



ACQUISITION OF MINE-RESISTANT, AMBUSH-PROTECTED (MRAP) VEHICLES: A CASE STUDY

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NPS Acquisition Research Symposium

May 12, 2010

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 12 MAY 2010	2. REPORT TYPE	3. DATES COVERED 00-00-2010 to 00-00-2010			
4. TITLE AND SUBTITLE Acquisition of Mine-Resistant, Ambush-Protected (MRAP) Vehicles: A Case Study		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) University of Maryland, Center for Public Policy and Private Enterprise, School of Public Policy, College Park, MD, 20742		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 7th Annual Acquisition Research Symposium to be held May 12-13, 2010 in Monterey, California. U.S. Government or Federal Rights License					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 27	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



Overview

- ➔ Introduction and Background
- ➔ Demand for MRAPs
- ➔ MRAP Description
- ➔ MRAP Procurement
- ➔ Lessons Learned and Recommendations



MRAP Vehicle Program

- ➔ The largest military industrial mobilization since WWII
- ➔ The most significant example of urgent government-industry cooperation on a massive scale since WWII
- ➔ DoD's #1 acquisition program (per SecDef Gates, May 07)

“The MRAP program was the first major defense procurement program to go from concept to full-scale production in less than a year since World War II.” – Secretary of Defense Robert Gates



The Threat

- ➔ Improvised Explosive Devices (IEDs)
 - Approximately 70 percent of troop casualties
 - Increasing frequency--*“Beginning in June 2003, IED incidents targeting coalition forces began to escalate from 22 per month to over 600 per month in June 2004. In June 2006, these incidents reached more than 2,000 per month. At one point in 2006, coalition forces in Iraq were experiencing almost 100 IEDs per day”* – GAO, 2009
 - Evolving sophistication
 - Explosively-Formed Penetrators (EFPs)
 - Under-vehicle detonation
 - Bigger bombs





Iraq IED Video



Video is courtesy of a combat-disabled US Army "Silent Professional"

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Initial Two Prong Approach

➔ **Avoidance tactics and defeating insurgents' ability to make and detonate IEDs**

- In October 2003, a small Army unit dedicated itself to studying IED avoidance tactics and defeating insurgents' ability to make and detonate IEDs.
 - Unit elevated the to a joint task force in 2004, became a permanent entity in February 2006.
 - In FY2007, JIEDDO employed hundreds of people and commanded a budget over **\$4 billion**.

➔ **Adding armor to HMMWVs**

- In the summer of 2003, DoD also began procuring up-armored HMMWVs (identified as the M1114), as well as adding armor kits to existing vehicles.
 - congressional pressure and media exposure spurred a significant ramp-up in production
 - Add-on kits or new, up-armored models
 - Already in production
 - Flat bottoms absorb a great deal of blast force
 - Marginal improvements in survivability over HMMWV, but, at the same time, insurgent attacks increase in
 - frequency and ferocity

What are MRAPs?

- ➔ MRAP vehicles:
 - a family of vehicles that incorporate a V-shaped, armored hull that directs blast away from crew
 - High ground clearance dissipates blast intensity
 - Heavily armored
- ➔ Not a new Concept
 - South Africa deployed the first major contingent of MRAPs in the 1970s





Early MRAP Use

- ➔ U.S. began testing MRAP vehicles in FY 2000
 - A few dozen were in service in Iraq and Afghanistan prior to the MRAP program
 - Viewed as a niche capability for EOD teams, rather than as replacement for the HMMWV
 - Demonstrated superior survivability
- ➔ Vehicle Loss Rates Attributable to Mines

Conflict	Loss rate (%)
World War II	23
Korea	56
Vietnam	70
Operation Desert Storm	59
Operation Restore Hope (Somalia)	60



Demand for MRAPs

- ➔ Field demand for better-armored vehicles began, as IEDs emerged as a major threats, shortly drive into Baghdad 2003
 - Interest beyond EOD teams, from regular combat forces to replace HMMWVs on certain missions
 - For example, a Military Police Commander issued an urgent request for armored security vehicles in June 2003, to better protect U.S. convoys in Iraq
 - Also, latter that summer 101st Army Airborne Division issued a report citing IED injuries and seeking more vehicle armor



Formal Request

- ➔ First formal field request – Urgent Universal Need Statement (UUNS) from Deputy Commanding General, I Marine Expeditionary Force came February 17, 2005
 - Request for 1,169 MRAPs routed to the USMC in-house rapid acquisition process
- ➔ **MCCDC stops processing request** in light of Commandant's decision to replace all HMMWVs with up-armored HMMWVs
- ➔ Demand continued, and manifested as a Joint Universal Operational Needs Statement (JUONS) in joint-service channels
 - May 2006: Commanding General, Multi-National Force – West issues a Joint Staff Rapid Validation and Resourcing Request for 185 MRAPs
 - July 2006: An additional 1000 MRAPs requested
 - November 2006: First contract signed for MRAP production



Why the 'Delay' in the Requirements Process?

- ➔ Nearly two years (20 months) passed from the time of the first formal field request for MRAPs, until validated requirements were obtained
- ➔ Speculation on DoD's thinking:
 - Threatened programs of record, e.g. MRAPs would divert funding away from existing development programs such as the Joint Light Tactical Vehicle (JLTV)
 - Enemy constantly adapting faster than MRAPs or other solutions (up armored HMMWVs) could be fielded and updated
 - Incongruent with envisioned light, expeditionary force structure
 - Counter to counter-insurgency strategy
 - Casualty rates not historically high
 - Belief in a short war
 - Would arrive too late to make a difference



MRAP Description

Category I



- Intended for urban combat environments and patrols
- Transports up to 6 personnel
- Curb weight 7 – 15 tons
- Estimated per unit cost range: \$300,000 to \$550,000*

Category II



- Intended for convoy escort, troop/cargo transport, explosive ordnance disposal and ambulance missions
- Transports up to 10 personnel
- Curb weight 15-25 tons
- Estimated per unit cost range: \$540,000 - \$644,000*

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MRAP Description (cont.)

Category III

- Used primarily for route clearance and explosive ordinance disposal
- Transports up to 13 personnel
- Curb weight 25 tons
- Estimated unit cost: \$856,000*
- Only FPI's 6x6 Buffalo was awarded production in this category,
- And, only the USMC acquired Category III MRAPs through the MRAP program



*These estimates are for the base model. Modifications, to include armor upgrades, increased the costs. The accepted estimate is that average cost for MRAPs is approximately \$1 million per vehicle.

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And we're off

- ➔ Aug 2006 - RFI to industry
- ➔ Initial requirement validated Oct '06 for 1,185
 - Requirements would escalate to over 16,000 MRAPs and 6,600 M-ATVs by Oct '09
- ➔ Nov 2006 – RFP released
 - Minimum set of performance standards
- ➔ Nov 2006 – Sole Source production contract signed for Cat II and III
 - already in production by Force Protection Industries (FPI)
 - Goal to start procuring vehicles immediately



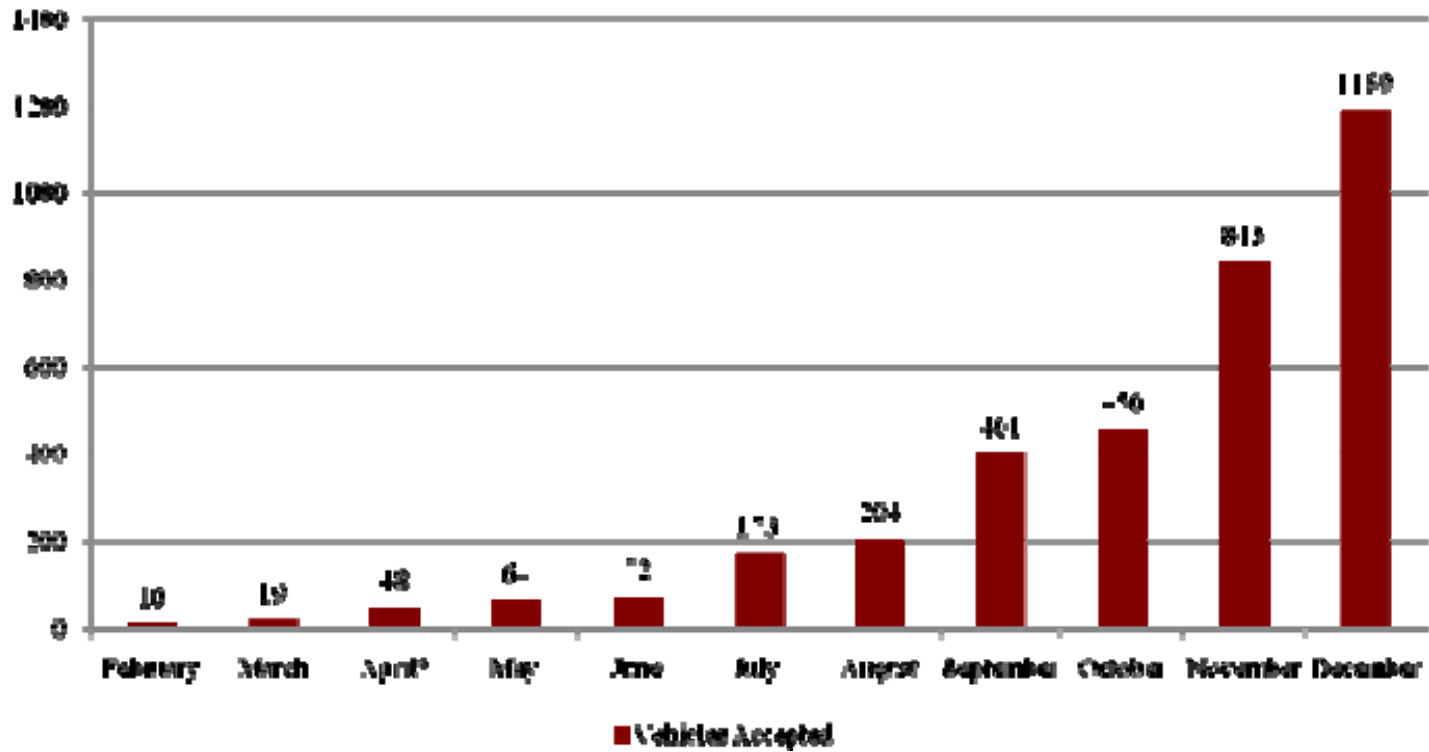
Industry Responds

- ➔ Ten manufacturers responded to the RFP
- ➔ The proposals were evaluated based on technical approach and proposed delivery schedule.
- ➔ Nine contractors were awarded firm-fixed-price IDIQ contracts
 - Up to 1500 Cat I, and 2600 Cat II MRAPs per year (one year and four option years)
- ➔ Also required the nine vendors to supply 2 vehicles in each category (I and II) for survivability and mobility testing.
 - These 36 test vehicles cost \$88 million.
- ➔ LRIP orders immediately to 5 manufacturers on the basis of risk in their proposals
 - Allowed industry to ramp-up
 - The entire program would essentially run on LRIPs
- ➔ Follow-on production orders based on subsequent rounds of testing and production capacity



Program Accelerates Quickly

MRAPs Accepted in 2007





Other Issues

Funding

- ➔ Congress gave the program everything it requested, it even appropriated funds in excess of requests
- ➔ Through FY2009, \$26.8B in wartime supplementals and reprogramming -- to procure over 16,000 MRAP vehicles
- ➔ Supplemental funding had no “color.”
 - A component critical was a transfer fund set up by the Office of the Secretary of Defense (OSD)
 - Allowed the Joint Program Office to decide how to color money by type and service.

Priming the Industrial Pump

- ➔ DX rating
- ➔ Funded manufacturer facility upgrades
- ➔ Tire shortage
 - Paid for additional molds for Michelin
 - Certified Goodyear tires
- ➔ Steel shortage
 - Dropped import restrictions
 - Qualified more steel makers
 - Increased plant capacity



Other Issues

Testing

- ➔ Concurrent testing, production modification, and fielding
 - New orders placed after each round of testing
 - Continuous improvement
- ➔ Manufacturer reps on site at Aberdeen
 - Immediate feedback to production and design teams

GFE and Transport

- ➔ All GFE installed at SPAWAR
- ➔ Air-shipped until capacity reached
 - Roughly half of all MRAPs
 - Approximately \$160,000 per vehicle
- ➔ Surface (Sea) shipments
 - Approximately \$20,000
 - Afghanistan MRAPs still air-shipped



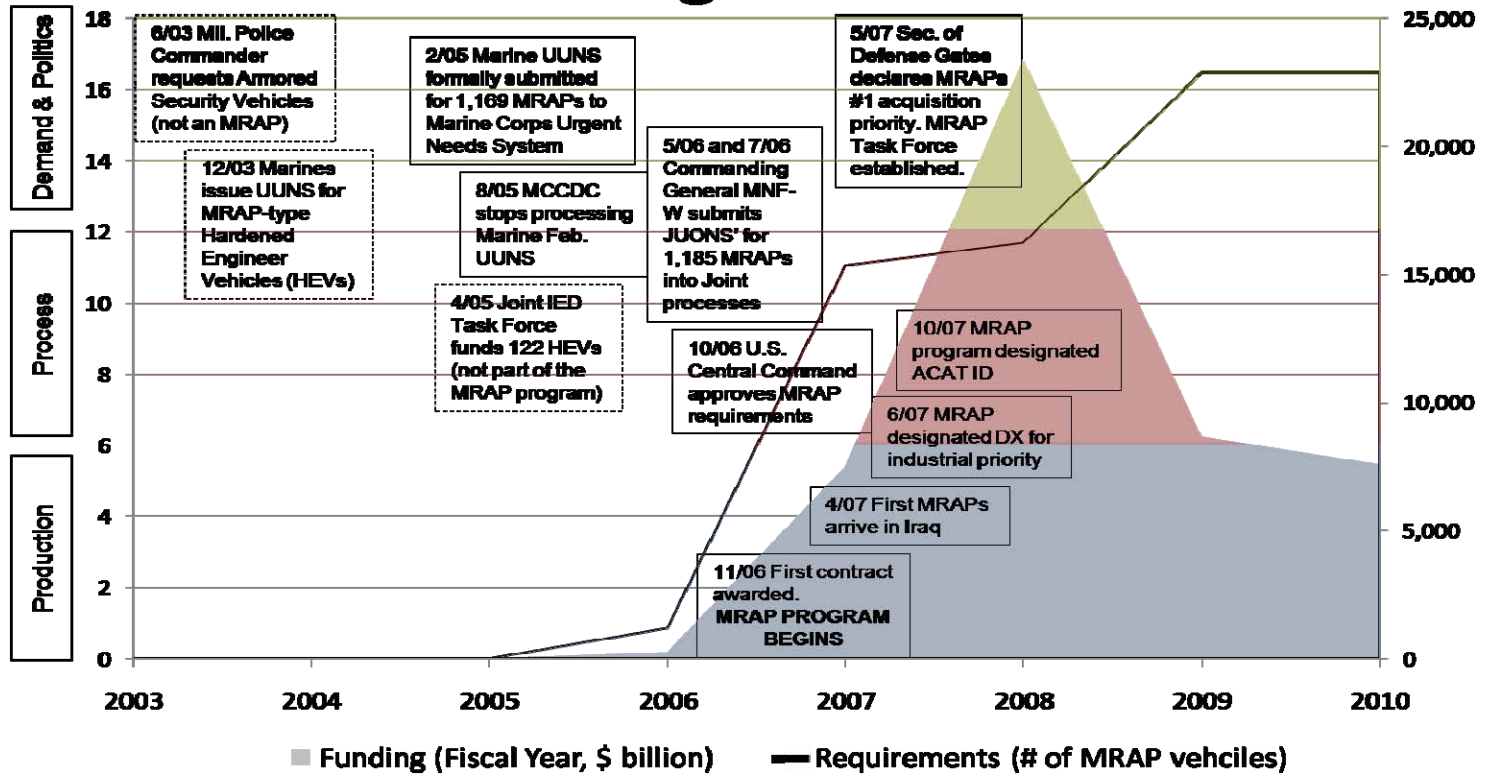
Field Support

- ➔ With the initial requirement (below 1,700 vehicles), the program planned for contractor logistics support.
- ➔ As the requirements dramatically increased, the Army planned to transition to an organic approach
- ➔ Currently employing a hybrid strategy
- ➔ The program office also required the contractor's field service representatives to be able to maintain the other manufacturers' MRAPs
 - This provided significant flexibility in-theater
- ➔ As of November 2009, fleet readiness was 97% in Iraq and 90% in Afghanistan



MRAP Program Summary

MRAP Program Timeline





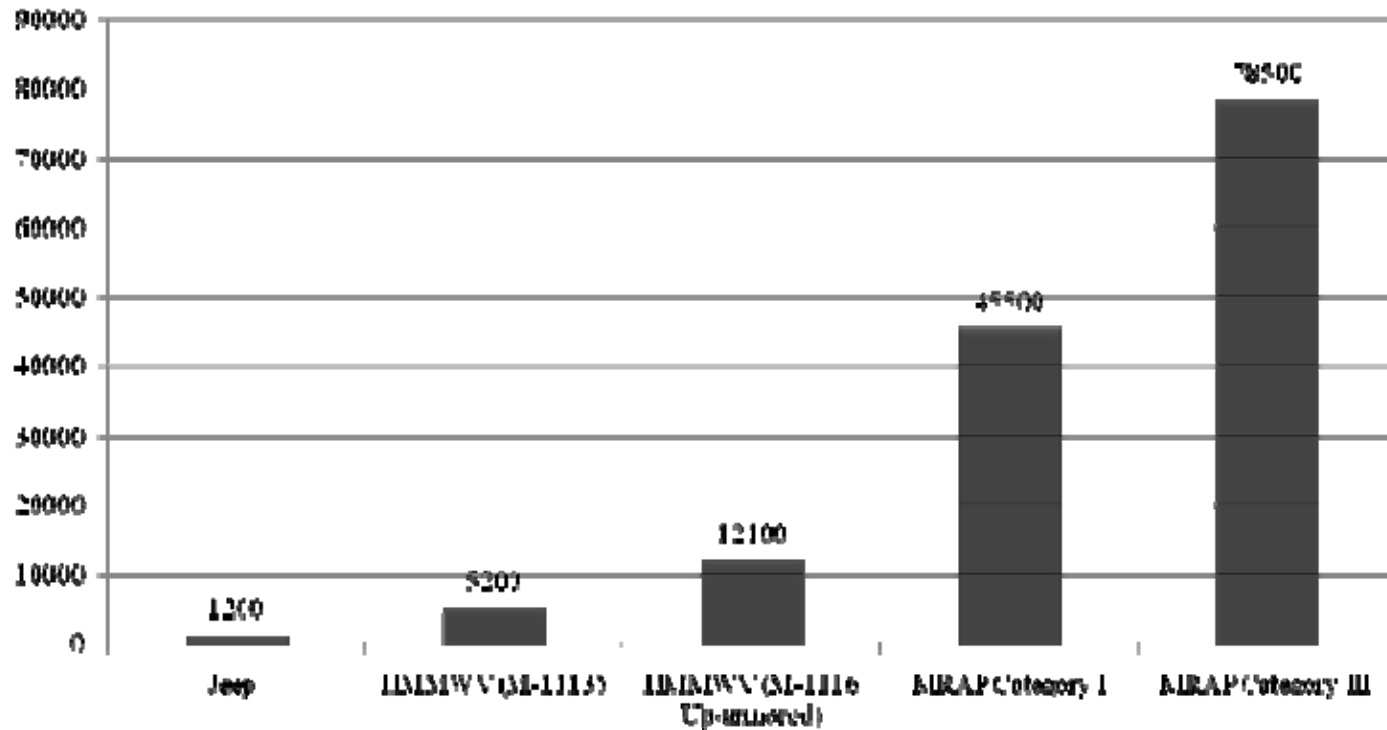
MRAP Limitations

- ➔ Poor maneuverability makes it difficult, sometimes impossible to use in an urban environment
- ➔ Poor off-road performance
- ➔ Prone to tipping
- ➔ 70% of world's bridges can't hold MRAPs
- ➔ Too wide for many roads
- ➔ High fuel consumption—approximately 3 mpg
- ➔ Can only be airlifted by U.S. Air Force's C-17 and C-5, and Russia's AN-124
- ➔ Do not fit on the Marine's pre-positioning ships



Not So Expeditionary

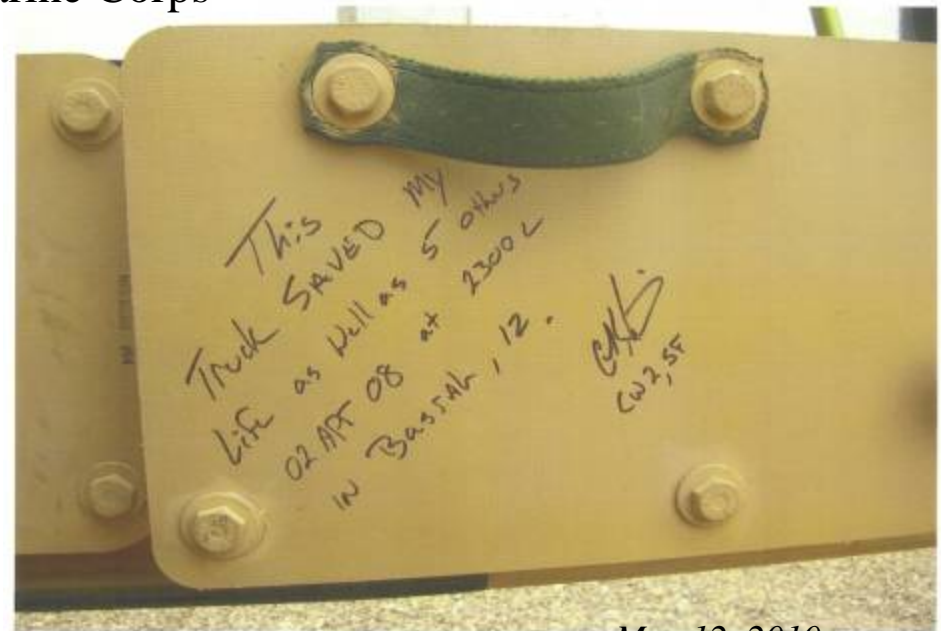
Vehicle Weight Comparison (lbs)



The Most Survivable Vehicle

“MRAPs have proven time and time again to save the lives and limbs of soldiers and Marines ... and I think they’re worth every dime the taxpayers are spending on them” - Secretary of Defense Gates (Scully 2009)

- ➔ MRAPs can reduce IED casualties by 80%
 - Commandant of the Marine Corps
- ➔ 4 to 5 times safer than up-armored HMMWV
 - Asst. Commandant of the Marine Corps
- ➔ Casualty Rates:
 - MRAPs: 6%
 - Abrams tank: 15%
 - Up-armored HMMWV: 22%



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Lessons Learned & Recommendations

Leadership

- ➔ Champions—enjoyed the unwavering support of the SECDEF and Congress
- ➔ MRAP Task Force—all relevant decision-makers met weekly to solve problem in real-time
- ➔ Unity of message/purpose—once the decision was made, there was clear agreement by all stakeholders that the goal was to field as many survivable vehicles as possible as quickly as possible.

Recommendations

- ➔ Assign senior-level champions to ensure that the program keeps moving through the acquisition process.
- ➔ Constantly reinforce the priorities of the project and expectations



Lessons Learned & Recommendations

Requirements and Acquisition Processes

- ➔ Rapid acquisitions need not be linear
 - Tailored acquisition approach
- ➔ Inadequacy of current acquisition system for rapid acquisitions
 - Ad hoc organizations
 - Must work within the deliberate acquisition system
- ➔ Supplemental Funding

Recommendations

- ➔ Allow flexibility in timing of paperwork and process
- ➔ Create a separate rapid acquisitions agency



Lessons Learned & Recommendations

Production

- ➔ Priming the industrial base
 - Industry leaned forward buying material at risk, in advance of orders at their own
 - DoD awarded LRIP contracts to all low-risk manufacturers even before testing was underway
 - DoD provided funding to upgrade facilities and equipment
- ➔ Securing scarce resources—steel and tires were the limiting factor
- ➔ Used existing technology, with continuous refinement and competition
- ➔ Manufacturers embedded at test center
- ➔ Open to outside solutions—minimum performance requirements were set
- ➔ Willingness to take reasonable risks

Recommendation

- ➔ Encourage the appropriate level of risk tolerance
- ➔ Embed manufacturer representatives at test facilities



Conclusion

- ➔ The level of effort and flexibility of everyone involved – from the program office, to the manufacturers, to SPAWAR – made the rapid fielding of MRAPs possible and **absolutely saved lives**
- ➔ The program has also shown what is possible in scale and scope when enormous political will and (nearly unlimited) funding are brought to bear on the existing military procurement system
- ➔ Succeeded **despite** having to work within the existing acquisition system