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

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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"
**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

<table>
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<th>Conflict</th>
<th>Loss rate (%)</th>
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<tr>
<td>World War II</td>
<td>23</td>
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<tr>
<td>Korea</td>
<td>56</td>
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<td>Vietnam</td>
<td>70</td>
</tr>
<tr>
<td>Operation Desert Storm</td>
<td>59</td>
</tr>
<tr>
<td>Operation Restore Hope (Somalia)</td>
<td>60</td>
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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 ordinance disposal and ambulance missions
- Transports up to 10 personnel
- Curb weight 15-25 tons
- Estimated per unit cost range: $540,000 - $644,000*

*Estimated costs are approximate and subject to change.
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.
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

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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

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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

- 5/07 Sec. of Defense Gates declares MRAPs #1 acquisition priority. MRAP Task Force established.
- 10/06 U.S. Central Command approves MRAP program.
- 10/07 MRAP program designated ACAT ID.
- 6/07 MRAP designated DX for industrial priority.
- 4/07 First MRAPs arrive in Iraq.
- 11/06 First contract awarded. MRAP PROGRAM BEGINS.
- 5/06 and 7/06 Commanding General MINE W submits JUONS for 1,185 MRAPs into Joint process.
- 8/05 MCCDC stops processing Marine Feb. UUNS.
- 4/05 Joint IED Task Force funds 122 HEVs (not part of the MRAP program).
- 12/03 Marines issue UUNS for MRAP-type Hardened Engineer Vehicles
- 2/05 Marine UUNS formally submitted for 1,169 MRAPs to Marine Corps Urgent Needs System.
- 6/03 Mil. Police Commander requests Armored Security Vehicles (not an MRAP).

Funding (Fiscal Year, $ billion) Requirements (# of MRAP vehicles)

May 12, 2010
20
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)

- Jeep
- LMMV (L-I-II)
- LMMV (M-III) Unarmored
- MRAP Category I
- MRAP Category III

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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%
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

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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.