

Center for American Progress



# Army Equipment After Iraq

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# **ARMY EQUIPMENT AFTER IRAQ**

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## Executive Summary

Operations in Iraq have placed the heaviest burden on the active and reserve components of the U.S. Army. While most attention has rightly focused on the war's impact on our men and women in uniform, this report examines another, more hidden impact that the war in Iraq has had on the U.S. Army — the stress placed on Army equipment and its implications for U.S. military performance and readiness.

Three years after the invasion of Iraq, strains are beginning to appear in the U.S. Army's equipment arsenal, reducing its capacity to supply its troops with the best warfighting tools available. While the Army has managed to sustain a high level of readiness in Iraq despite equipment strains, readiness for non-deployed units and units outside of Iraq has already been reduced.

In order to sustain the current pace of military operations in Iraq without leaving the nation vulnerable to aggression in other places, the Department of Defense (DoD) must continuously repair, rebuild and replace equipment worn out or destroyed by the war effort, a process known as "reset." However, normal sustainment patterns have been threatened by the war in Iraq due to the high utilization rates and harsh conditions of the Iraqi environment. The Abrams tank, for example, is operating at six times its rate during peacetime, while medium and heavy trucks are operating at 10 times the typical peacetime rate. These equipment strains currently undermine the Army's ability to confront new challenges overseas or cope with disasters at home and threaten to impede operations in Iraq over the long term.

*Near-term Needs & Recommendations:* In order to assure that Army equipment readiness fully recovers from operations in Iraq, six near-term steps are necessary.

- Congress should fully fund the service's \$9 billion request for reset funding in fiscal 2006, and a similar level of reset funding should be sustained in subsequent years as long as the Army maintains a major presence in Iraq.
- Congress should provide additional resources to cover most of the procurement and depot maintenance items contained in the Army's \$7 billion unfunded requirements list for fiscal 2007.
- Once the deployed force departs Iraq, Congress should continue funding reset for at least two years to assure full resolution of all war-related equipment problems.
- The Army should cease deferring recapitalization of aging equipment and request a level of reset funding consistent with fully revitalizing the force for future challenges.
- DoD should conduct and submit to Congress a comprehensive review of new equipment that will be required for the Army National Guard and Army Reserve to recover fully from Iraq deployments and enable the reserve component to meet future commitments.
- The U.S. Army should fund its reset program through the normal budget process and not through supplementals, as has been the case since the beginning of operations in Iraq.

*Long-term Plans & Recommendations:* The war in Iraq has taught the U.S. Army invaluable lessons about which capacities it must bolster over the long term. In order to assure that the Army is ready to cope with the diverse challenges it will face in the years after U.S. forces depart Iraq, five long-term steps are essential.

- The Army should continue efforts to reorganize its warfighting capabilities around modular, networked brigade combat teams.
- The Army should accelerate the fielding of new situational awareness and communications systems, including the Warfighter Information Network-Tactical that will provide a foundation for the overarching Future Combat System, the Blue Force Tracker and brigade-level unmanned aerial vehicles.
- The Army should produce and fund a comprehensive plan for the continuous enhancement of heavy armored vehicles, such as the Abrams main battle tank and Bradley infantry fighting vehicle.
- The Army should complete replacement of its Cold War truck fleet while beginning development of a successor to the versatile High Mobility Multipurpose Wheeled Vehicle (Humvee).
- The Army should work hard to keep all elements of its aviation modernization program on track, recognizing that timely fielding of new or improved attack, utility, cargo and reconnaissance helicopters are critical to future conventional and counter-insurgency operations.

## ARMY EQUIPMENT AFTER IRAQ

It is now more than three years since America's military was mobilized for the invasion and occupation of Iraq. During those years, many of the assumptions underpinning Operation Iraqi Freedom have been called into question. But war creates its own grim reality, a fact all too clearly reflected in the U.S. Army's rapidly aging equipment arsenal of combat systems. The active and reserve components of the Army have carried most of the burden of the Iraq campaign, deploying more than 40 percent of their equipment to remove the forces of Saddam Hussein and counter the subsequent insurgency.<sup>1</sup> Much of that equipment will need to be repaired or replaced in the years ahead. The experience of waging a protracted military campaign has also revealed shortfalls in capability that must be addressed if the Army is to be fully prepared for future challenges.

Media coverage of Army operations in Iraq has focused mainly on the human dimension of war — the bravery of America's soldiers, the burden on families whose loved ones have been deployed, the difficulty of recruiting and retaining qualified volunteers for a dangerous job. But beyond the personal triumphs and tragedies the war has produced, there are larger issues of military performance and preparedness that must be addressed. Because Army equipment needs have been neglected in the past and the Iraq campaign has proved more protracted than anticipated, stresses are beginning to appear in the service's capacity to supply its troops with the best warfighting tools available. These stresses must be reduced to ensure that no soldier dies unnecessarily. With that in mind, the report examines:

- The impact of the war in Iraq on the readiness and reliability of Army equipment;
- The lessons learned from the Iraq operation about equipment deficiencies in the Army's active force and its reserve component;
- The near-term steps required to repair or modify equipment so that the U.S. Army can support continued operations in Iraq and other commitments such as the counter-insurgency campaign in Afghanistan;
- The long-term steps required to rebuild or replace aging Army equipment so that it can participate in the fast-paced, networked military operations of the post-Iraq period.

The evidence and recommendations that follow reflect two basic facts about today's Army and the fight against international terrorist networks. First, the nature of warfare is changing in ways that demand new tools, new tactics and new organizations. It is not enough to restore Army equipment to its former state of readiness, because the service must assimilate the benefits of new technology and new concepts of operation. Second, the Army must be equipped to leverage the full potential of all its personnel, not just those likely to deploy first. Iraq has proven that the Army Reserve and National Guard really are partners with the active component in a "total force," and they must have the tools to deploy quickly without depleting capabilities critical to homeland defense.

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<sup>1</sup> *Resetting the Force: The Equipment Challenge*, Torchbearer National Security Report, Arlington, VA: Association of the United States Army, October 2005, p.3.

## The Impact of Iraq

Over the past three years, the United States has maintained an occupation force of 160,000-180,000 personnel in and around Iraq. That force, equating to 16 to 18 brigades when support elements are included, is roughly 10 times the size of the American military presence in Afghanistan during the same period.<sup>2</sup> Most of the U.S. military personnel and equipment deployed to Iraq have been drawn from the active and reserve components of the Army. Because planners did not anticipate how lengthy and intense the Iraq campaign would become, the Army has been forced to continually adjust its approach to manning, equipping and sustaining the force.

Army equipment deployed to Iraq from the United States and overseas locations has generally performed well. A high state of readiness has been sustained in the theater of operations despite heavy use, a harsh environment and frequent attacks.

However, this impressive performance has been bought at a price. Like its personnel, the Army's inventory of equipment is exhibiting increasing signs of combat-related stress. That stress is already eroding the readiness of units outside Iraq and could eventually impede operations within Iraq. The impact of Iraq on Army equipment is particularly apparent in four areas:

- High utilization rates and harsh conditions have greatly accelerated the aging of equipment;
- A significant amount of equipment is being destroyed due to both combat losses and the wear associated with constant use;
- Equipment readiness in deployed units has shown a gradual erosion as the service struggles to keep up with maintenance and replacement needs;
- Readiness in non-deployed units has plummeted as equipment is transferred to deploying units or left behind when troops depart Iraq.

**Equipment stress.** The Army's preferred measure of equipment usage is operational tempo, or "optempo." Optempo is calculated as a multiple of the rate prevailing in peacetime. For example, the M1A2 Abrams tank drives 800 miles in a normal year, but those deployed in Iraq are covering about 5,000 miles per year, giving the Abrams an optempo six times the usual rate. The M2 Bradley tracked fighting vehicle that often accompanies Abrams in battle is experiencing a similar rate of use, as is the High Mobility Multipurpose Wheeled Vehicle, a light truck popularly known as the Humvee. Medium and heavy trucks are experiencing optempos as high as 10 times the typical peacetime rate. Helicopter optempo's in Iraq range from two to five times the normal rate, depending on the type of helicopter. At these elevated rates of utilization, combat systems quickly become unusable without frequent maintenance and repair.<sup>3</sup>

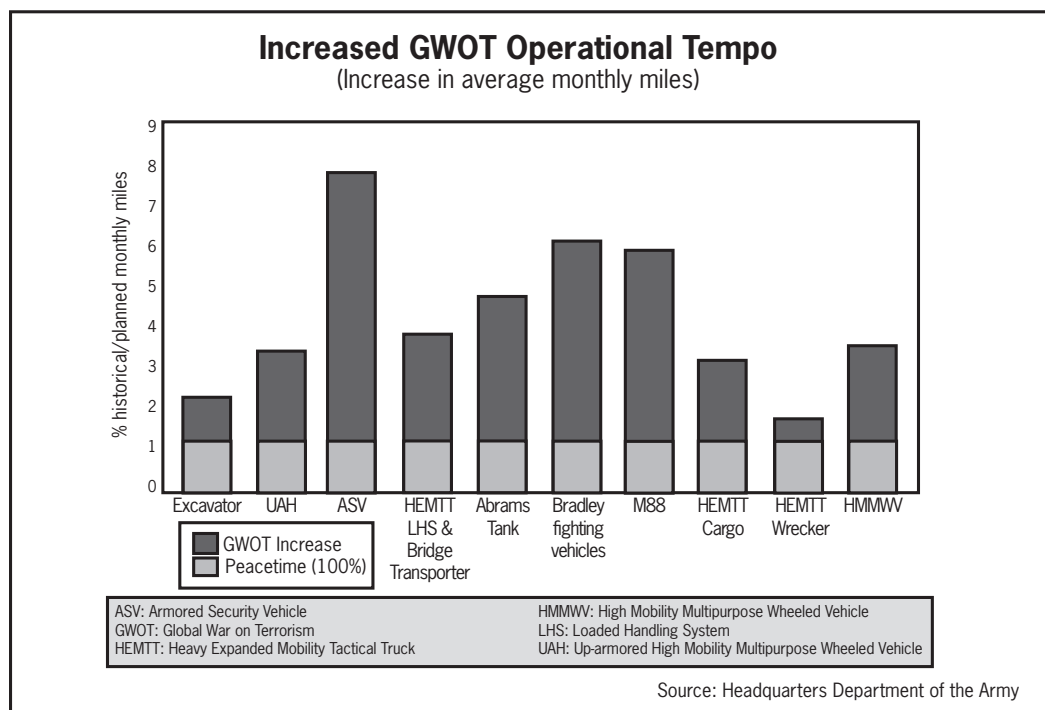
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<sup>2</sup> *An Analysis of the U.S. Military's Ability to Sustain an Occupation in Iraq: An Update*, Washington, DC: Congressional Budget Office, October 5, 2005, pp.1-3.

<sup>3</sup> *Resetting the Force*, pp.4-9; *Military Readiness: DoD Needs to Identify and Address Gaps and Potential Risks in Program Strategies and Funding Priorities for Selected Equipment*, Washington, DC: Government Accountability Office (GAO-06-141), October 2005, pp.40-46, 49-60.



Not surprisingly, high optempos have resulted in an accelerating aging of equipment. This results not only from the frequency of use but also the harshness of conditions in Iraq, which are seldom matched in peacetime training environments. Mechanical and electronic systems, such as in the Abrams tank, are exposed to fine sand, extreme heat and other elemental forces that would be encountered only rarely in peacetime. Rather than operating on the soft ground of open country for which they were designed, the M1A2's in Iraq often travel on paved roads that damage treads and other moving parts. They also are subjected to attacks by insurgents employing a range of weapons such as rocket-propelled grenades and improvised explosive devices. The Abrams is better equipped than most vehicles to withstand such stresses, but it still experiences as much wear and tear in one year of operation in Iraq as in five years of peacetime training.<sup>4</sup>



Attrition rates for equipment deployed to Iraq during the occupation have been relatively light, but the cumulative loss over time from combat damage and heavy usage is significant. The Army sought \$553 million in its emergency supplemental request to Congress for fiscal 2005 to fund the replacement of 800 major pieces of equipment, including 350 wheeled vehicles. More recently, the Army disclosed in January 2006 that it would seek \$1.2 billion to replace more than 100 helicopters lost to hostile fire and accidents in Iraq.<sup>5</sup> In addition to direct combat losses and accidents, the Army faces a growing problem with systems that have been operated so heavily for so long that repair is no longer economical. The service estimates that 12 percent of the wheeled vehicles, two percent of the tracked vehicles and three percent of the helicopters sent to Iraq will be “washed out” in this fashion.<sup>6</sup>

<sup>4</sup> *Resetting the Force*, p.4.

<sup>5</sup> Rebecca Christie, “U.S. Army Seeks \$1.5 Bln to replace War-Damaged Aircraft,” *Dow Jones Newswires*, January 12, 2006; Lt.Gen. C.V. Christianson, Deputy Chief of Staff, U.S. Army, Statement before the House Armed Services Committee Readiness Subcommittee, 2005, p.8.

<sup>6</sup> Christianson, p.8; Douglas Holtz-Eakin, Director, Congressional Budget Office, “The Potential Costs Resulting from Increased Usage of Military Equipment in Ongoing Operations,” Statement before the House Armed Services Committee Readiness Subcommittee, April 6, 2005, footnote 9.

<b>Combat Losses</b>			
<b>Vehicle combat losses in Iraq since 2003 (approx.)</b>			
M1 Abrams tanks			<b>20</b>
Bradley fighting vehicles			<b>50</b>
Stryker wheeled combat vehicles			<b>20</b>
M113 armored personnel carriers			<b>20</b>
Humvees			<b>250</b>
Fox wheeled reconnaissance vehicles, mine clearing vehicles, heavy and medium trucks and trailers			<b>more than 500</b>
<b>Aircraft combat losses in Afghanistan and Iraq since 2001 *</b>			
Apache attack helicopters	<b>27</b>	Chinook cargo helicopters	<b>14</b>
Black Hawk utility helicopters	<b>21</b>	Kiowa assault helicopters	<b>23</b>

Source: Army Times

**Readiness trends for active-duty.** Despite all the factors tending to degrade systems deployed in Iraq, the active-duty Army has managed to sustain high rates of readiness for most categories of equipment deployed to Iraq. The service’s preferred metric for readiness is the mission-capable rate, which measures what portion of a force is prepared to participate in operations on short notice. According to the Association of the United States Army, the service is sustaining mission-capable rates in the 90 percent range for tanks, armored vehicles and heavy trucks operating in Iraq, while achieving a 77 percent mission-capable rate for Apache and Blackhawk helicopters.<sup>7</sup> The Government Accountability Office (GAO) notes consistently high mission-capable rates for newer medium trucks, Humvee light trucks and the Kiowa armed reconnaissance helicopter.<sup>8</sup>

However, GAO also notes a gradual slippage since the war began in many categories of equipment as increased maintenance needs, troop rotations and efforts to add armor to wheeled vehicles have complicated the task of sustaining a high state of readiness. This is true even in the case of systems with high mission-capable rates such as the Abrams tank, which faces readiness challenges due to shortages of spare parts and maintenance technicians. A few systems, such as the CH-47D Chinook cargo helicopter, exhibit consistently lower readiness rates because of age and heavy usage.<sup>9</sup>

**Reserve readiness.** The news about equipment readiness outside the war zone is much less positive, especially among reserve-component units. The Army National Guard and the Army Reserve began the Iraq war with less capable equipment than the active force and have lost ground as the occupation progressed. In the case of the National Guard, non-deploying forces have transferred more than 100,000 major equipment items to deploying forces, while deploying forces in turn have left behind more than 64,000 major items when they departed Iraq so the equipment could be used by follow-on forces.<sup>10</sup> Since much of this “stay-behind” equipment is relatively old and being used very intensively in the war zone, it may never return to stateside units. The drawdown of National Guard equipment in the United States to support the war effort is so extensive that it raises doubts about preparedness for homeland defense. For instance, GAO reported in October 2005 that non-deployed Guard units had no night-vision goggles or chemical-agent detection equipment on hand.

<sup>7</sup> *Resetting the Force*, pp.7-8.

<sup>8</sup> *Military Readiness: DoD Needs to Identify and Address Gaps...*, pp.54-60, 67-69.

<sup>9</sup> *Ibid.*, pp.63-65.

<sup>10</sup> *Plans Needed to Improve Army National Guard Equipment Readiness and Better Integrate Guard into Army Force Transformation Initiatives*, Washington, DC: Government Accountability Office, October 2005, pp.4-5.

There are legitimate reasons for transferring reserve equipment to the deployed force, especially when stateside units either lack skills relevant to operations in Iraq or have exhausted their potential for deployment under existing personnel policies.<sup>11</sup> However, the decline in equipment readiness in domestic reserve units, like the accelerated aging of equipment in the war zone, underscores the fact that military progress in Iraq is being bought at a heavy price. Vast expenditures will be required to repair or replace worn-out equipment; while that effort is underway, the readiness of the Army to confront new challenges overseas or cope with disasters at home will be reduced. Recognizing the danger posed by diminished equipment readiness, the Army is working hard to keep up with the maintenance and modernization demands imposed by the war. Over time, though, it is gradually losing ground.

## **Lessons of Iraq**

The Iraq war has presented military planners with a series of unpleasant surprises. Although the initial, conventional phase of operations unfolded largely as planned, the insurgency that followed has proven to be durable and demanding — so much so that the number of U.S. casualties in 2005 was nearly identical to the number in 2004. It is now clear that some of the key assumptions driving the original invasion were flawed and that subsequent mistakes enabled a tenacious resistance to become firmly rooted. The most egregious errors were made by senior civilians in the Bush administration, but it is the Army more than any other institution that has been forced to cope with the consequences of those errors. The service has worked hard to learn from both its successes and failures in Iraq. While it is too early to assess definitively the significance of the Iraq campaign, several lessons concerning Army equipment are already apparent.

***Force protection.*** The first lesson is that if the Army is going to continue participating in stability operations such as the Iraq counter-insurgency campaign, it will need to invest more heavily in force protection. The current inventory of Army equipment was conceived for fighting conventional adversaries in circumstances where secure and contested areas are well defined. However, counter-insurgency campaigns seldom unfold in such circumstances, and Iraq is no exception. In fact, a central feature of the Iraq conflict has been the inability of defenders to fully secure cities and countryside against an elusive enemy. U.S. forces are in continuous danger whenever they leave guarded compounds.

The Army is not accustomed to operating in such environments, but it would be a mistake to view Iraq as an exception. Iraq has taught extremists around the world how effective guerrilla tactics work against the U.S. military. The service has to assume that the need to equip all personnel with body armor, to reinforce the structures of all vehicles and to monitor all routes for improvised explosive devices will persist in the future. Modernization plans therefore must reflect an increased awareness of the requirement for force protection.<sup>12</sup>

***Situational awareness.*** A second glaring lesson from Iraq is that soldiers often lack adequate understanding of what is going on around them. In Iraq, this lack of situational awareness is traceable mainly to the Army's dearth of foreign language skills and deficient human intelligence.

<sup>11</sup> *An Integrated Plan is Needed to Address Army Reserve Personnel and Equipment Shortages*, Washington, DC: Government Accountability Office, July 2005, p.4.

<sup>12</sup> MGen. Stephen M. Speakes, MGen. Jeffrey A. Sorenson and BGen. Stephen D. Mundt, Statement on Army Force Protection and Aviation Safety Programs before the House Armed Services Committee Readiness Subcommittee, February 1, 2006, pp.1-10.

No amount of new technology can correct for the fact that soldiers don't speak Arabic and do not have reliable local sources. However, there are some technologies that could enhance situational awareness beyond these fundamentals.

For example, the after-action report of the Third Infantry Division stressed that divisions and brigades need their own unmanned aerial vehicles for collecting imagery and targeting intelligence. The report also praised a new battlefield network called Blue Force Tracker that relies on satellite communications and information fusion to keep track of all friendly and hostile forces in an area of operations.<sup>13</sup> Systems such as these give individual warfighting units unprecedented awareness and operational options that do not depend on the action of higher echelons. That kind of flexibility will be increasingly important in the fluid warfighting environments of the future.

**Tactical communications.** A third and related lesson from Iraq is that the Army's line-of-sight communications systems — Mobile Subscriber Equipment, Enhanced Position Location Reporting System, Single Channel Ground and Airborne Radio System — are so antiquated that they pose a danger to effective military operations. This is no surprise. Army planners have been warned for years by opposition force commanders at the U.S. national training center that existing links are easy to destroy or degrade. Experiences in Iraq and Afghanistan underscore the need to shift to satellite-based communications that can circumvent surface obstacles while maintaining connectivity with troops on the move.<sup>14</sup>

Blue Force Tracker is a good start on such communications, but other systems are also needed such as the Warfighter Information Network-Tactical (WIN-T) which will provide the networking foundation for the Future Combat System. The Army needs to move expeditiously to provide all units with wireless wideband links that assure communications on the move regardless of weather or terrain.

**Information warfare.** A fourth lesson from Iraq relevant to future equipment purchases is that the Army needs to upgrade its capacity for intercepting, analyzing and jamming adversary electronic signals. As the after-action report of the Third Infantry Division noted, "The signal environment in current and future battlefields runs the gamut from tactical FM radios, to [high frequency] radios, to mobile secure cell phones, to fiber optics."<sup>15</sup> These signals enable every facet of enemy operations, from the sharing of information to the command of forces to the remote detonation of hidden explosives. The Army needs an agile, precise system that can assist combat units in dissecting the local electromagnetic environment and selectively jamming threat signals.

The need for better signals intelligence and countermeasures is not confined to periods of intense warfighting. The Army currently monitors more than 80,000 frequencies in the Baghdad area and has determined that certain types of threats generate specific electromagnetic profiles. However, deficiencies in software code for some of the service's latest intelligence tools have prevented quick tracking and integration of diverse signals. Operational units are writing their own software to get around these defects, but the service needs to develop tools that do not impose unnecessary constraints on the ability of soldiers to monitor and manipulate enemy transmissions.

<sup>13</sup> *Third Infantry Division (Mechanized) After Action Report: Operation Iraqi Freedom*, Washington, DC: Department of the Army, 2004, pp.3-5, 14-16.

<sup>14</sup> *Ibid.*, pp.4-5, 53-55.

<sup>15</sup> *Ibid.*, p.15.

**Heavy armor.** A fifth lesson concerns the robust role played by heavy armor in Iraq. Tanks and armored personnel carriers have been out of favor with the advocates of “military transformation” for so long that their value and versatility in Iraq has come as something of a revelation. Not only have they provided critical capabilities in waging urban battles, but they have proven surprisingly relevant to the conduct of counter-insurgency operations. One of the most successful new systems deployed to Iraq has been the Stryker armored vehicle, which departs from long tradition in the Army’s armor community by using wheels rather than tracks. Although more lightly armored than an Abrams tank, the Stryker has survived hundreds of hits by rocket-propelled grenades while giving soldiers greater flexibility when on patrol in dangerous areas.<sup>16</sup>

The unexpected frequency and lethality of insurgent attacks has led the Army to rethink its future plans for armor, placing greater emphasis on the Stryker while increasing modernization funds for the Abrams, Bradley and other legacy armored systems. With necessary connectivity and sensor upgrades, these vehicles are now expected to remain in the active force through mid-century.<sup>17</sup>

**Reserve forces.** A final lesson of Iraq is that the longstanding practice of under-equipping the reserve component in order to outfit the active force with the latest technology no longer makes sense. Using a tiered resourcing strategy, the Army has traditionally provided first-deploying units with the best, most abundant equipment, while the Army Reserve and Army National Guard got older equipment in lesser amounts.<sup>18</sup> That was a reasonable approach for a fiscally-constrained organization concerned mainly with waging conventional warfare in far-away places.

Times have changed. Threats today are more likely to be unconventional (“asymmetric”) than conventional. The length of wars may be longer, while their intensity may be lower. And there is a greater need to reconcile the requirements of overseas combat with the demands of homeland defense. In such circumstances, the Guard and Reserve need to be better equipped, even if it means depriving the active-duty force of some under-utilized equipment such as air defense missiles or artillery. Other services can make up for the lost firepower, but they cannot replace the Guard in responding to domestic disasters.

There are many other, lesser lessons of Iraq that bear upon future equipment needs, from the types of munitions most useful in modern warfare to the challenge of maintaining fragile electronic equipment in harsh operating environments. But all lead to a clear conclusion: The Army will require elevated levels of funding for years after it departs from Iraq. The additional money will be needed not only to reset worn-out equipment, but also to assimilate what has been learned from prosecuting the Iraq campaign. The Army often complains that it gets too small a share of the defense budget — a questionable argument when the amounts of money other services spend on supporting the Army are taken into account. But the simple truth today is that the Army has carried most of the burden in Iraq, and therefore deserves privileged treatment in future defense budgets.

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<sup>16</sup> Steve Fainaru, “Soldiers Defend Faulted Strykers,” *Washington Post*, April 3, 2005, p.A21.

<sup>17</sup> *Military Readiness: DoD Needs to Identify and Address Gaps...*, pp.40-49; Ann Roosevelt, “Army Near Term Plans Take Shape For Abrams,” *Defense Daily*, October 26, 2005.

<sup>18</sup> *Plans Needed to Improve Army National Guard Equipment Readiness...*, pp.8-10.



## Near-term Needs

In order to sustain the current pace of military operations in Iraq without leaving the nation vulnerable to aggression in other places (including the homeland), the Department of Defense must continuously repair, rebuild and replace equipment worn out or destroyed by the war effort. Funding for this effort is provided outside the regular defense budget in the form of emergency supplemental appropriations, and because the Army is carrying most of the burden of the campaign, it receives most of the supplemental funding. The service refers to activities aimed at restoring or replacing equipment degraded by the war as “reset.” In 2003 the Army received \$1.2 billion for reset, an amount which tripled in 2004 to \$3.7 billion, and then greatly increased in 2005 to \$6.5 billion. With 19 brigade combat teams expected to return to home station in the United States from Iraq and Afghanistan in 2006, the level of reset activity in the current year is expected to reach \$9 billion.<sup>19</sup>

Restoring or replacing the equipment of deployed Army units is the biggest category of systems subject to the reset process, but it is by no means the only one. In addition to the hundreds of thousands of items that returning troops bring back to the United States with them, the Army must also reset so-called “stay-behind equipment” such as up-armored vehicles that were left in Iraq for use by follow-on forces; pre-positioned equipment drawn from stores maintained in Europe, Asia and ships anchored in the Indian Ocean; and equipment losses resulting from combat or extreme wear. Current reset practices are designed to keep up with the restoration or replacement of equipment carried by deploying units as they rotate out of Iraq, but that approach won’t work with stay-behind or pre-positioned items, which can only be fully restored when hostilities end.<sup>20</sup> The Army contends it will need supplemental appropriations for two years after such a cessation to fully accomplish its reset goals.

**Reset process.** The concept of reset covers a range of actions, some of which are relatively simple and cheap, and others of which are complex and costly. The actions required depend on the condition of a particular item and the Army’s plans for using that item in the future. For example, it may only cost a few hundred dollars to accomplish a typical maintenance action on a Humvee in the field and a few thousand dollars to repair a damaged Humvee in a military depot. But the Army’s Humvee fleet began in Iraq with an average age of 13 years, and it has been used at six times peacetime rates under harsh conditions carrying extra weight in the form of armor that protects passengers. To cope with all those stresses, the service has decided to “recapitalize” (rebuild) thousands of Humvees, a protracted process that costs \$52,000 per vehicle.<sup>21</sup>

All reset actions share the aim of returning equipment to a high state of readiness so that it is available on short notice for use in military operations. The Congressional Budget Office identifies five levels of reset activity defined by their complexity and cost:<sup>22</sup>

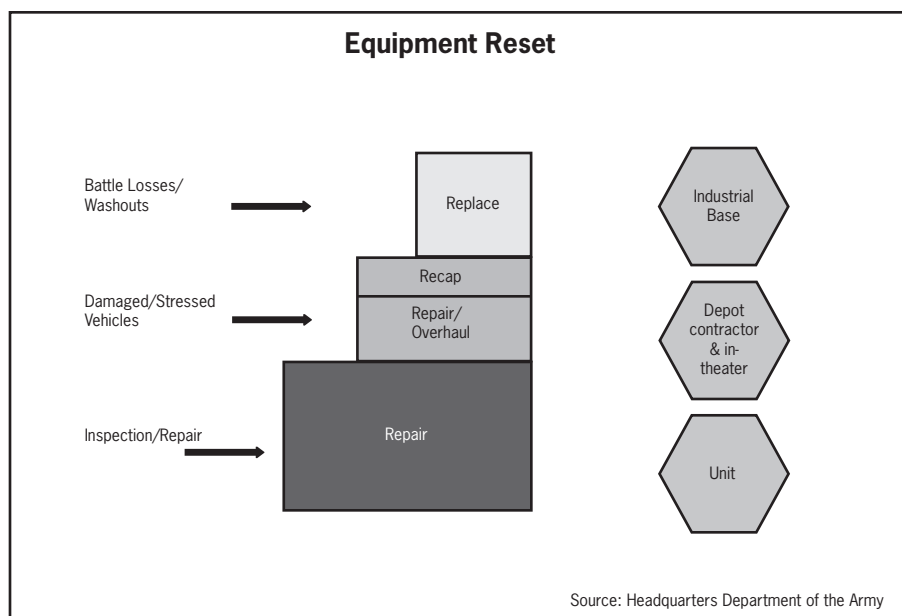
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<sup>19</sup> Christianson, pp.3-5.

<sup>20</sup> *Ibid.*, pp.4-8.

<sup>21</sup> Interview at Headquarters, Army Materiel Command, Ft. Belvoir, VA, October 21, 2005.

<sup>22</sup> Holtz-Eakin, pp.15-16 in internet version of document.



- Sustainment, meaning routine maintenance such as oil changes and minor parts replacement, which is typically accomplished in the field by the unit operating the equipment;
- Restoration to standard in theater, meaning repairs that require specialized skills but can be accomplished within the theater of operations;
- Restoration to standard in depot, meaning the most complex repairs and overhauls, which must be carried out in a dedicated repair center (usually in the U.S.);
- Recapitalization, meaning a complete rebuilding of equipment intended to return it to a like-new state, which is accomplished either at a government depot or in a contractor facility;
- Replacement, meaning the production of new systems to take the place of destroyed equipment, an activity usually performed at private-sector industrial sites.

Major equipment items will eventually have to pass through every one of these stages if they are to remain in a high state of readiness. Combined with initial development and manufacture, the various stages of sustainment, restoration, recapitalization and replacement comprise what is known as the “product life-cycle” of a military system. In peacetime this cycle may extend over several decades, but the stresses of war accelerate the process so that each stage of support is compressed and intensified. Delaying repair or recapitalization once equipment has reached a specified level of wear may result in premature loss to the force because the less demanding stages of support cannot address fundamental problems. For instance, the Army found more than 200 pounds of sand in the cockpit of one helicopter from Iraq that was being rebuilt, even though it already had been cleaned and stripped.<sup>23</sup>

<sup>23</sup> Christie; see also Pamela Hess, “Army Needs \$1.2b for Chopper Replacement,” United Press International, January 12, 2006.

**Funding reset.** Most of the accumulated cost for Army equipment repair and replacement since 9/11 was covered by a supplemental appropriation passed by Congress in 2005. However, the Congressional Budget Office estimates that the service will need an additional \$3.7 to 5.3 billion annually to cover equipment costs associated with operations in Iraq and Afghanistan. About 40 percent of that amount will be needed to restore or replace wheeled vehicles, with the remainder split almost evenly between tracked vehicles and helicopters.<sup>24</sup> Within those categories, though, there are many subsystems and components that will require individualized attention. The electronic equipment carried on vehicles, for example, is usually more fragile than mechanical systems and will require very different remedial treatment than engines or transmissions.

In general, Congress and the Bush administration have provided adequate funding to keep up with the near-term equipment needs generated by Iraq. Fiscal 2005 was the first year in recent times that the Army's entire request for spare parts was funded. But spot shortages of particular items occur on a daily basis, and the deployment of many maintenance technicians to the war zone has undercut the capacity of domestic repair depots to cope with the high level of demand generated by the conflict. When the Fourth Infantry Division returned from Iraq in 2004, it brought with it more than 70,000 pieces of equipment in need of restoration or replacement.<sup>25</sup> The persistently high level of demand for repair and recapitalization services is a key reason why members of the 2005 Base Closure and Realignment Commission chose not to close depots recommended for shutdown by the Bush administration.

**Accumulating problems.** Despite adequate levels of funding and high rates of readiness in the war zone, the Army is experiencing an increasing backlog of equipment deficiencies that will require longer-term solutions. First, much of the equipment sent to Iraq was already relatively old, and heavy use will undoubtedly accelerate its removal from service. Second, the high cost of recapitalization — restoring equipment to zero-hours/zero-miles status — has led the service in many cases to substitute simpler repair and restoration measures rather than rebuilding systems; this will eventually have negative consequences for the readiness of the force. Third, non-deploying reserve units have been stripped of much of their equipment, and a large portion of it will never return due to wear in the war zone.<sup>26</sup> Finally, the Army's practice of rebuilding helicopters and ground vehicles rather than buying new ones has reduced the flow of used systems into the reserves, which means the service has smaller, older inventories of equipment in standby status for national emergencies.

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<sup>24</sup> Holtz-Eakin, p.19 in internet version of document.

<sup>25</sup> *Resetting the Force*, p.4.

<sup>26</sup> *Plans Needed to Improve Army National Guard Equipment Readiness...*, pp. 4, 10, 13.



**Near-term recommendations.** In order to assure that Army equipment readiness fully recovers from the consequences of the protracted military campaign in Iraq, five near-term steps are necessary.

- Congress should fully fund the service’s \$9 billion request for reset funding in fiscal 2006, and a similar level of reset funding should be sustained in subsequent years as long as the Army maintains a major presence in Iraq.
- Congress should provide additional resources to cover most of the procurement and depot maintenance items contained in the Army’s \$7 billion unfunded requirements list for fiscal 2007.
- Once the deployed force departs Iraq, Congress should continue funding reset for at least two years to assure full resolution of all war-related equipment problems.
- The Army should cease deferring recapitalization of aging equipment and request a level of reset funding consistent with fully revitalizing the force for future challenges.
- The Department of Defense should conduct and submit to Congress a comprehensive review of new equipment that will be required for the Army National Guard and Army Reserve to fully recover from Iraq deployments and enable the reserve component to meet future commitments at home and abroad.
- The U.S. Army should fund its reset program through the normal budget process and not through supplementals, as has been the case since the beginning of operations in Iraq.

## **Long-term Plans**

The Army has crafted a complex plan to transform its warfighting capabilities that will require decades to complete. Its strategic planning guidance identifies five initiatives central to force transformation: reorganization of warfighting units into modular “brigade combat teams”; development of a robust communications network; fielding a new family of combat vehicles; stabilization of the force; and rebalancing responsibilities between active and reserve components.<sup>27</sup> Each of these efforts will have some bearing on how the Army modernizes its equipment to cope with future challenges.

**Military transformation.** The fundamental goal of Army transformation is to use new technology to maximum effect, fashioning a more agile and aware force that can be quickly concentrated or dispersed as circumstances require. Modularity and networking figure prominently in this vision; units must be interchangeable and continuously connected in order to operate with sufficient speed and precision and exploit opportunities in the battlespace. Close cooperation with other parts of the joint force is also essential, since the Army plans to reduce its budgetary and logistics burden by relying on the Air Force and Navy for intertheater transportation, overhead reconnaissance, long-range firepower and other vital functions. But the service will still need to field a full array of ground and airborne combat vehicles — manned and unmanned — supported by a resilient infrastructure of communications and logistics systems.<sup>28</sup>

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<sup>27</sup> *Army Strategic Planning Guidance 2005*, Washington, DC: Department of the Army, 2005, pp.8-9 in internet version of document.

<sup>28</sup> *2004 Army Transformation Roadmap*, Washington, DC: Department of the Army, August 31, 2004, pp.1-1 through

The desire to transform the force at the same time that it is waging a multi-front military campaign presents Army leaders with difficult investment choices. First, they must balance the near-term need to maintain aging Cold War equipment against the long-term promise of new technology. Money spent fixing existing equipment will not be available to develop next-generation systems. Second, they must balance conventional military capabilities optimized for fighting the militaries of other nations against the more unconventional capabilities needed to cope with global terrorist networks and insurgencies. Money spent on heavy armor or artillery will not be available for special forces. Third, they must balance active-duty capabilities with reserve-component capabilities, recognizing that the reserves will be the first responders during domestic natural disaster or attack on the homeland. Giving the reserves inferior equipment may have made sense during the Cold War when battle lines were far from America's shores, but current demands for homeland defense require well-equipped forces both at home and abroad.

Each of these tradeoffs becomes harder when set against a backdrop of profound uncertainty about future military challenges. Policymakers have made so many mistakes in recent years concerning the timing and character of threats that military planners no longer assume they know which capabilities will be most important in the future. That drives the Army to emphasize versatility and flexibility in its forces, but also to harbor a fair degree of skepticism about whether current thinking on military change will prove valid over the long run. For instance, the service's heavy armor had fallen out of favor with proponents of transformation prior to the urban warfare experiences of Iraq, but now is considered a crucial factor in winning urban battles. On the other hand, the much-touted agility of helicopters in conducting fast-paced operations has been called into question by the vulnerability of such aircraft to attacks by lightly-armed Iraqi insurgents.

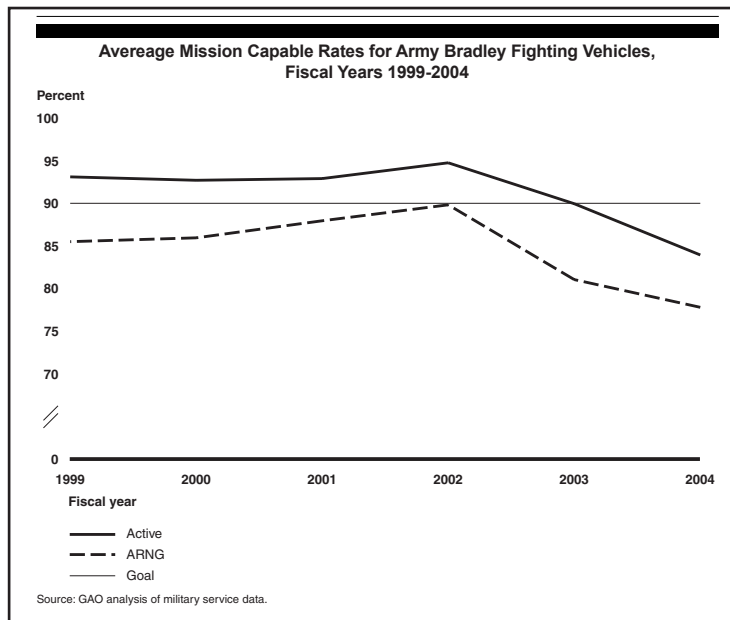
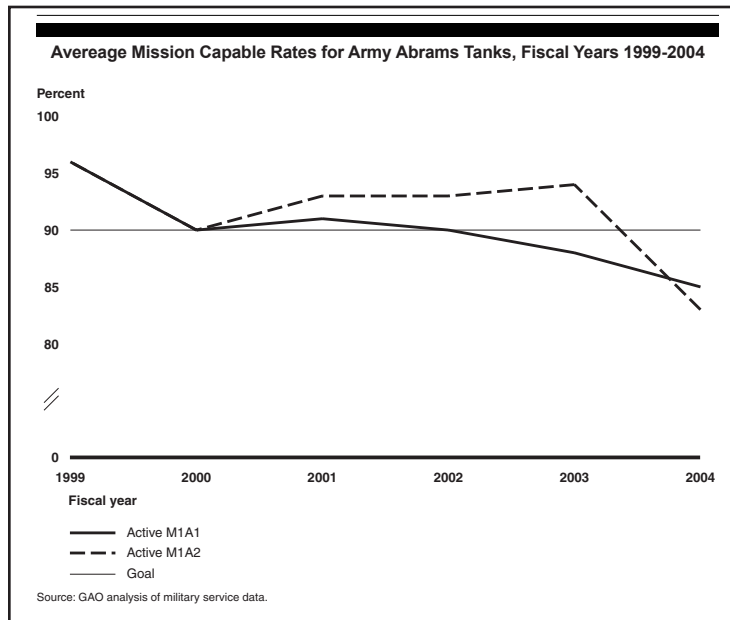
The present thinking of Army planners is that their service will field a mix of traditional and newer combat systems until mid-century. Emerging technologies such as mobile satellite communications, multi-spectral sensors and robotic vehicles will enhance the capabilities of the future force, but tanks, trucks and helicopters will continue to play a central role in land warfare. The persistence of such signature systems in the military posture reflects the lessons of recent conflicts, the technical challenge of developing next-generation weapons and the budgetary obstacles to replacing the service's arsenal quickly. It also reflects a realization that big gains in warfighting effectiveness can be obtained at relatively modest cost by introducing new technologies into existing systems, particularly technologies that bolster connectivity and awareness.

***Armor modernization.*** In the case of armor, that realization has resulted in a plan to retain upgraded Abrams tanks and Bradley fighting vehicles in the force until 2045, as well as the venerable M113 armored personnel carrier that first debuted in 1960. The diverse inventory of Abrams tanks will be remanufactured into two variants with digital electronics, second-generation infrared targeting devices and active protection systems. The Bradley fleet will undergo a similar consolidation of types designed to match fighting vehicles to the capabilities of the tanks with which they operate.<sup>29</sup>

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2-12, 5-1 through 5-20.

<sup>29</sup> *Military Readiness: DoD Needs to Identify and Address Gaps...*, pp.40-46.



Abrams and Bradley will be augmented by the lighter, more deployable Stryker wheeled combat vehicle and an improved version of M113 incorporating stronger armor. Most of the Army's modular brigades will be organized around the fighting power provided by these vehicles.<sup>30</sup> However, the GAO has warned that long-term plans for the Bradley and M113 are not adequately funded, and further uncertainty arises from the unsettled state of next-generation vehicle development in the Future Combat System program.

<sup>30</sup> *A Modular Force for the 21<sup>st</sup> Century*, Torchbearer National Security Report, Arlington, VA: Association of the United States Army, March 2005, pp.10-12.

**Truck modernization.** In the case of trucks, the Army plans to continue using its three main tactical vehicles through 2030, gradually remanufacturing or replacing them as necessary. The fleet of 12,700 Heavy Expanded Mobility Tactical Trucks that transport ammunition, petroleum products and other consumables has required the addition of armor to operate in Iraq, but Army leaders express satisfaction with their performance despite an average age of 15 years. The newer family of Medium Tactical Vehicles has performed very well once equipped with protective armor, and will continue to replace aging Cold War trucks; about 20,000 have been bought to date, representing a third of the service's stated requirement.<sup>31</sup>

The 120,000 High Mobility Multi-Purpose Wheeled Vehicles (Humvees) will require extensive recapitalization and/or replacement given an average age of 13 years, but will provide the preponderance of light trucks in the force for the foreseeable future. Because trucks have been used more intensively than any other type of vehicle in Iraq and have required armor not included in original designs, accelerated remedial action may be needed in the future to preserve the fleet. The GAO reports that the Army has not fully identified funding and requirements for long-term sustainment of the fleet.<sup>32</sup>

**Helicopter modernization.** In the case of helicopters, the Army has long-term plans to recapitalize or replace each of the four types of rotorcraft that have been used in Iraq. More than 1,000 UH-60A Blackhawk utility helicopters will be replaced with a new UH-60M variant with improved range and payload, enhanced survivability and digital electronics. About 600 of the service's 700 AH-64A Apache attack helicopters will be remanufactured to a new AH-64D "Longbow" configuration with greatly increased lethality and awareness; the remaining Apaches will receive safety upgrades. The CH-47D Chinook cargo helicopter will be remanufactured for a second time into a CH-47F variant providing 20 additional years of operational life (55 new Chinooks will also be built).<sup>33</sup> And the AH-58D Kiowa armed reconnaissance helicopter will be completely replaced by 368 new reconnaissance helicopters scheduled to debut early in the next decade. Termination of the service's long-delayed Comanche helicopter program enabled the Army to reprogram money for both a new armed reconnaissance helicopter and a new light utility helicopter.<sup>34</sup>

The Army thus appears to have coherent and executable plans in place to modernize its key ground and airborne vehicles over the next two decades. But there are three challenges that could adversely affect these plans. First, the service does not know today when its forces will depart Iraq and what the cumulative impact of operations there will be on its equipment. Second, the Army has come to rely on supplemental appropriations for much of its recapitalization and replacement funding; there is no way of knowing when that infusion of additional money will disappear. Third, the ultimate success of Army plans to reorganize its warfighting units and equipment inventory around networked operations is not assured. The latter point is particularly noteworthy because programs such as the Future Combat System are exceedingly complex and costly, raising the possibility that the current, brief moment of funding sufficiency for the service could be squandered in misguided modernization goals.

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<sup>31</sup> *Military Readiness: DoD Needs to Identify and Address Gaps...*, pp.49-50, 57-60.

<sup>32</sup> *Ibid.*, pp.54-57.

<sup>33</sup> *Ibid.*, pp.60-67.

<sup>34</sup> Robert Wall, "Ready to Roll: Congress gives go-ahead to Army's armed reconnaissance helo," *Aviation Week & Space Technology*, September 27, 2004, p.32.

***Long-term recommendations.*** In order to assure that the Army is ready to cope with the diverse challenges it will face in the years after U.S. forces depart Iraq, five long-term steps are essential.

- The Army should continue efforts to reorganize its warfighting capabilities around modular, networked brigade combat teams.
- The Army should accelerate fielding of new situational awareness and communications systems, including the Warfighter Information Network-Tactical that will provide a foundation for the overarching Future Combat System, the Blue Force Tracker and brigade-level unmanned aerial vehicles.
- The Army should produce and fund a comprehensive plan for the continuous enhancement of heavy armored vehicles such as the Abrams main battle tank and Bradley infantry fighting vehicle.
- The Army should complete replacement of its Cold War truck fleet while beginning development of a successor to the versatile High Mobility Multipurpose Wheeled Vehicle (Humvee).
- The Army should work hard to keep all elements of its aviation modernization program on track, recognizing that timely fielding of new or improved attack, utility, cargo and reconnaissance helicopters are critical to future conventional and counter-insurgency operations.





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