions & Answers", *Office of Naval Research*, 25 May 2006, <http://www.onr.navy.mil/about/events/docs/76_JLTV%20Q&A.doc>, (12 December 2007).

Some would say that despite the cost and limited capability of the MRAP that the Marine Corps has a moral obligation to field this vehicle in an effort to save lives. It is true that no price tag can be put on the life of an American service member. However, it is also true that MRAPs have already saved lives in theater. What must be considered is if limited tax dollars are spent on MRAP today it may take longer to field more capable systems like the JLTV that will provide a better long term solution. JLTV has already recently been delayed almost two years, conceivably by the skyrocketing cost of the MRAP program.¹⁵ The Marine Corps must limit its acquisition and use of MRAPs because of the prohibitive cost.

Lack of Mobility

The counterinsurgency in Iraq is largely in urban areas. Due to the urbanization of society it is likely that battlefields of tomorrow will also be fought in urban terrain. There are several reasons that MRAP is not well suited for this environment.

Urban terrain in underdeveloped nations like Iraq have characteristically poor infrastructure, requiring vehicles with good mobility characteristics. Roads are often narrow with

¹⁵ Christian Lowe, "Frag Kit 6 to go on MRAPS", *Defensetech*, 2 October 2007, <<http://www.defensetech.org/archives/003763.html>>, (12 December 2007).

little room to maneuver. The MRAP is unable to traverse some of the same urban streets where the HMMWV once could. As an example of its limited mobility, during a recent visit to Haditha, Marine Corps Commandant, General Conway was riding in a MRAP when it became stuck on a concrete strip dividing two sides of a highway. After a delay, the driver was able to drive the length of the median to free the vehicle.¹⁶

Whereas the HMMWV was built with an off-road capability, the MRAP has no capability for off-road mobility except in the best of conditions. MRAPs poor off-road characteristics is due to its relative gargantuan weight. Bridges that used to be crossed by HMMWVs are no longer passable by MRAP.¹⁷ These mobility limitations are sure to be noticed by the enemy and used to his advantage. The Marine Corps must limit acquisition and use of MRAP because it can not afford to equip its combat units primarily with MRAPs that will offer a sanctuary to the insurgent.

Irrelevance on Tomorrow's Battlefield

It is impossible to predict the conditions that tomorrow's battlefield will present. The only thing about war that remains the same is the nature of it. *MCDP 1 Warfighting* states about

¹⁶ Gordon Lubold, "For Marines, Fewer Bombproof Trucks", *Christian Science Monitor*, 29 November 2007, <<http://www.csmonitor.com/2007/1130/p01s11-usmi.html>>, (30 November 2007).

¹⁷ Hansen.

war that "each episode [of war] merges with those that precede and follow it-shaped by the former and shaping the conditions of the latter-creating a continuous, fluctuating flow of activity replete with fleeting opportunities and unforeseen events...

Success depends in large part on the ability to adapt..."¹⁸

Success in war requires doctrine, tactics, and material resources that are flexible. Unfortunately the MRAP is a one dimensional vehicle built for a specific limited environment.

Since the beginning of warfare, as weapons developed, counters to those weapons developed as well. A microcosm of weapon development can be seen in OIF. Upon conclusion of major combat operations, the IED began to be used effectively by insurgent forces. Introduction of this weapon was largely due to the US failure to secure tons of Iraqi ordnance stockpiles. The IED became a relatively inexpensive economy of force measure that began to produce casualties which in turn weakened political resolve. In the first years of the war, the IED was primarily placed on the roadside and was effective against the standard HMMWV. The military responded to this threat with the purchase of armored HMMWVs. In response, insurgents began effectively targeting the underside of HMMWVs with IEDs, producing the same casualties as before.¹⁹ The military has

¹⁸ MCDP 1, *Warfighting*, pg 9.

¹⁹ Vanden Brook.

responded with the fielding of the MRAP. Enemy response has been predictable; they are now employing explosively formed penetrators (EFPs). These EFPs are shaped charges that fire a stream of molten copper capable of tearing through the armor of an MRAP or even a tank.²⁰ As the first MRAPs are just being fielded in Iraq, already the cries are going up for the requirement for a MRAP II that would protect against EFPs.²¹

LtCol Roy McGriff III, in his paper *Mine Resistant Armor Protected Vehicles*, argues that offensive mine warfare is the most likely threat to ship to objective maneuver (STOM) operating forces and that MRAP vehicles are necessary in that environment.²² However, Krepinevich and Wood point out that "threats change and evolve, sometimes quite rapidly." This rapid change is illustrated by the EFP development seen in Iraq.²³ The mine will not retain its current form and capability but, as history has shown, will continue to evolve and adapt to the armor that opposes it. The Marine Corps must limit MRAP acquisition realizing it will not protect against tomorrow's threats.

²⁰ "Explosively Formed Penetrator", *Wikipedia*, 3 December 2007, <http://en.wikipedia.org/wiki/Explosively_formed_penetrator>, (12 December 2007).

²¹ Peter Eisler, "The Truck the Pentagon Wants and the Firm the Makes It", *USA Today*, 1 August 2007, <http://www.usatoday.com/news/military/2007-08-01-force-protection-mraps_N.htm>, (12 December 2007).

²² Major Roy McGriff III, "Mine Resistant Armor Protected Vehicles", *School of Advanced Warfighting*, 16 September 2005.

²³ Krepinevich and Wood, 48.

Conclusion

The Marine Corps needs to purchase a limited number of MRAP vehicles to deal with the immediate threat of IED. As decisions are made concerning future use and employment of the MRAP there are some considerations that must be weighed. The MRAP lacks the expeditionary capability of the rest of the Marine Corps. The MRAP is not a replacement to the HMMWV as it has very limited mobility. The development of counters to the enemy's threat must be weighed against the enemy's ability to adapt his tactics to that counter. The MRAP acquisition should be thought of as a very limited capability that is for Iraq only and not something to be integrated into future expeditionary operations.

WORD COUNT: 2000

Bibliography

- Allen, Scott. Interview by Capt David Stark, 30 November 2007.
- Baldor, Lolita C. "Marines to Cut Armored Vehicle Orders", *MSNBC*, 30 November 2007, <<http://www.msnbc.msn.com/id/22030978/>>, (12 December 2007).
- Blomfield, Adam. "Israel Humbled by Arms from Iran", *Telegraph*, 16 August 2006, <<http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2006/08/15/wmid15.xml>>, (12 December 2007).
- Copp, Tara. "US Military Seeks Acceleration of MRAP Vehicle Delivery", *Jane's Defence Weekly*, 25 July 2007, <<http://www8.janes.com/search/printfriendlyview.do?docid=/content1/janesdata/mags/jd.>>, (13 November 2007).
- Cushman, Jeremiah. "U.S. Military Pushes Blast-Resistant Vehicles", *Military Periscope*, 15 March 2007, <<http://www.militaryperiscope.com/special/special-200703151658.shtml>>, (13 November 2007).
- Eisler, Peter. "The Truck the Pentagon Wants and the Firm that Makes It", *USA Today*, 1 August 2007, <http://www.usatoday.com/news/military/2007-08-01-force-protection-mraps_N.htm>, (12 December 2007).
- "Explosively Formed Penetrator", *Wikipedia*, 3 December 2007, <http://en.Wikipedia.org/wiki/Explosively_formed_penetrator>, (12 December 2007).
- Garamone, Jim. "Top Marine Explains Cut in Purchase of Mine-resistant Vehicles", *Defenselink*, 5 December 2007, <<http://www.defenselink.mil/news/newsarticle.aspx?id=48333>>, (6 December 2007).
- Hansen, David. Interview by Capt David Stark, 30 November 2007.
- Iraq Coalition Casualty Count, 21 December 2007, <<http://icasualties.org/oif/>> (12 December 2007).
- "JLTV INDUSTRY DAY Questions & Answers", *Office of Naval Research*, 25 May 2006, <http://www.onr.navy.mil/about/events/docs/76_JLTV%20Q&A.doc>, (12 December 2007).
- King, COL Dion. "Marine Corps Announces Mine Resistant Ambush

Protected Vehicle Contracts", *Marines*, 26 January 2007, <<http://www.marines.mil/marinelink/mcn2000.nsf/0/B0F54EEACB8B05B78525726F007D6048?opendocument>>, (8 December 2007).

Krepinevich, Andrew F., and Dakota L. Wood. "Of IEDs and MRAPs: Force Protection in Complex Irregular Operations", *Center for Strategic and Budgetary Assessments*, 17 October 2007, <http://www.csbaonline.org/4Publications/PubLibrary/R.20071017.Of_IEDs_and_MRAPs/R.20071017.Of_IEDs_and_MRAPs.pdf>, (13 November 2007).

Lowe, Christian. "Frag Kit 6 to go on MRAPs", *Defensetech*, 2 October 2007, <<http://www.defensetech.org/archives/003763.html>>, (12 December 2007).

Lubold, Gordon. "For Marines, Fewer Bombproof Trucks", *Christian Science Monitor*, 29 November 2007, <<http://www.csmonitor.com/2007/1130/p01s11-usmi.html>>, (12 December 2007).

McGriff III, Maj Roy. "Mine Resistant Armor Protected Vehicles", Paper Submitted to School of Advanced Warfighting, Command and Staff College, 16 September 2005.

Monroe, Maj Mike. Interview by Capt David Stark, 3 December 2007.

Shanker, Tom. "Marines Press to Remove Their Forces From Iraq", *NY Times*, 11 October 2007, <<http://www.nytimes.com/2007/10/11/washington/11military.html?n=top/reference/times%20topics/people/g/gates,%20Robert%20M.>>, (5 December 2007).

Vanden Brook, Tom. "Marine leaders defend '05 decision on MRAPs", *USA Today*, 22 July 2007, <http://usatoday.com/news/military/2007-07-22-mrap-defense_N.htm>, (8 December 2007).

"V22", NAVAIR, <http://www.navair.navy.mil/v22/index.cfm>, (12 February 2008).

United States Marine Corps, MCDP 3, *Expeditionary Operations*, pg 36.

United States Marine Corps, MCDP 1, *Warfighting*, pg 9.