United States General Accounting Office

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Report to the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives

June 2003

DEFENSE INVENTORY

The Army Needs a Plan to Overcome Critical Spare Parts Shortages

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GAO-03-705

June 2003

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Highlights

Highlights of GAO-03-705, a report to the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives

DEFENSE INVENTORY

The Army Needs a Plan to Overcome Critical Spare Parts Shortages

Why GAO Did This Study

Prior reports and studies have identified major risks in the Department of Defense's (DOD) management, funding, and reporting of spare parts spending programs. Spare parts shortages adversely affect the U.S. Army's operations and can compromise the readiness of weapon systems. To address these issues, Congress has fully funded DOD's requests for spare parts spending and in some instances increased funding for additional spare parts. Yet, the Army continues to experience spare parts shortages. The Committee requested that GAO evaluate (1) the Army's strategic plans for reducing spare parts shortages, (2) the likelihood that key initiatives will reduce such shortages, and (3) the Army's capability to identify the impact on readiness of increased investments for spare parts.

What GAO Recommends

GAO recommends that the Secretary of Defense:

- Modify or supplement the *Transformation Campaign Plan* or the Armywide initiatives to include a focus on mitigating critical spare parts shortages.
- Implement, with a specific completion milestone, the Office of the Secretary of Defense's recommendation to report the impact of parts funding on equipment readiness.

In written comments, DOD generally concurred with the intent of the recommendations but not all specific actions.

www.gao.gov/cgi-bin/getrpt?GAO-03-705.

To view the full report, including the scope and methodology, click on the link above. For more information, contact George Morse at (757) 552-8108 or morseg@gao.gov.

What GAO Found

The Army's logistics strategic plan provides strategic goals, objectives, and milestones for force transformation efforts, but does not specifically address the mitigation of critical spare parts shortages. The Army's *Transformation Campaign Plan*, published in April 2001, serves as a mechanism to move the Army from its present posture to a more strategically deployable and responsive force. The plan prescribes specific goals and milestones to support the transformation process. However, it lacks objectives and performance measures it could use to show progress in mitigating critical spare parts shortages.

The Army's six servicewide logistics initiatives are aimed at enhancing readiness by improving internal business processes that would increase supply availability. However, they were not designed to mitigate spare parts shortages. These processes include those that acquire, repair, and distribute spare parts. Recognizing that the Armywide initiatives were not designed to specifically focus on mitigating critical shortages, the Army recently started a new initiative to address individual spare parts shortages that affect key weapon systems readiness. However, this initiative is not part of the Armywide logistics improvement efforts, and therefore it is not coordinated with other initiatives and its results are not linked with the overall goals and performance measures. Absent this coordination and linkage, any systemic problems that the initiatives identifies may not be elevated to the Armywide initiatives for resolution and its benefit may be limited to improving the availability of only a few parts.

The Army has the means to link funding to weapon system readiness, and reports this in its budget justification documents, but it does not report to Congress how additional investments in spare parts would increase readiness. The Army Materiel Systems Analysis Activity can use models to indicate the investment needed to reach a desired level of supply availability, along with the possible corresponding increase in readiness, and it has provided such information to Army units. Additionally, the Army has used consultants to project the impact of additional funding on the readiness of specific weapon systems and provided this to the Army Vice Chief of Staff. For example, the Logistics Management Institute projected that an additional investment of $331 million for additional spare parts would increase the overall readiness of the Apache and Blackhawk helicopters by approximately 2.6 percent.

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Abbreviations

DOD	Department of Defense
GPRA	Government Performance Results Act

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Accountability * Integrity * Reliability

United States General Accounting Office
Washington, DC 20548

June 27, 2003

The Honorable Jerry Lewis
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

The Army is now involved in a major effort to transform its forces to be more deployable and responsive during the 21st century. Equipment readiness is necessary to support this transformed force posture, and adequate supplies of spare parts are critical to equipment readiness. The Army is generally meeting or exceeding the Department of Defense's (DOD) overall supply performance goal of having parts available 85 percent of the time when they are requested. However, the Army continues to experience a shortage of critical spare parts—those that affect readiness for aviation and ground weapon systems—despite spending $4.9 billion from its annual operations and maintenance appropriations and supplemental funding totaling $225 million since fiscal year 2001.[1] While recognizing that spare parts shortages will never be eliminated, it is reasonable to expect the services to place a priority on efforts to mitigate (reduce) those shortages that adversely impact readiness. This priority should be inherent in their overall planning and stewardship of funds they request from Congress and their accountability for making spare parts investment decisions that provide a good readiness return. Since 1990, we have identified DOD's inventory management as high risk, because management systems and procedures were ineffective and wasteful. In our January 2003 Performance and Accountability Series, we wrote that DOD was experiencing equipment readiness problems because of a lack of key spare parts, and we recommended that DOD take actions to address those shortages.[2] As recently as August 2002, DOD

[1] These figures are based on the Army's OP-31 Budget exhibit about which GAO recently reported concerns. U.S. General Accounting Office, *Defense Inventory: Better Reporting on Spare Parts Spending Will Enhance Congressional Oversight*, GAO-03-18 (Washington, D.C.: Oct. 24, 2002).

[2] U.S. General Accounting Office, *Major Management Challenges and Program Risks: Department of Defense*, GAO-03-98 (Washington, D.C.: Jan. 2003).

recognized the need to overcome critical spare parts shortages and recommended changes to improve the readiness of weapon systems.[3]

This report is one of a series of reports[4] that responds to your request that we identify ways to improve the availability of high quality spare parts for aircraft, ships, vehicles, and weapon systems. As agreed, this report focuses on Army strategic planning efforts and initiatives to mitigate critical spare parts shortages. More specifically, we focused our review on the following questions:

1. Does the Army's strategic plan address the mitigation of critical spare parts shortages—those that adversely affect readiness? [5]

2. Will key Army logistics initiatives likely mitigate spare parts shortages that affect readiness?

3. Does the Army have the ability to identify the impact on readiness of increased investments for spare parts?

To accomplish these objectives, we analyzed Army strategic plans and major initiatives identified by the Army that pertain to logistics and supply support. We interviewed officials at Army Headquarters, Army Materiel Command, Army Aviation and Missile Command, Tank and Automotive Command, and the Army Materiel Systems Analysis Activity. Our criteria for evaluating the Army's strategy and initiatives included the Government

[3] Office of the Secretary of Defense, *Inventory Management Study* (Washington, D.C.: Aug. 2002).

[4] U.S. General Accounting Office, *Defense Inventory: The Department Needs a Focused Effort to Overcome Critical Spare Parts Shortages*, GAO-03-707 (Washington, D.C.: June 27, 2003); U.S. General Accounting Office, *Defense Inventory: Air Force Plans and Initiatives to Mitigate Spare Parts Shortages Need Better Implementation*, GAO-03-706 (Washington, D.C.: June 27, 2003); U.S. General Accounting Office, *Defense Inventory: Navy Logistics Strategy and Initiatives Need to Address Spare Parts Shortages*, GAO-03-708 (Washington, D.C.: June 27, 2003); U.S. General Accounting Office, *Defense Inventory: Several Actions Are Needed to Further DLA's Efforts to Mitigate Shortages of Critical Parts*, GAO-03-709 (forthcoming); U.S. General Accounting Office, *Defense Inventory: Air Force Item Manager Views of Repair Parts Issues Consistent With Issues Reported in the Past*, GAO-03-684R (Washington, D.C.: May 21, 2003).

[5] For this report, critical spare parts are defined as those parts that directly affect the readiness of weapon systems. For example, the Army periodically identifies parts as "top drivers" of weapon readiness, such as a rotor blade for the Apache helicopter.

Performance Results Act (GPRA) of 1993, previous GAO reports, and appropriate DOD reports and guidance.[6]

Results in Brief

The Army's logistics strategic plan provides strategic goals, objectives, and milestones for force transformation efforts, but does not specifically address the mitigation of critical spare parts shortages. In April 2001, the Army published its *Transformation Campaign Plan*, which serves as a mechanism for integrating and synchronizing the necessary actions to move the Army from its present posture to a more strategically deployable and responsive force. The plan prescribes specific goals and milestones to support the transformation process. However, it lacks objectives and performance measures it could use to show progress in mitigating critical spare parts shortages. For example, the plan describes how the Army is to provide logistical support to deploy and sustain its forces across a full spectrum of operations, but without a strategic planning focus on improving the availability of critical spare parts, the Army cannot ensure that it is investing in those items that would give them the greatest readiness return on investment and taking other actions needed to reduce the critical spare parts shortages that impact readiness.

The Army's six servicewide logistics initiatives are aimed at enhancing readiness by improving internal business processes that would increase supply availability. However, they were not designed to mitigate spare parts shortages. These processes include those that acquire, repair, and distribute spare parts. For example, the Single Stock Fund is a business process reengineering initiative, ongoing since 1997, that provides worldwide visibility and access to national inventories down to the installation level. This initiative improves visibility and access to spare parts, spare parts requirements determination, and measures progress based on the successful linkage of various inventories. Recognizing that the Armywide initiatives were not designed to specifically focus on mitigating critical shortages, the Army recently started a new initiative to address individual spare parts shortages that affect key weapon systems readiness. However, this initiative is not part of the Armywide logistics improvement effort, and therefore it is not coordinated with other initiatives and its results are not linked to the Army's overall goals and performance measures. Absent this coordination and linkage, any systemic problems that the initiative identifies may not be elevated to the Armywide

[6] Public Law 103-62, August 3, 1993.

initiatives for resolution and its benefit may be limited to improving the availability of only a few parts.

The Army has the means to link funding to weapon system readiness, and reports this in its budget justification documents, but it does not report to Congress how additional investments in spare parts would increase readiness. The Army Materiel Systems Analysis Activity uses models to indicate the investment needed to reach a desired level of supply availability along with the estimated increase in readiness, and on request it has provided such information to Army units. In addition, the Army has used consultants to project the impact of additional funding on the readiness of specific weapon systems and has provided the projections to the Army Vice Chief of Staff. For example, the Logistics Management Institute projected that an additional investment of $331 million for additional spare parts would increase the overall readiness of the Apache and Blackhawk helicopters by approximately 2.6 percent. Army officials warn that there is no direct correlation between additional investments in spare parts and readiness due to factors such as maintenance capacity and training requirements. However, the projected impact of additional investments for parts on supply availability and readiness would be valuable information for Congress when they decide how to allocate resources. The value of providing such information was recognized in an August 2002 DOD report, which directed that readiness impact be included as part of the calculation for spare parts purchases.[7] However, DOD did not specify when the Army should begin reporting this information to Congress.

Given the critical nature of spare parts shortages and their impact on readiness as well as the Army's need to make good investment decisions, we are recommending that the Secretary of Defense direct the Secretary of the Army to include a focus on mitigating crucial spare parts shortages with goals, objectives, milestones, and quantifiable performance measures in the *Transformation Campaign Plan* or Armywide initiatives. We are also recommending that the Army provide decisionmakers with information that links investments in spare parts inventories to weapon system readiness targets. In written comments on a draft of this report, DOD generally concurred with the intent of our recommendations, but not all suggested actions. DOD said the Army would address spares shortages

[7] Office of the Secretary of Defense, *Inventory Management Study* (Washington, D.C.: Aug. 2002).

through its supply management processes, metrics would be tracked in the Army's Strategic Readiness System, and initiative milestones would be added to the *Transformation Campaign Plan*.[8] However, the Army would not be modifying the *Transformation Campaign Plan* or the Armywide logistics initiatives to focus on spare parts shortages as we had recommended. We endorse the Army's effort to add metrics to its readiness system and milestones for its initiatives to the *Transformation Campaign Plan*, but continue to believe that effectiveness of the Army's efforts would be improved if its overall plan or initiatives included goals, objectives, and milestones for mitigating critical spare parts shortages. DOD also stated that it would be linking spare parts investments to individual weapon system readiness in future budgets submissions when the required data becomes available. However, we remain concerned that DOD has not set a deadline for fully reporting this information. The Department's comments and our evaluation are on page 17 of this report.

Background

The Army's vision for the 21st century mandates a land force that can operate in joint, combined, and multinational formations to perform a variety of missions, ranging from humanitarian assistance and disaster relief to major theater wars. The Army's vision also requires that it be capable of putting a combat force anywhere in the world within 96 hours. To meet these objectives, the Army states that it must transform into a more deployable and strategically responsive force. This transformation process also dictates that the Army reengineers its logistics processes to increase responsiveness to its combat units and to provide the spare parts needed to maintain equipment readiness.

In recent years, Congress has provided increased operations and maintenance funding for DOD to enable military units to purchase spare parts from the supply system as needed. For example, during fiscal years 1999-2002, Congress provided supplemental funding totaling $1.5 billion, of which the Army received $170 million in 1999, $25 million in 2001, and $200 million in 2002 to address spare parts shortages that were adversely affecting readiness. The Army now projects that it will spend over $7 billion during fiscal years 2003-05 to purchase spare parts for its combat and support systems. The Army Chief of Staff's list of programs that need more funding indicates that the Army needs an additional $415 million to

[8] The Army Strategic Readiness System provides senior leaders with a means to link resources to readiness and translates strategy into measurable objectives.

sustain the forces in fiscal year 2003 and $263 million to sustain them in fiscal year 2004 and according to an Army official, to support operations Enduring Freedom and Iraqi Freedom. A portion of these amounts would be used to purchase spare parts, but the Army did not provide a breakout of how the funds will be allocated.

In July 2001, we reported that spare parts shortages in the Army were adversely affecting operations, maintenance, and personnel.[9] For example, we reported that safety concerns and the lack of spare parts in 1999 prevented the Chinook and Apache helicopters from meeting their mission-capable goals. To compensate for the lack of spare parts, maintenance personnel used parts cannibalized from other equipment, an inefficient practice that doubles the time needed for a single maintenance effort. We also reported that the Army had major initiatives under way to improve the availability of spare parts as part of an overall strategy to revolutionize its logistics processes. The initiatives included improving demand forecasts for spare parts, increasing the visibility and access to spare parts Armywide, and reducing the time it takes to receive parts after they have been ordered. At that time, we did not assess the extent to which the initiatives might mitigate spare parts shortages.

DOD is also concerned about the adverse impact that spare parts shortages have on the readiness of weapon systems. In an August 2002 report on its inventory management practices, DOD stated a desire to improve supply management accountability by linking investments in spare parts to readiness results in order to ensure that resources are focused on optimal readiness gains. DOD noted that the models it uses to determine inventory purchases are generally biased toward the purchase of low-cost items with high demands instead of the items that would improve readiness the most.[10] The report recommended that the services improve their ability to make inventory investment decisions based on weapon system readiness. It also recommended that the services' requests for funds to increase inventory investments be justified based on the corresponding increase in weapon system readiness.

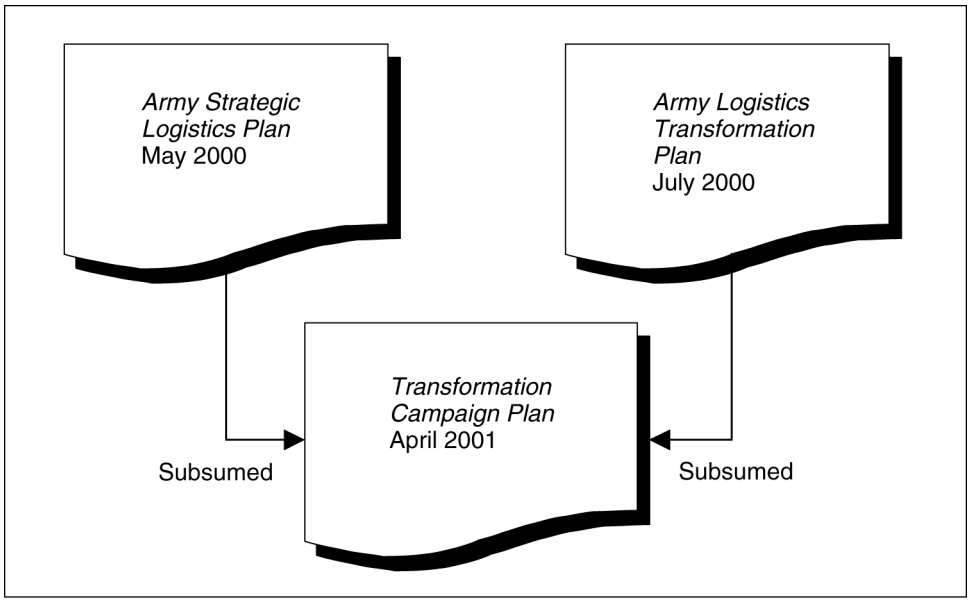
[9] U.S. General Accounting Office, *Army Inventory: Parts Shortages Are Impacting Operations and Maintenance Effectiveness*, GAO-01-772 (Washington, D.C.: July 31, 2001).

[10] Office of the Secretary of Defense, *Inventory Management Study* (Washington, D.C.: Aug. 2002).

Strategic Plan Addresses Transformation, but Not Mitigation of Critical Spare Parts Shortages

The Army's current strategic plan provides strategic goals, objectives, milestones, and performance measures for force transformation efforts. However, it does not address how the service expects to mitigate critical spare parts shortages that degrade equipment readiness. As shown in figure 1, the Army published two plans during 2000 that were subsumed into a single plan in April 2001. These plans provided guidance for transforming the Army's logistics to support forces that will be more agile and responsive.

Figure 1: Army Logistics Strategic Guidance



Source: GAO.

The Army's *Strategic Logistics Plan*, published in May 2000, was designed to implement the guidance in the Army Chief of Staff's vision for its forces in the 21st century. This plan outlined the major logistical requirements for achieving a joint, combined, or multinational force that can be used for a variety of missions, ranging from humanitarian assistance to major theater wars. For example, a major goal of the plan was to achieve total asset visibility, which was intended to give inventory managers information on the location, quantity, condition, and movement of parts worldwide. Total asset visibility would therefore allow managers to access and redistribute parts in the Army's inventory to meet immediate spare parts requirements.

In March 2000, DOD issued the Defense Reform Initiative 54, which required each military service to submit an annual logistics transformation

plan. The Army's effort was published in July 2000 as the Army *Logistics Transformation Plan*. The purpose of this plan was to document, on an annual basis, the planned actions and related resources for implementing the Army *Strategic Logistics Plan*. Generally, the logistics transformation plan outlined the interrelated activities necessary to support DOD's four intermediate objectives: (1) establish customer wait time[11] as a supply performance measure; (2) adopt a priority system that provides assets to the commander by the required delivery date; (3) achieve accurate total asset visibility of existing spare parts; and (4) field a Web-based system that provides seamless, interoperable, real-time logistics information.

In April 2001, the Army published its *Transformation Campaign Plan*, an all-encompassing document that serves as a mechanism for integrating and synchronizing the necessary actions to move the Army from its present posture to a future force that will be more strategically deployable and responsive. The plan contains specific goals and objectives to provide logistical support to deploy and sustain its forces across a full spectrum of operations, and it incorporates the criteria for an effective strategy contained in GPRA.[12] Furthermore, according to Army officials, the Army monitors the progress of its efforts to ensure that logistics decisions, goals, and milestones complement and support the entire transformation progress. For example, one strategic goal contained in the plan requires the Army to be able to deploy a combat brigade in 96 hours. The plan dictates that the Army measures its ability to deploy combat brigades by employing major decision points at which senior leaders will evaluate progress and decide whether adjustments need to be made to the original combat brigade deployment strategy. However, there are no such strategic goals, objectives, or performance measures in this Army plan relating to monitoring and resolving critical spare parts shortages.

As shown in table 1, the plan contains 14 lines of operation—or broad responsibilities—that describe closely related activities designed to meet specific transformation objectives by established milestones.

[11] The total elapsed time between a customer's request and receipt of the requested item.

[12] GPRA requires establishment of a performance plan covering any program activity set forth in the agency's budget that contains objectives and quantifiable and measurable performance targets designed to assess the success of the particular program.

Table 1: Framework for the Army's *Transformation Campaign Plan*

Major transformation tasks	Supporting lines of operation
Ensure a Trained and Ready Army	(1) Strategic Requirements and Planning
	(2) Modernization and Recapitalization
	(3) Manning and Investing in Quality People
	(4) Maintain Unit Readiness and Training
	(5) Training and Leader Development
Transform Operational Army	(6) Joint/Army Strategy and Concepts
	(7) Army Doctrine
	(8) Operational Force Design
	(9) Deploying and Sustaining the Force
	(10) Develop and Acquire Advanced Technology
Transform Institutional Army	(11) Management of Force Programs
	(12) Installations
Support the Forces	(13) Strategic Communications
	(14) Resourcing

Source: U.S. Army's *Transformation Campaign Plan.*

Logistics requirements are addressed by line 9 in the plan, "Deploying and Sustaining the Force." Specifically, this line of operation addresses how to transform Army support elements to make the service more strategically responsive and reduce the cost for logistics without reducing war-fighting capability.

Armywide Initiatives Improve Logistics Business Processes, but Are Not Focused on Mitigating Critical Spare Parts Shortages

The Army's key logistics initiatives were designed to improve internal business processes, but not specifically mitigate critical spare parts shortages. Its ongoing six servicewide initiatives are primarily focused on improving logistics business processes in the areas of (1) procurement and repair of spare parts, (2) inventory management, and (3) supply operations thereby improving supply availability. However, we could not determine the extent to which they have reduced critical spare parts shortages. The Army recently started a separate, non-Armywide readiness enhancement initiative that includes an effort to mitigate critical spare parts shortages.

Armywide Initiatives Are Aimed at Improving Logistics Overall

The Army's six major initiatives are expected to improve overall logistical support for its units by focusing on improving logistics processes in order to be more responsive and effective in meeting customer needs. Table 2 summarizes the Army's initiatives by focus area along with the expected improvements to logistics operations.

Table 2: Army Major Logistics Initiatives

Focus areas	Initiatives	Expected improvement
Procurement and repair	Partnership Program	Increase supply performance by providing parts directly from vendors to supply customers.
	Recapitalization Program	Reduces the demand for spare parts through modernizing and overhauling 17 major weapon systems.
	National Maintenance Program	Improves the repair of spare parts with uniform repair standards.
Inventory management	Single Stock Fund	Improves inventory management by creating visibility and access to Armywide assets.
	Logistics Modernization Program	Makes inventory management more effective by modernizing and integrating about 30 legacy logistics databases.
Supply operations	Distribution Management	Improves overall supply operations to reduce the time it takes to deliver spare parts to supply or maintenance customers.

Source: GAO.

Spare Parts Procurement and Repair Initiatives Expected to Improve Supply Performance and Reduce Demand

The Army's Partnership, Recapitalization, and National Maintenance Program initiatives are intended to improve the parts supply process, reduce demand through modernization of major weapon systems, and provide uniform repair standards. The expected improvements are being measured in a variety of ways, but none measure or track increases in supply availability and readiness rates. Without such measures, we could not determine the extent to which the initiatives have significantly reduced critical spare parts shortages.

The Army is forming partnerships with manufacturers to provide spare parts and technical assistance directly to the applicable maintenance depot in order to improve depot-level repair of selected weapon systems and to improve the depot's performance in supplying repaired parts. The Army has formed partnership agreements with General Electric Aircraft Engines, Sikorsky Aircraft Corporation, Boeing, Parker-Hannifin, Honeywell, Rolls Royce, and Bell Helicopters. Some of these companies have agreed to provide spare parts and technical assistance directly to the Corpus Christi Army Depot, where depot-level repair is performed for the Apache and Chinook helicopters. According to an Army official, these agreements are beneficial for the Army as well as the industry partners. The Army improves repair operations and saves money by obtaining

hard-to-get, sole-source parts and technical assistance for a negotiated cost, and the industry partner is able to keep production lines open by relying on steady demands from the Army. The Army official said that the partnership initiatives have resulted in significant improvements to its depot repair operation. For example, the average elapsed time before the engine in the Apache and Blackhawk helicopters would fail has improved from about 400 hours to about 1,140 hours. Moreover, the repair-cycle time for components in the partnership program has decreased from 360 to 95 days, thereby decreasing the demand for spare parts by providing units with more reliable equipment and achieving more efficient supply performance. The Army's Recapitalization Program is expected to return 17 selected legacy weapon systems to like-new condition by rebuilding[13] and upgrading[14] them at maintenance depots over time as funds become available. Specifically, the Recapitalization Program is intended to (1) extend the service life of the equipment; (2) reduce operating and support costs; (3) improve reliability, maintainability, safety, and efficiency; and (4) enhance capabilities. The Army began recapitalizing a limited number of the weapon systems in fiscal year 2002, with full-scale operation beginning in fiscal year 2003 (see app. I for a list of systems). In fiscal year 2003, the Army fully funded the initial spare parts requirements of the Recapitalization Program, investing at least $419.7 million of its operations and maintenance funding to run the program. An Army official said that about $200 million was taken from the Recapitalization Program to help with the Iraq war, but the program will be reimbursed from the supplemental appropriation. According to Army officials, recapitalizing Army weapon systems will initially increase the demand for spare parts because new parts will be used for equipment that is cycled through the rebuilding and upgrading process. However, in the long term, the like-new equipment should be more reliable and the demand for spare parts should decrease.

The National Maintenance Program is expected to establish, by fiscal year 2005, a single national standard for the repair of equipment components and spare parts. The program's overhaul standard is generally higher than the variety of standards held by individual repair units, and consists of restoring components and spare parts to a nearly like-new condition. This condition includes the restoration of the part's original appearance,

[13] Rebuilding overhauls a system to like-new condition with near zero time and near zero miles.

[14] Upgrading rebuilds and improves a system to increase capability.

performance, and life expectancy. The National Maintenance Program is intended to help sustain the weapon systems that have undergone overhauls and rebuilds through the Army's Recapitalization Program. In fiscal years 2001 and 2002, the Army obligated $70 million and $16 million, respectively, for the development of maintenance standards and program support. The Army has completed overhaul standards for 521 items and is expected to complete standards for the remaining 272 items by fiscal year 2005. The expected benefit of the National Maintenance Program is that a single higher repair standard for components and spare parts will enhance weapon system readiness and reduce the demand for spare parts.

Inventory Management Initiatives Are Designed to Improve Visibility and Customer Support

The Army is improving inventory management through its Single Stock Fund and Logistics Modernization Program initiatives, which are intended to provide better visibility over spare parts in the inventory, improved spare parts requirements determination, and an enhanced inventory distribution process. Like the procurement and repair initiatives discussed above, these initiatives do not measure progress in reducing critical spare parts shortages that impact readiness.

In response to a recommendation in our 1990 report,[15] the Army approved a business process reengineering initiative called the Single Stock Fund in November 1997. The Single Stock Fund is aimed at improving inventory management by (1) providing worldwide visibility and access to spare parts down to the installation level, (2) consolidating separate national and installation level inventories into a single system, and (3) integrating logistics automated information systems and financial automated information systems. The Single Stock Fund streamlines and where needed, eliminates multiple financial transactions that have previously caused numerous inefficiencies in duplicate automated legacy systems. The visibility of worldwide supply items allows managers to calculate worldwide spare parts requirements and increases the volume of inventory that is available for redistribution to meet priority readiness requirements. For example, the Secretary of the Army testified in 2003 before the Senate Armed Services Committee that from May 2000 through November 2002, the Single Stock Fund made it possible to redistribute inventory valued at $758 million. He further stated that the Single Stock Fund reduced customer wait time by an average of 18.5 percent.

[15] U.S. General Accounting Office, *Army Inventory: A Single Supply System Would Enhance Inventory Management and Readiness*, GAO/NSIAD-90-53 (Washington, D.C.: Jan. 25, 1990).

The Logistics Modernization Program is aimed at improving inventory management by modernizing the Army's 30-year-old national and retail logistics automated business processes and practices. The Logistics Modernization Program is intended to provide an automated system with real-time capabilities for managing wholesale and retail inventories by modernizing and integrating about 30 legacy logistics databases. The program includes about 47 new forecasting methodologies to enable managers to better forecast demands for spare parts. The Logistics Modernization Program's integrated automated systems should reduce supply-cycle time[16] and provide managers with the ability to better support customers by tracking spare parts requisitions from the time the requisition is submitted until the customer receives the part. Moreover, the program is to work in tandem with the Single Stock Fund to provide worldwide visibility of supply assets in real time. The Army Materiel Command plans to roll out the Logistics Modernization Program over the next several years, with the first phase of implementation scheduled in early 2003. The program's measures of success include reducing supply-cycle time, but not supply availability and equipment readiness.

Supply Operations Initiative Is Designed to Reduce Spare Parts Delivery Time

The Army is also trying to improve its supply operations and reduce the time it takes to deliver spare parts to customers through the Distribution Management initiative. Distribution Management[17] is an Armywide initiative established in 1995 to improve supply operations by developing a faster, more flexible, and efficient logistics pipeline. The initiative's overall goal is to eliminate the unnecessary steps in the logistics pipeline that delay the flow of parts through the supply system. Distribution Management currently uses two teams—the Distribution Process Improvement Team and the Repair Cycle Process Improvement Team—to monitor progress and spearhead continuous improvements within their respective areas of responsibility. However, the extent to which supply availability has been improved is not clear because neither team tracks this as measures of success.

The Distribution Process Improvement Team promotes initiatives to improve the Army's inventory distribution processes, including customer response, inventory planning, warehouse management, transportation, and supply. For example, the team initiated dollar-cost banding, a new stock

[16] Supply-cycle time measures the time for materiel to complete the entire supply cycle, including acquisition, distribution, transportation, warehousing, and delivery.

[17] Formerly Velocity Management.

determination algorithm that has improved inventory performance. Traditionally, Army units have used a "one-size-fits-all" approach for determining whether or not to stock a particular spare part. Consequently, an item not currently stocked would need nine requests in the prior year to be stocked on the shelf, regardless of its criticality to equipment readiness. This criterion was applied equally to a 10-cent screw and to a $500,000 tank engine. The dollar-cost banding approach, however, allowed inventory managers to stock a mission-critical item with only three requests, rather than nine. The Army has credited this concept with decreasing customer wait time and increasing equipment readiness.

The Repair Cycle Process Improvement Team strives to improve the Army's maintenance processes through such initiatives as the equipment downtime analyzer, a computer system that links supply and maintenance performance to equipment readiness. The analyzer examines equipment maintenance operations and the supply system to identify problem areas as well as the functions that are working well in the maintenance process. This capability enables managers to quickly diagnose the root of the problems and to develop solutions to help maximize the future effectiveness of the maintenance process. For example, in one case, the apparent reason for a tank not being mission ready for 18 days was that the maintenance personnel were waiting for the supply system to provide a part. The equipment downtime analyzer revealed the following: (1) because the supply system initially provided the wrong part, a second part had to be ordered; (2) because maintenance personnel did not initially realize that the part was needed, a third part was ordered late; and (3) maintenance personnel finally decided, on day 18, to stop waiting for the part to be delivered by the supply system and took action to obtain it from another tank that was not mission ready in order to complete the maintenance process.

A Separate Army Initiative Explicitly Addresses Critical Spare Parts Shortages

Although the Army is generally meeting or exceeding it overall supply performance goal of having parts available 85 percent of the time when they are requested, the Army continues to experience critical spare parts shortages that affect equipment readiness. For example, in a July 2001 report on Army spare parts shortages, we identified 90 components or assemblies for the Apache, Blackhawk, and Chinook helicopters for which the Army was experiencing critical spare parts shortages.[18] The Army

[18] GAO-01-772.

began a new initiative, separate and apart of the Armywide initiatives, to take management action on individual critical spare parts shortages. However, because it is not a part of the Armywide initiatives, it is not clear how it will be effectively integrated with them to maximize mitigating critical spare parts shortages and improve readiness.

The new Army initiative to address spare parts shortages that are most essential to equipment readiness, entitled the "Top 25 Readiness Drivers," began in October 2002. For each of its 18 major combat systems, the Army, on an ongoing basis, has been identifying the top 25 components or spare parts that are key to the systems' readiness. Of the total 450 spare parts, the Army had identified as critical to equipment readiness in February 2003, 291 or 65 percent of the parts were stocked below the required level. Twenty-nine percent or 132 of these parts were in the Army's lowest inventory category—those for which there is less than 1½ month supply. Major commands report the inventory status of these spare parts to the Army Materiel Command, who in turn presents a consolidated report to the Army Deputy Chief of Staff for Logistics every 2 weeks. A review group headed by the Deputy Chief of Staff for Logistics initiates possible actions that can be taken to mitigate the most severe spare parts shortages among the top spare parts or components.

This new Army initiative is a movement in the right direction to address critical spare parts shortages; however, it remains unclear the extent to which this initiative will mitigate critical spare parts shortages and improve equipment readiness. The initiative's effectiveness may be limited because its efforts and results are not linked to or coordinated with the goals and metrics of the Army's other initiatives as part of an overall approach to mitigating critical spare parts shortages in the future.

Army Can Identify Readiness Impact of Additional Investment and Needs to Report This to Congress

While the Army has the means to link funding to a corresponding level of readiness and reports this information in budget justification documents (see app. II), it does not report how additional funding requests for spare parts might impact readiness to decisionmakers such as Congress. The Office of the Secretary of Defense has recommended that the services provide such information when requesting additional funds in the future.

The Army has reported that its models correlate the impact of investments in spare parts on supply availability.[19] However, because of various other

[19] We did not validate the accuracy of these models.

factors such as maintenance capacity and training requirements that affect equipment status, the models can only estimate the impact of the additional investment on weapon system readiness. The Army Materiel Systems Analysis Activity uses the Supply Performance Analyzer Model and the Selected Essential-Item Stockage for Availability Method Model to determine the investment needed to reach a weapon system's desired supply availability rate. Information from these models has been supplied to individual units to assist in inventory investment decisions. In addition, the Army used an outside consultant to analyze the impact additional investment in spare parts would have on readiness. For example, to support a briefing to the Army Vice Chief of Staff in March 2001, the Logistics Management Institute completed an analysis for the Army showing that an additional $331 million for spare parts would increase the mission-capable rate for the Apache and Blackhawk helicopters by 2.6 percent. According to Army officials, the correlation between additional investments in spare parts and readiness is not exact because other factors such as maintenance capacity and training requirements impact readiness.

Despite having the means to determine how additional funding might affect readiness, the Army does not provide such analyses to Congress as part of its funding requests. For example, in the justification for the fiscal year 2002 budget, the Army requested and received $250 million to purchase additional spare parts. Moreover, the Army sent correspondence to the House Committee on Armed Services showing that an additional $675 million was needed for spare parts during fiscal year 2002. However, in neither case did the Army provide analysis to Congress showing how the additional funding might affect readiness. The June 2002 Financial Management Regulations provided a template for reporting the funds to be spent on spare parts by weapon system as part of the budget submission. The benefit of reporting such a link was cited in an August 2002 Office of the Secretary of Defense study that recommended that future requests for additional funds to increase spare parts inventories be justified in budget documents submitted to Congress based on the corresponding increase in weapon systems readiness.[20]

[20] Office of the Secretary of Defense, *Inventory Management Study* (Washington, D.C.: Aug. 2002).

Conclusions

The Army's *Transformation Campaign Plan* serves as a mechanism to transform the Army's forces from its present posture to a more strategically deployable and responsive force. The plan prescribes specific goals and milestones to support this transformation process, but it lacks specific focus on mitigating spare parts shortages. In addition, the Armywide initiatives to improve the procurement and repair of spare parts, inventory management, and supply operations do not focus on mitigating critical spare parts shortages. Without a strategy or Armywide initiatives focused on the mitigation of critical spare parts shortages and their impacts on equipment readiness, the Army cannot ensure that it has appropriately addressed shortages in those parts that would give them the greatest readiness return. Furthermore, while some of the Army's logistics initiatives might increase the availability of spare parts in general, the lack of specific and effective measures of performance will limit the Army's ability to ascertain progress in mitigating spare parts shortages that are critical to equipment readiness. Finally, the Army has the means to determine how funding might impact parts availability and equipment readiness as part of its stewardship and accountability for funds, but has not provided this information to Congress when it requests additional funding. Without such information that links additional spare parts funding to readiness and provides assurance that investments are based on the greatest readiness returns, Congress cannot determine how best to prioritize and allocate future funding.

Recommendations for Executive Action

We recommend that the Secretary of Defense direct the Secretary of the Army to

- modify or supplement the *Transformation Campaign Plan*, or the Armywide logistics initiatives to include a focus on mitigating critical spare parts shortages with goals, objectives, milestones, and quantifiable performance measures, such as supply availability and readiness related outcomes and
- implement the Office of Secretary of Defense recommendation to report, as part of budget requests, the impact of additional spare parts funding on equipment readiness with specific milestones for completion.

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD generally concurred with the intent of both recommendations, but not the specific actions we recommended. DOD's written comments are reprinted in their entirety in appendix III.

In concurring with the intent of our first recommendation, DOD expressed concern that because spare parts shortages are a symptom of imperfect supply management processes, its improvement plans must focus on improving these processes rather than on the symptoms. According to DOD, the Army's *Transformation Campaign Plan* correctly focuses on transforming the Army's forces and equipment from its present posture to a more strategically deployable and responsive objective force. Furthermore, DOD also stated that the Armywide logistics initiatives correctly focus on improving procurement, repair of spare parts, inventory management, and supply operations. DOD also noted it has/is taking several actions. The "Top 25 Readiness Drivers" initiative, which addresses specific stock numbers that affect its major weapon systems, has been added to the metrics in the Army's Strategic Readiness System. Milestones for logistics initiatives would be added to the Army's *Transformation Campaign Plan*. Also, spares shortages will be tracked in the Strategic Readiness Systems and logistics initiatives will be tracked in the *Transformation Campaign Plan*. Therefore, DOD does not agree that the Army needs to modify its *Transformation Campaign Plan* or the Armywide logistics initiatives to focus on spare parts shortages.

We do not believe that these actions alone are sufficient to meet our recommendation. We endorse the Army's efforts to add related metrics to its Strategic Readiness System and milestones for its logistics initiatives to the *Transformation Campaign Plan*. Further, our report recognizes that the Army's plan focuses on improving the Army's force transformation efforts and that improving logistics processes is part of the solution to mitigating spare parts shortages. However, the intent of our recommendation was for the Army to include in its *Transformation Campaign Plan* or servicewide initiatives a focus on mitigating critical spare parts shortages. As our report clearly points out, without a focus on mitigating critical spare parts shortages with goals, objectives, and milestones included in the strategic plan or Armywide initiatives, we believe there is increased likelihood that the Army's progress will be limited because it efforts may be ineffective or duplicative in mitigating spare parts shortages that are critical to equipment readiness. Therefore, we believe implementation of our recommended actions is necessary to ensure improved readiness for legacy and future weapon systems.

In concurring with the intent of our second recommendation, DOD stated that the Army would begin implementing the recommendation by providing mission-capable rates during the upcoming mid-year budget review consistent with the June 2002 updated budget exhibit in the Financial Management Regulation. DOD also states that the Army will

fully comply with the August 2002 inventory management study reporting recommendation when the required data becomes available.

We support the Army's effort to report mission-capable rates for its weapon systems. However, we are concerned that the Army has not set a deadline for fully implementing the recommendation. Providing this valuable information to Congress in a timely manner is an important step in placing a priority on efforts needed to mitigate spare parts shortages as part of the Army's overall stewardship of funds and accountability for making spare parts investment decisions that provide a good readiness return. We have therefore modified our second recommendation to include a provision that the Army establish milestones for fully implementing the recommendation from the August 2002 inventory management report.

Scope and Methodology

To determine whether the Army's strategic plans address mitigating spare parts shortages, we obtained and analyzed Army planning documents that pertained to spare parts or logistics. We focused our analysis on whether these strategic plans addressed spare parts shortages and included the performance plan guidelines identified in GPRA. We interviewed officials in the Office of the Army Deputy Chief of Staff for Logistics, and the Army Transformation Office to clarify the content and linkage of the various strategic plans.

To determine the likelihood that Army initiatives will achieve their intended results and contribute to the mitigation of spare parts shortages to improve readiness, we obtained and analyzed service documentation and prior GAO reports on major management challenges and program risks and on the Army's major initiatives that relate to spare parts or supply support. We focused our analysis on whether the initiatives addressed spare parts shortages and the need for quantifiable and measurable performance targets as identified in GPRA. We also interviewed officials in the Supply Policy Division, Army Deputy Chief of Staff for Logistics; Army Materiel Command; Army Aviation and Missile Command; Army Tank and Automotive Command; and Combined Arms Support Command. We obtained and analyzed Army data pertaining to spare parts availability, spare parts back ordered, and specific spare parts that are affecting equipment readiness.

To determine the extent to which the Army identifies how additional investments in spare parts affect supply support and readiness, we obtained and analyzed documentation on the Army's needs for additional

funding to purchase spare parts. We analyzed the Army's budget justification for the funding needed for spare parts for the years 2004 and 2005. We obtained the results of prior analyses showing how additional funding might affect readiness. However, we did not independently validate or verify the accuracy of the Army's models that show the relationship between funding, supply performance, and readiness.

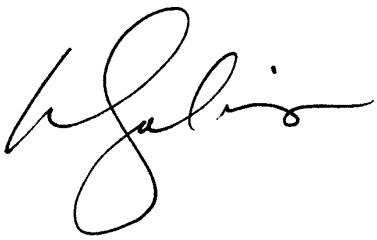
We also visited and interviewed officials at the Army Materiel Systems Analysis Activity and considered DOD's recommendations in its August 2002 Inventory Management Report.

We performed our review from August 2002 through March 2003 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Secretary of Defense, the Secretary of the Army, and other interested congressional committees and parties. 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.

Please contact me on (202) 512-8365 if you or your staff has any questions concerning this report. Major contributors to this report are included in appendix IV.

Sincerely yours,



William M. Solis, Director
Defense Capabilities and Management

Appendix I: Army Recapitalization Systems

Aviation	Apache AH-64 A and AH-64 D Longbow Helicopters Black Hawk UH-60 Helicopter Chinook CH-47 Helicopter
Combat	Patriot Ground Support Equipment M1 Abrams Tank M2/M3 Series Bradley Fighting Vehicles M992 Field Artillery Ammunition Supply Vehicle Multiple-Launch Rocket System M113 Family of Vehicles
Combat Support	M48/M60 Armored Vehicle Launched Bridge AN/TPQ-36 Fire Finder Small Emplacement Excavator M9 Armored Combat Earthmover
Combat Service Support	Heavy Expanded Mobility Tactical Truck M88A1/A2 Hercules Recovery Vehicle High Mobility Multipurpose Wheeled Vehicle AN/ASM-190 Electronic Shop Shelter

Appendix II: Army Working Capital Fund Fiscal Year 2004/2005 Biennial Budget Estimates Supply Management

Table 3: Operating Requirements by Weapon System Category

Dollars in millions

Weapon system/category	FY 2002	Material readiness indicator[a] (percent)	FY 2003	Material readiness Indicator[a] (percent)
Chemical Defense Equipment	76.8	NA[b]	119.3	NA
Other Armament, Munitions and Chemicals	92.0	NA	103.4	NA
AH-64	300.2	77	578.5	75
UH-60	409.2	75	861.0	80
OH-58D	98.7	83	190.1	75
CH-47D	217.0	60	657.4	75
T701C Engines	147.1	NA	151.2	NA
Air Delivery/Aviation/Troop Equipment	172.9	NA	121.7	NA
Mobile Subscriber Equipment	31.0	NA	67.6	NA
Night Vision Equipment	45.4	NA	103.1	NA
Batteries	49.8	NA	70.4	NA
Other Communications/Electronics	279.0	NA	494.9	NA
Multiple Launch Rocket System	25.0	94	47.7	90
PATRIOT	96.9	96	140.1	90
Other Missile Systems	89.8	96	74.8	90
M1 Series Tank	505.4	86	798.3	90
M88 Recovery Vehicle	87.8	84	134.8	90
M109 Howitzer	30.8	93	36.3	90
M198 Howitzer	5.1	96	8.5	90
M113	58.1	92	62.6	90
Bradley Fighting Vehicle	117.1	94	181.1	90
High Mobility Multipurpose Wheeled Vehicle	76.4	94	82.6	90
Tires	52.9	NA	82.0	NA
Other Tank & Automotive	177.9	NA	268.7	NA
Total	**3,242.3**		**5,436.3**	

Source: DOD.

[a] The material readiness indicator, according to an Army official, is the percentage of the total weapon system fleet that is expected to be mission ready.

[b] NA means not applicable.

Table 4: Operating Requirements by Weapon System Category

Dollars in millions

Weapon System/Category	FY 2004	Material readiness indicator[a] (percent)	FY 2005	Material readiness indicator[a] (percent)
Chemical Defense Equipment	111.9	NA[b]	121.3	NA
Other Armament, Munitions and Chemicals	106.2	NA	105.1	NA
AH-64	501.3	75	481.0	75
UH-60	662.2	80	615.1	80
OH-58D	133.3	75	147.2	75
CH-47D	481.2	75	517.9	75
T701C Engines	119.4	NA	125.9	NA
Air Delivery/Aviation/Troop Equipment	120.5	NA	90.3	NA
Mobile Subscriber Equipment	44.8	NA	27.2	NA
Night Vision Equipment	66.7	NA	60.5	NA
Batteries	34.4	NA	31.2	NA
Other Communications/Electronics	366.2	NA	379.0	NA
Multiple Launch Rocket System	51.1	90	50.9	90
PATRIOT	132.6	90	127.3	90
Other Missile Systems	82.3	90	93.4	90
M1 Series Tank	770.6	90	816.1	90
M88 Recovery Vehicle	136.8	90	131.4	90
M109 Howitzer	37.2	90	35.0	90
M198 Howitzer	11.2	90	10.9	90
M113	66.5	90	70.4	90
Bradley Fighting Vehicle	208.6	90	229.7	90
High Mobility Multipurpose Wheeled Vehicle	83.2	90	85.9	90
Tires	69.1	NA	71.8	NA
Other Tank & Automotive	308.8	NA	301.4	NA
Total	**4,706.0**		**4,726.0**	

Source: DOD.

[a] The material readiness indicator, according to an Army official, is the percentage of the total weapon system fleet that is expected to be mission ready.

[b] NA means not applicable.

Appendix III: Comments from the Department of Defense

DEPUTY UNDER SECRETARY OF DEFENSE FOR
LOGISTICS AND MATERIEL READINESS
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

JUN 11 2003

Mr. William Solis, Director
Defense Capabilities and Management
U.S. General Accounting Office
441 G Street, N.W.
Washington, DC 20548

Dear Mr. Solis:

This is the Department of Defense (DoD) response to the GAO draft GAO-03-705, DEFENSE INVENTORY: The Army Needs a Plan to Overcome Critical Spare Parts Shortages, dated May 12, 2003 (GAO Code 350248). The DoD generally concurs with the intent of the recommendations.

Detailed comments on the draft report recommendations are included in the enclosure. The DoD appreciates the opportunity to comment on the draft report.

Sincerely,

Allen W. Beckett
Principal Assistant

Enclosure

DRAFT REPORT
(GAO-03-705/Code 350248)

"DEFENSE INVENTORY: The Army Needs a Plan to Overcome Critical Spare Parts Shortages"

DEPARTMENT COMMENTS

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the Secretary of the Army to modify or supplement the Transformation Campaign Plan or the Armywide logistics initiatives to include a focus on mitigating crucial spare parts shortages with goals, objectives, milestones, and quantifiable performance measures, such as supply availability and readiness related outcomes. (p. 16/GAO Draft Report)

DOD RESPONSE: Concur with intent. Spare parts shortages are a symptom of imperfect supply chain management processes. Improvement plans must focus on improving these processes rather than on the symptoms. The Army's Transformation Campaign Plan (TCP) correctly focuses on transforming the Army's forces and equipment from its present posture to a more strategically deployable and responsive objective force. The Army-wide logistics initiatives correctly focus on improving procurement, repair of spare parts, inventory management, and supply operations. The Secretary of the Army has established the Strategic Readiness System (SRS) to provide Army-wide metrics. The SRS is available to tactical and logistics leaders. The "Top 25 Readiness Drivers" which addresses specific stock numbers affecting the Army's major weapon systems has been added to the SRS. The "Top 25" is also a metric for the Commander U.S. Army Materiel Command. Therefore, we do not agree with directing the Army to modify the Transformation Campaign Plan or the Army-wide logistics initiatives to focus on spare parts shortages. Spares shortages will continue to be tracked in the SRS and logistics initiatives in the TCP. Milestones for logistics initiatives will be added to the Army TCP, Line of Operation 9, Deploying and Sustaining the Force. Estimated completion date is September 2003.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the Secretary of the Army to implement the Office of Secretary of Defense recommendation to report, as part of budget requests, the impact of additional spare parts funding on equipment readiness. (p. 17/GAO Draft Report)

DOD RESPONSE: Concur with intent. In June 2002, the OUSD(C) updated the SM-3B budget exhibit, which is a weapon system breakout showing readiness type data, requiring this information as part of the annual budget estimate submission. The OUSD(C) recognized the fact that the data provided may not be entirely complete until modernized systems are in place. Army has started this process. During the mid-year review, the Army Working Capital Fund, Supply Management Army budget call requested "mission capable rates as provided in the monthly readiness report or unit status reports" as part of the justification package. Since the FMR already requires the Army to implement the recommendation from the August 2002 study as data becomes available, no further direction is required and action consistent with this recommendation is complete.

Appendix IV: GAO Contacts and Staff Acknowledgments

GAO Contacts

Richard G. Payne (757) 552-8119
George O. Morse (757) 552-8108

Acknowledgments

In addition to those named above, Robert L. Coleman, Alfonso Q. Garcia, Susan K. Woodward, Robert K. Wild, Cheryl A. Weissman, Barry L. Shillito, and Charles W. Perdue also made significant contributions to this report.

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