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July 15, 2008

The Honorable Neil Abercrombie
Chairman
The Honorable Jim Saxton
Ranking Member
Subcommittee on Air and Land Forces
Committee on Armed Services
House of Representatives

The Honorable Gene Taylor
Chairman
The Honorable Roscoe Bartlett
Ranking Member
Subcommittee on Seapower and Expeditionary Forces
Committee on Armed Services
House of Representatives

Subject: *Rapid Acquisition of Mine Resistant Ambush Protected Vehicles*

About 75 percent of casualties in current combat operations in Iraq and Afghanistan are attributed to improvised explosive devices (IED). To mitigate the threat from these weapons, the Department of Defense (DOD) initiated the Mine Resistant Ambush Protected (MRAP) vehicle program, which uses a tailored acquisition approach to rapidly acquire and field the vehicles. In May 2007, the Secretary of Defense affirmed MRAP as DOD's single most important acquisition program. To date, more than $22 billion has been appropriated to acquire more than 15,000 MRAP vehicles, and about 6,600 of the vehicles have been fielded.

In view of the importance of this program and the significant cost involved, you asked us to (1) describe DOD's approach for and progress in implementing its strategy for rapidly acquiring and fielding MRAP vehicles, and (2) identify the challenges remaining for the program.

To describe DOD's approach for and progress in implementing its strategy for rapidly acquiring and fielding MRAP vehicles, we reviewed DOD's plans to buy, test, and field the vehicles and discussed the plans with cognizant department and contractor officials. To identify the remaining challenges for the program, we reviewed the results of testing and DOD's plans to upgrade and sustain the vehicles. We conducted this performance audit from June 2007 to July 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable

basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Results in Brief

DOD used a tailored acquisition approach to rapidly acquire and field MRAP vehicles. The program established minimal operational requirements and relied heavily on commercially available products. The program also undertook a concurrent approach to producing, testing, and fielding the vehicles. To expand limited existing production capacity, the department awarded indefinite delivery, indefinite quantity (IDIQ) contracts to nine commercial sources for the purchase of up to 4,100 vehicles per year from each vendor.[1] To evaluate design, performance, producibility, and sustainability, DOD committed to buy at least 4 vehicles from all vendors. According to program officials, subsequent delivery orders were based on a phased testing approach with progressively more advanced vehicle test results and other assessments.[2] To expedite the fielding of the vehicles, mission equipment packages including radios and other equipment were integrated into the vehicles after they were purchased. Finally, DOD designated the MRAP program as DOD's highest priority acquisition, which helped contractors and other industry partners to more rapidly respond to the urgent need and meet production requirements.

While the department's concurrent approach to producing, testing, and fielding the vehicles has provided an urgently needed operational capability, it has also increased performance, sustainability, and cost risks. For example, safety and performance testing is not yet complete, and any shortcomings revealed may require design changes or postmanufacturing fixes. Operating, maintaining, and sustaining a fleet of more than 15,000 fielded vehicles manufactured by at least five different vendors could also present significant challenges—especially for the Army, whose fleet will include more than 10,000 vehicles from five manufacturers. Future budgets could be significantly affected by these challenges, particularly since the department is still determining its cost estimate to operate and sustain the current MRAP quantities. At the same time, DOD is seeking to develop a replacement for the ubiquitous high-mobility multipurpose wheeled vehicle and to fund various other high-priority weapon systems across the services. Finally, as threats change, performance requirements—and MRAP's role in DOD's overall tactical wheeled vehicle strategy—could change, further exacerbating these challenges.

Background

In February 2005, Marine Corps combatant commanders identified an urgent operational need for armored tactical vehicles to increase crew protection and mobility of Marines operating in hazardous fire areas against IEDs, rocket-propelled

[1] An IDIQ contract is a type of indefinite delivery contract that provides for an indefinite quantity of supplies or services within stated limits, during a fixed period. The government places orders for individual requirements. Federal Acquisition Regulation (FAR) 16.504.

[2] Program officials indicated the following factors were included in the decision to place orders: Test results, cost, production rates, production quality and risks, supportability, avoiding a production break, vehicle allocation and configuration, and funding availability.

grenades, and small arms fire.[3] In response, the Marine Corps identified the solution as the up-armored high-mobility multi purpose wheeled vehicle (HMMWV). Over the next 18 months, however, combatant commanders continued to identify a requirement for more robust mine-protected vehicles. According to the acquisition plan, in late 2006 the Marine Corps awarded a sole source IDIQ contract and subsequently placed orders for 280 vehicles to respond to the urgent requirement while it conducted a competitive acquisition for the balance of the vehicles. In February 2007, the Assistant Secretary of the Navy (ASN) for Research, Development, and Acquisition (RDA) approved MRAP's entry into production as a rapid acquisition capability. In September 2007, the Under Secretary of Defense for Acquisition, Technology, and Logistics designated MRAP as a major defense acquisition program[4] with the Navy as the Executive Agent and the Marine Corps Systems Command as the Joint Program Executive Officer.

DOD's framework for translating mission needs into systems dictates that acquisition programs follow a process that includes:

- determining the appropriate technologies to be integrated into a full system;
- evaluating through testing whether systems are operationally effective, suitable, and survivable; and
- reducing manufacturing risk and ensuring operational supportability.

This process is carried out sequentially with each step being mostly completed before the next step begins. The process does, however, permit tailoring procedures to achieve cost, schedule, and performance goals consistent with applicable laws and regulations. Accordingly, the ASN (RDA) directed that the MRAP be acquired as rapidly as possible but without skipping any of the mandatory and required steps normally associated with an acquisition program.

Quantities to be fielded quickly grew from the initial 1,169 vehicles for the Marine Corps identified in the 2005 urgent need statement to the current approved requirement of 15,838 vehicles split between the Army, Marine Corps, Navy, Air Force, and Special Operations Command (SOCOM), plus 133 for ballistic testing.

[3] Similar needs had also previously been identified by Marine Corps commanders going back to January 2004, leading to the development of armor kits for tactical vehicles. (See GAO, *Defense Logistics: Lack of Synchronized Approach between the Marine Corps and Army Affected the Timely Production and Installation of Marine Corps Truck Armor*, GAO-06-274 (Washington, D.C.: June 22, 2006).

[4] DOD designates acquisition programs based on their location in the acquisition process, dollar value, and special interest. A major defense acquisition program is a major system with an eventual total expenditure for procurement of more than $2.19 billion in fiscal year 2000 constant dollars.

Table 1: Approved MRAP Acquisition Quantities by Military Service and Other Users

Service	Total
Army	12,000
Marine Corps	2,225
Navy	544
USAF	558
SOCOM	378
Ballistic testing	133

Source: Joint Staff.

Three versions of the MRAP vehicle are being acquired for different missions:

- Category I, the smallest version of MRAP, is primarily intended for operations in the urban combat environment, and can carry up to 7 personnel.
- Category II is a multi-mission platform capable of supporting security, convoy escort, troop or cargo transport, medical, explosive ordnance disposal, or combat engineer operations, and carries up to 11 personnel.
- Category III, the largest of the MRAP family, is primarily intended for the role of mine and IED clearance operations, and carries up to 13 personnel.[5]

MRAP vehicles are purchased without mission equipment—such as communications and situational awareness subsystems—that must be added before the vehicles can be fielded to the user. The military services buy the subsystems for their vehicles and provide them as government furnished equipment (GFE) to be installed at a government integration facility located at the Space and Naval Warfare Systems Command in Charleston, South Carolina.

DOD also has a requirement for vehicles with enhanced capabilities, which adds greater crew protection and mobility against a more advanced threat. The Army and Marine Corps are exploring multiple solutions including a new vehicle, the MRAP II, and, according to the program office, competitively awarded two contracts in December 2007 to purchase test vehicles for ballistic and automotive tests. The MRAP II solicitation indicated that the resulting IDIQ contracts could be used to order production quantities.

DOD Used a Tailored Acquisition Approach to Rapidly Field a Class of Vehicles that Meets Minimum Requirements for Crew Protection

DOD adopted a tailored acquisition approach to acquiring the MRAP vehicles in order to field the most survivable vehicles as quickly as possible. The department awarded indefinite delivery, indefinite quantity contracts to nine vendors; implemented a phased test plan that emphasizes crew protection; established a delivery schedule to field vehicles as quickly as possible; and developed a sustainment concept that includes a combination of contractor and military personnel logistical support. The program's industry partners facilitated rapid fielding by generally meeting or exceeding planned production rates.

[5] Only the Marine Corps will acquire these vehicles. The Army is pursuing a separate acquisition program to replace its current fleet of vehicles that perform this mission.

Contracting Strategy Created Flexible Ordering Options

To date, the Marine Corps Systems Command, the buying command for the MRAP, has issued delivery orders for 14,173[6] total vehicles or about 90 percent of the current requirement of 15,838 vehicles approved by the Joint Requirement Oversight Council.

Table 2: Planned MRAP Delivery Order Quantities by Vendor

Vendor	Vehicles
Navistar Defense	5,214
Force Protection Industries	3,150
BAE Tactical Vehicle Systems	2,862
BAE Ground Systems	2,205
General Dynamics Land Systems – Canada Corporation	606
Other[a]	136
Total	**14,173**

Source: Joint Program Office.

[a] These vehicles will not be fielded.

DOD recognized that no single vendor could provide all of the vehicles needed to meet requirements quickly enough and invited vendors to offer their nondevelopmental solutions. The request for proposal made clear that the government planned to award one or more IDIQ contracts to those vendors that were determined to be the best value to the government. The Marine Corps awarded IDIQ contracts to nine vendors and issued the first delivery orders in early 2007 for 4 vehicles from each vendor for initial limited ballistic and automotive testing. One vendor could not deliver test articles in the time required and the Marine Corps terminated that contract at no cost to the government. According to program officials, vehicles from another vendor did not meet minimum requirements and the Marine Corps terminated the contract for convenience. These actions reduced the number of vendors to seven and the Marine Corps issued a round of delivery orders to five of these vendors for a combined total of 395 vehicles.

As testing on vehicles continued, the Marine Corps issued additional delivery orders to two more vendors. In the end, five vendors received the bulk of delivery orders; the mix of firms included four that had extensive experience producing a high volume of military or commercial vehicles and one that was relatively new to mass military vehicle production.

The Marine Corps also contracted for initial sustainment of MRAP vehicles. At the early stages of the program, DOD assumed a small quantity of vehicles would be needed and they would have a limited service life span. Therefore, the IDIQ

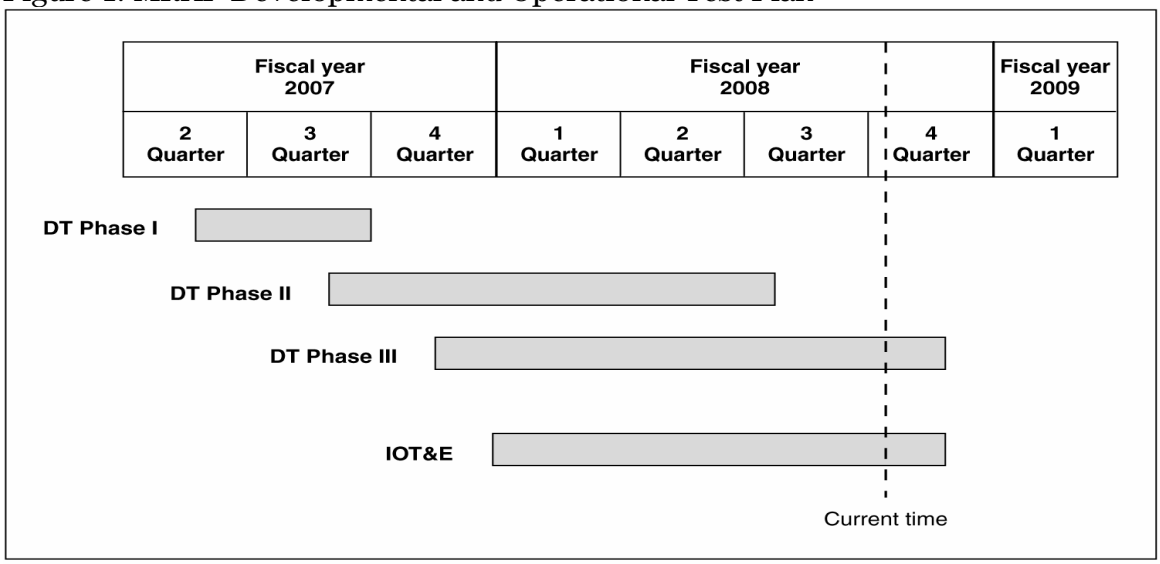
[6] This includes delivery orders for 110 vehicles from the two vendors whose vehicles did not meet requirements and will not be fielded. The vehicles are in storage awaiting a decision on their disposition. It also includes 12 MRAP II test vehicles acquired under different contracts.

contracts contained 1 year of contractor logistical support with options for additional years. These contracts also included one field service representative for every 10 vehicles.[7] As required quantities escalated and a much longer vehicle service life span was envisioned, DOD determined this approach was not practical and began adjusting its long-term support strategy for MRAP vehicles from maintenance by contractors to maintenance by military personnel.

Highly Concurrent Test Strategy Emphasized Crew Protection

Conventional DOD acquisition policy dictates that weapons be fully tested before they are fielded to the user.[8] However, the need to begin fielding survivable vehicles as quickly as possible resulted in a phased approach designed to quickly identify vehicles that met the requirement for crew protection so they could be rapidly fielded. The test plan included three phases of developmental tests (DT) that incrementally raised the bar and operational test and evaluation (IOT&E). This approach resulted in a high degree of overlap between testing and fielding of the MRAP vehicles; orders for thousands of vehicles were placed before operational testing began and orders for thousands more were placed before it was completed. Figure 1 shows the concurrent nature of the overall test plan.

Figure 1: MRAP Developmental and Operational Test Plan



Source: GAO based on DOD information.

All three phases of developmental testing—which began in March 2007 and are scheduled for completion in August 2008—evaluated ballistic and automotive performance of vehicles. Phase I included a limited evaluation by users. Phase II

[7] Field service representatives provide maintenance support, including repair and replacement of major components of the vehicle to maintain combat readiness.

[8] Successful development test and evaluation to assess technical progress against critical technical parameters, early operational assessments, and the use of modeling and simulation to demonstrate system integration are critical prior to beginning production. However, the process permits tailoring of the test program when necessary to support urgent needs. *DOD Instruction 5000.2, Operation of the Defense Acquisition System (May 12, 2003).*

further evaluated vehicles at the desired level of performance against the ballistic threat, added more endurance miles to the automotive portion of the test, and included mission equipment such as radios and other electronic systems. Phase III raised the bar for ballistic performance to the emerging threat and assessed nonballistic protection to include near-lightning strikes, high-altitude electromagnetic pulse, and nuclear, biological, and chemical decontamination tests.[9] The automotive portion of the test increased endurance to 12,000 miles per vehicle.

As indicated in figure 1, DOD is also testing vehicles to determine their operational survivability, effectiveness, and suitability when operated by marines, sailors, and soldiers in simulated operational conditions using profiles that reflect missions found in current combat operations in Iraq and Afghanistan. Vehicles from four vendors have completed operational testing; testing on vehicles from another vendor is scheduled to be complete in June 2008. Analysis is planned to be complete by August 2008.

Mission Equipment Installed after MRAP Delivery to Expedite Fielding

All MRAP vehicles are delivered to the government without mission equipment, which must be added before the vehicles can be fielded to the user. Mission equipment includes radios and vehicle intercoms; situational awareness hardware such as global positioning systems and visual display enhancements; and countermeasures such as IED defeat systems. Some of the equipment differs across the services—for example, the Army and Marine Corps use different communication systems—and each service purchases its own specific government furnished equipment (GFE) for installation on its vehicles.

The Space and Naval Warfare Center (SPAWAR), located in Charleston, South Carolina, integrates MRAP vehicles with GFE on 25 integration lines prior to fielding. According to a senior SPAWAR official, the center provides an optimal location for GFE integration because it has an experienced integration workforce; on-site test facility; and accessibility to air, ship, rail, and interstate assets. SPAWAR opened two other facilities to assist with the integration process: one in Orangeburg, South Carolina, provided for a surge capability and served as a back-up location in case of a natural disaster at the Charleston site. Currently, 13 lines are being used to integrate vehicles and 2 more lines could be activated if needed. Another site in Kuwait, consisting of 5 integration bays, was used to integrate limited numbers of one vendor's vehicles destined for delivery to units in the region. Integration on those vehicles was completed in May 2008.

SPAWAR faced initial challenges in starting up the integration facility and ramping up installation to meet the demand, but implemented changes to overcome the challenges and expedite the process, for example:

- Before workers could begin installing GFE on any vehicles, it was necessary to standardize a process that could be replicated. This process differed depending on the vendor, the type of vehicle (such as a category I or II, and ambulance), and the military service that would use the vehicle. Ultimately, there were 27 major

[9] Vehicles used in ballistic testing were repaired by vendors to be used in subsequent phases of testing.

configurations of GFE placement on the vehicles. Placement of GFE and antennas also had to be tested to ensure that operation of one piece of equipment did not interfere with another.

- Some work must be done on the vehicles before integration can begin, costing time. Wiring on the vehicles had to be reconfigured first to accommodate the GFE. Also, a rack used to hold communications equipment in one vendor's vehicles had to be dismantled, rotated 90 degrees, and reinstalled so the equipment would fit. Some of this work is now being done by contractors before the vehicles are delivered to the government.
- Vehicles sometimes were received with known missing parts or needing work prior to undergoing integration. As a result, a field service representative from the vendor would have to correct the problem, which sometimes delayed the integration of equipment onto the vehicles. According to an official in the Office of the Secretary of Defense, the Defense Contract Management Agency, working with SPAWAR, took over responsibility to ensure these items were tracked and resolved prior to the transportation of these vehicles to theater.
- Many delivery orders called for vendors to deliver vehicles at the end of the month, causing a surge of vehicles to arrive at the same time. These peaks in delivery often resulted in a backlog of vehicles waiting to begin the integration process. The program office attempted to reduce surges in deliveries and establish a continuous flow of vehicles by specifying weekly delivery from the five vendors delivering the bulk of the vehicles.
- Vehicles arrived in batches from different vendors, for different customers, and of different sizes, which resulted in a mix of vehicles being integrated at one time. For example, in the last week in August 2007, 83 vehicles arrived from five vendors for three different users. SPAWAR cross-trained workers to install the GFE on multiple vehicle configurations, which according to SPAWAR officials allowed them to be more flexible.

The program office established a goal of completing the integration process in 7 days from the day a vehicle arrived at the facility until it was ready to ship. The first few vehicles took much longer, but the process improved over time. Vehicles bought under the initial IDIQ contract began arriving at SPAWAR in early March 2007. The first 10 vehicles to be integrated did not begin the process for an average of almost 14 days and took on average 14 days to be completed.[10] In the first week of September 2007, 15 vehicles were integrated, beginning on average 10 days after they arrived and finishing in a little more than 9 days on average. During the first week of March 2008, workers processed 276 vehicles on average in less than 10 days, including less than 2 days to actually install the equipment. To date, integration has kept pace with production and delivery to theater, and in April 2008 SPAWAR integrated the highest number in 1 month—1,157 vehicles—which exceeded the projected capability of 1,000 vehicles per month.

DOD Communicated Urgency to Industry, and Industry Responded

DOD leadership took several steps to communicate the importance of producing survivable vehicles as quickly as possible, for example,

[10] This included the time to standardize the process for installing the GFE.

- In May 2007, the Secretary of Defense designated MRAP as DOD's single most important acquisition program and established the MRAP Task Force to integrate planning, analysis, and actions to accelerate MRAP acquisition.[11]
- The Secretary also approved a special designation for MRAP—a DX rating— that requires related contracts to be accepted and performed on a priority basis over other contracts without this rating.[12]
- The Secretary of the Army waived a restriction on armor plate steel, which expanded the countries from which DOD could procure steel.[13]
- DOD allocated funds to increase steel and tire production capacity for MRAP vehicles as these materials were identified as potential limiting factors for the MRAP industrial base.
- Senior Office of Secretary of Defense officials and lawmakers also visited key locations to witness firsthand the efforts of vehicle producers and integrators.
- The Joint Requirements Oversight Council (JROC)[14] utilized the Joint Allocation Distribution Board[15] to manage MRAP vehicle distribution among the services.

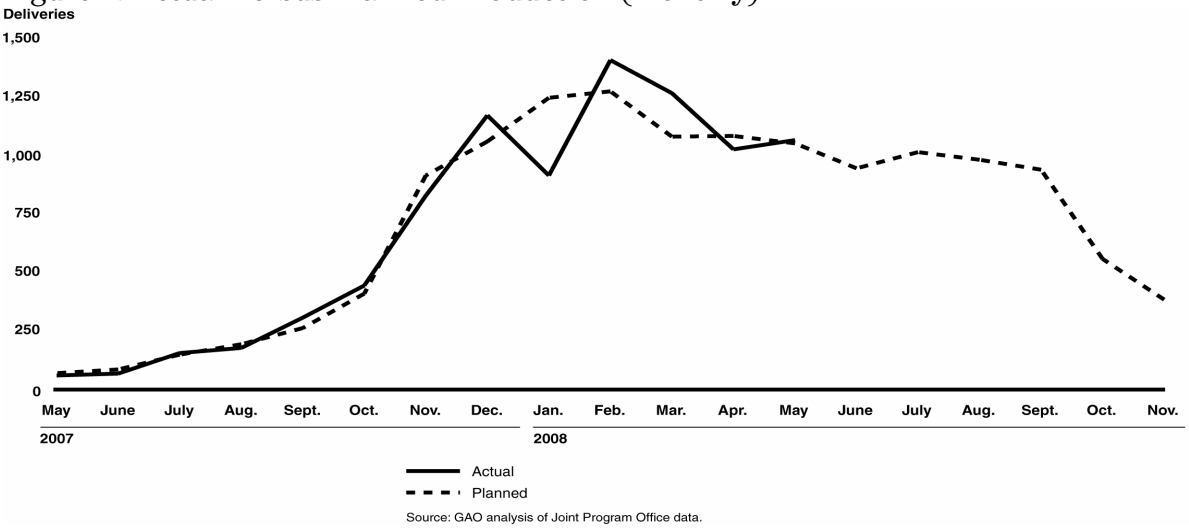
Major vendors and key subcontractors responded to the urgency communicated by the department. According to vendor officials from four of the companies, they collectively invested a substantial amount of their own capital in anticipation of MRAP work. For example, some vendors purchased steel and other critical components in advance of delivery orders for MRAP vehicles in order to meet projected time lines. In other cases, vendors purchased or developed new facilities for MRAP production. Multiple vendors also formed teaming arrangements to meet the increase in vehicle delivery demands.

Ultimately, MRAP vendors have successfully increased their production rates to meet the delivery requirement (see fig. 2).[16] Deliveries began in February 2007 with one vendor delivering 10 vehicles. By September 2007, the five vendors that received the

[11] The MRAP Task Force is chaired by the Under Secretary of Defense for Acquisition, Technology, and Logistics. The objective of the task force is to expedite fielding of MRAP vehicles to support combat operations. The task force regularly reports to the Secretary of Defense.
[12] 15 C.F.R. § 700.1-.14; DOD 4400.1-M; FAR Subpart 11.6.
[13] Recent defense appropriation acts have provided that none of the funds appropriated therein may be used for the procurement of carbon, alloy, or armor steel plate for use in any government-owned facility or property under control of the Department of Defense which were not melted and rolled in the United States or Canada. If the Secretary of the military department responsible makes certain certifications to the appropriations committees, this restriction may be waived. See e.g., Department of Defense Appropriations Act for Fiscal Year 2008, Pub. L. No. 110-116 § 8026 (2007); *see also*, *Department of Defense FAR Supplement 225.7011-2*.
[14] The JROC is an advisory council that assists the Chairman of the Joint Chiefs of Staff in identifying and assessing the priorities for joint military requirements to meet current and future military capabilities. Chaired by the Vice Chairman of the Joint Chiefs of Staff, the council is comprised of a senior officer from each of the military services. The JROC approved MRAP vehicle requirements as they evolved.
[15] The Joint Allocation Distribution Board (JADB) coordinates with U.S. Central Command (CENTCOM), the military services, and Special Operations Command (SOCOM) on the allocation of vehicles to ensure that the fielding of MRAP vehicles meets warfighter operational requirements and individual service concerns for long-term supportability. The JADB is comprised of service, CENTCOM, and SOCOM representatives.
[16] Parts shortages at two key vendors caused a delivery shortfall in January 2008, but the vendors caught up in February and March.

majority of the delivery orders had collectively delivered 871 vehicles; by March 2008—a little more than a year after the contracts were awarded—6,997 vehicles had been delivered. As of May 2008, vendors had collectively delivered 9,121 vehicles. Unless additional delivery orders are issued, monthly vehicle deliveries will decline as manufacture of vehicles under contract ramps back down.

Figure 2: Actual Versus Planned Production (monthly)



Source: GAO analysis of Joint Program Office data.

Evolving Threats and Rapid Acquisition of MRAP Capability Create Challenges

Although DOD's MRAP acquisition approach has provided a rapid solution to battlefield threats, the approach has also created a number of challenges in acquiring and sustaining mine resistant vehicles—challenges that will likely have short- and long-term impacts on capability and budgets. First, the highly concurrent test and production strategy with its emphasis on crew protection identified shortcomings that will need to be corrected and retested, as will the next generation of MRAP vehicles. Second, while the program's contracting strategy may have helped to maximize vehicle production, the long-term sustainment plans to support multiple vehicle designs are still being developed. Third, DOD has yet to determine the funding required to support the MRAP over the longer term. Finally, evolving threats to tactical wheeled vehicles in combat operations are likely to affect future acquisitions, operations, and industry capacity to produce MRAP and other tactical wheeled vehicles.

Testing Strategy Provides Little Time for Needed Modifications

The highly concurrent test and production strategy for the MRAP vehicle helped to quickly identify the vehicles that met requirements for crew protection but resulted in the fielding of vehicles with significant operational issues as well as the acquisition of a small quantity of vehicles that won't be fielded. While most of the vehicles met requirements against the ballistic threat in the first phase of developmental testing, automotive testing revealed shortcomings in reliability, mobility and handling, and

safety among all vendors. Some of these shortcomings are affecting whether vehicles are suitable for some missions.[17]

A number of these issues will require modifying the vehicle designs, postproduction fixes, or adapting the way vehicles are used. Changes to vehicle design that are introduced into the production line could require the retrofitting of thousands of vehicles already delivered, potentially impacting the program's cost and delivery schedule. Some of the changes to vehicle design will likely result in the need for more testing to ensure that the new designs still meet requirements and no additional problems exist. These tests, which include automotive and ballistic tests for the MRAP II—a more robust version of the baseline MRAP—are currently being conducted but won't be completed until spring 2009. Operational tests for the MRAP II won't be complete until fall 2009. If tests identify shortcomings, these would also need to be addressed and retested, further impacting program cost and schedule. In addition, the government issued delivery orders to two vendors for more than 100 vehicles that ultimately won't be fielded. Vehicles from both of the vendors met the contract requirements and were accepted by the government, but multiple problems were discovered during the first phase of developmental ballistic and automotive testing that precluded their fielding as MRAP vehicles. Most of the vehicles have been transferred to another government agency, but disposition on a few vehicles is still pending, and the vehicles are in storage.

Contracting Strategy Creates Sustainment Challenges

While procuring MRAPs from multiple vendors accelerated production and fielding, it will also complicate vehicle maintenance and support because each vendor's vehicle design is unique and requires specific operating procedures and maintenance. Over 15,000 vehicles from at least five different vendors will eventually be in DOD's fleet. The Army's fleet alone will consist of over 10,000 vehicles from five different vendors.

To ease maintenance and support concerns in the near term, the MRAP program office established a centralized training entity where maintainers can be cross-trained on multiple vendors' vehicles. However, this effort is still in the early stages, and the benefit will be slow to propagate throughout the services' maintenance organizations. In addition, ongoing vehicle upgrades in theater may require further upgrades to meet new emerging requirements, further complicating maintenance and configuration management efforts.

DOD's plan for logistical support beyond the first 2 years is still being developed. A key challenge for DOD is to effectively manage maintenance personnel and vehicle repair parts without sacrificing vehicle operational availability. DOD is transitioning from support provided by contractor personnel to support provided by military personnel. In the interim, a hybrid approach is being used. The original logistical support concept was based on a much smaller vehicle quantity requirement and shorter assumed vehicle life span. Finally, the proprietary nature of these vehicles complicates logistical support because some specific vehicle parts must be obtained for each vendor's vehicle variant. There is, however, limited component commonality among most MRAP vehicle types and with other existing DOD vehicle platforms.

[17] Specific details on shortcomings cannot be addressed in this report due to security classification.

Long-Term Budget Challenges

While the MRAP program is critical to current combat operations, DOD has yet to determine the potential affect of the program on its future budgets. Program funding to date, consistent with most funding to support current combat operations, has largely been provided through supplemental appropriations outside the normal budget process or by reprogramming of funds already appropriated for other programs to MRAP. The total estimated life-cycle cost to upgrade, test, operate, and maintain MRAP is still being determined, and total program costs may not be included in the department's annual budget request to Congress.

Since September 2001, funding for current combat operations has generally been provided through supplemental appropriations as emergency funding. The MRAP program, being a critical part of these operations, has also been largely funded through either supplemental appropriations or reprogramming of funds already appropriated for other programs to MRAP. Congress appropriated about $3 billion in fiscal year 2007 supplemental funding and approved an additional $1.6 billion for reprogramming. Congress also appropriated about $17 billion in fiscal year 2008 supplemental funding. This trend will likely continue as seen in DOD's recent request for an additional $2.6 billion in fiscal year 2009 supplemental funding for sustainment.

While annual emergency appropriations expedite funding for the program, they can also obscure future budgetary impacts. Supplemental appropriations are not typically included in DOD's long-term funding blueprint and are not subject to the same level of scrutiny as the regular budget and appropriations process. The military services consequently have not had to fully account for long-term budgetary affects and will eventually face substantial operational support costs in their normal budgetary plans.

The total estimated life-cycle cost to upgrade, test, operate, and maintain the MRAP program is still being determined, as there are many key unknown variables such as the Army's final vehicle requirement. However, the recently approved acquisition program baseline estimates total development and production costs to be almost $29 billion.[18,19] The ultimate price for MRAP will depend on future decisions on its role in the department's tactical wheeled vehicle strategy and how many, if any, of the fleet will remain on active service or how many are stored.

Long-term sustainment costs for the MRAP program could significantly affect future budgets because while the costs to develop and produce a weapon system are significant, they usually represent only about 28 percent of the total ownership costs. Operating and support costs, on the other hand, typically represent the highest portion of the total ownership cost of a weapon system because they include the cost to operate the system and keep it ready for action over many years. Long-term sustainment costs for the MRAP could consume a substantial share of DOD's

[18] The $29 billion represents the threshold value, or estimated upper limit, of program acquisition costs.
[19] DOD's Cost Analysis Improvement Group (CAIG) noted that the nature of MRAP contracts prevents them from gaining direct access to actual cost information, which is a normal part of their cost estimation practice. This could raise concerns about the accuracy of future cost estimates.

budgetary resources because the useful life for MRAP vehicles is now estimated at 15 years, much longer than the program office initially estimated. In addition, DOD has limited knowledge of vehicle reliability and key component replacement rates, which raises further concerns about the total life-cycle cost of these vehicles. DOD's Cost Analysis Improvement Group has been tasked with independently assessing the cost for the program, which should provide more insight into the demands the program may place on future budgets.

MRAP operation and sustainment costs will also compete for limited budgetary resources with other major DOD acquisition efforts. The Army, which will have in its inventory over 75 percent of all MRAP vehicles produced, will be particularly pressed to balance ongoing MRAP sustainment costs with competing programmatic and service-level priorities, such as its force modernization efforts. MRAP costs may compete with other critical programs such as the Future Combat System, which is the centerpiece of the Army's effort to transition to a lighter, more agile, and more capable combat force and is now estimated to cost $160.9 billion. Also, funding to develop the Joint Light Tactical Vehicle program, which will replace HMMWVs across the services, could be constrained by MRAP funding requirements.

Affect of Evolving Threat

The threat facing tactical wheeled vehicles continues to evolve. When DOD began adding armor to the HMMWVs, enemy insurgents responded by increasing the size and explosive force of IEDs and by employing explosively formed penetrator (EFP) weapons that are capable of penetrating heavily armored vehicles. The baseline MRAP vehicle was required to provide protection against mines, IEDs, small arms, and rocket-propelled grenades.

DOD is considering increased performance requirements so that MRAP can continue to provide required levels of crew protection. This could require additional investment in technology and in its application to existing and future tactical wheeled vehicle fleets. Multiple efforts are under way to improve crew protection of the baseline MRAP vehicle against EFP weapons, but doing so will add significant weight to these vehicles and potentially compromise other aspects of vehicle performance. In addition, some vehicles may require modification before the armor can be added. The government has also awarded indefinite delivery, indefinite quantity contracts to two vendors for the MRAP II, a more robust version of the baseline vehicle. Automotive and ballistic tests for those vehicles are currently being conducted. Initial results of testing were not available as of May 2008, but both could identify shortcomings, which would have to be addressed and retested.

The evolving threat could also affect DOD's plans for acquiring tactical wheeled vehicles. Until the requirements and the acquisition quantities to address this threat are determined, DOD will have incomplete knowledge of the program's potential role in its tactical wheeled vehicle portfolio. This increases the risk of capability duplication between its tactical wheeled vehicle systems.

Finally, DOD's future tactical wheeled vehicle portfolio likely will draw on current MRAP suppliers. Until vehicle performance requirements and sustainment needs are known, industry's ability to meet total tactical vehicle demands cannot be adequately

assessed. For example, the armor requirement for advanced protection has not been established, and its effects on other system components, such as tires and axles, have yet to be determined. The armor requirement ultimately determined may require additional vehicle design changes that could have ripple effects on an industrial base that has already been strained by demands for rapid production of new vehicle designs. Future tactical wheeled vehicle programs will likely draw on the existing supply base. DOD will be reporting on the tactical wheeled vehicle strategy, including the MRAP, this summer.

Agency Comments and Our Evaluation

We provided a draft of this report to the Department of Defense, and it provided technical comments, which were incorporated as appropriate.

Scope and Methodology

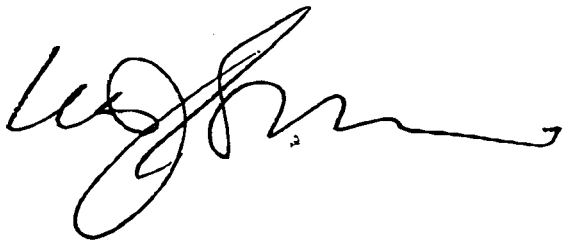
To describe DOD's approach for and progress in implementing its strategy for rapidly acquiring and fielding MRAP vehicles, we obtained and reviewed budget and planning documents and interviewed numerous DOD officials. To evaluate progress in ballistic and automotive testing, we obtained and reviewed test plans and reports, and discussed the test program with program office and test officials. We observed multiple test events at Aberdeen Proving Ground, Maryland and Yuma Proving Ground, Arizona. To determine whether the MRAP could be produced in sufficient quantities to support requirements, we obtained delivery status reports and discussed production issues with program office and DOD officials. We also visited four major MRAP prime contractors: BAE Tactical Vehicle Systems, Sealy, Texas; BAE Ground Systems, York, Pennsylvania; Force Protection Industries, Ladson, South Carolina; and Navistar Defense, Warrenville, Illinois, and West Point, Mississippi. To determine whether the vehicles were being delivered in a timely manner we obtained vehicle deployment status reports, interviewed agency and program office officials, and visited the primary integration site, the Space and Naval Warfare Center (SPAWAR) located in Charleston, South Carolina.

To identify the short- and long- term challenges remaining for the program, we obtained additional information and interviewed officials from the Red River Army Depot, Texarkana, Texas; Marine Corps Capabilities Development Directorate, Virginia; and Army Operations and Plans, Pentagon, Washington, D.C.

We did not assess whether the Marine Corps Systems Command competitive contracting procedures were in accordance with the Federal Acquisition Regulation since this was not within the scope of our work. The Department of Defense Inspector General is currently conducting a review of MRAP contracting procedures and expects to issue a report in mid-summer.

We conducted our review from May 2007 to May 2008 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Secretary of Defense, the Commandant of the Marine Corps, and interested congressional committees. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov. If you or your staff has any questions concerning this report, please contact me at (202) 512-4841 or sullivanm@gao.gov. Key contributors to this assignment were David Best, Assistant Director; Dayna Foster, Mike Aiken; Charlie Shivers; Erin Stockdale; J. Kristopher Keener; and Karen Sloan.



Michael J. Sullivan, Director
Acquisition and Sourcing Management

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