

June 1999

# AIR FORCE DEPOT MAINTENANCE

## Management Changes Would Improve Implementation of Reform Initiatives



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United States General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

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June 25, 1999

The Honorable James M. Inhofe  
Chairman  
The Honorable Charles S. Robb  
Ranking Minority Member  
Subcommittee on Readiness and  
Management Support  
Committee on Armed Services  
United States Senate

As you requested, we assessed the progress of the Air Force's depot maintenance reform initiatives. These initiatives are part of the Department of Defense's programs to improve the efficiency and responsiveness of its industrial operations. We make recommendations to the Secretary of Defense to require the Secretary of the Air Force to take a number of actions that should improve the initiatives and better ensure their success.

We are sending copies of this report to Senator Ted Stevens, Chairman, and Senator Robert Byrd, Ranking Minority Member, Senate Committee on Appropriations; Senator John W. Warner, Chairman, and Senator Carl Levin, Ranking Minority Member, Senate Committee on Armed Services; Representative C. W. Bill Young, Chairman, and Representative David Obey, Ranking Minority Member, House Committee on Appropriations; Representative Floyd Spence, Chairman, and Representative Ike Skelton, Ranking Minority Member, House Committee on Armed Services; the Honorable William S. Cohen, Secretary of Defense; the Honorable F. Whitten Peters, Acting Secretary of the Air Force; and the Honorable Jacob J. Lew, Director, Office of Management and Budget. We will make copies available to others on request.

If you have questions regarding this report, please contact me at (202) 512-8412. Other points of contact and key contributors are listed in appendix III.

David R. Warren, Director  
Defense Management Issues

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# Executive Summary

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## Purpose

The Air Force is implementing three depot maintenance initiatives designed to better manage its depot maintenance programs, including the management of spare and repair parts. The Air Force spends approximately \$4 billion on its depot maintenance programs annually. At the request of the Chairman and Ranking Minority Member of the Senate Armed Services Committee, GAO reviewed the status of the three initiatives and management issues related to the initiatives.

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## Background

The Air Force Materiel Command (AFMC), which includes five Air Logistics Centers,<sup>1</sup> provides supply and maintenance support to the Air Combat Command, Air Mobility Command, Air Education and Training Command, Air Force Reserves, Air National Guard, and other major Air Force customers as well as to some Army, Navy, and foreign military sales customers. The Air Force's complex, integrated support structure determines which weapon systems and components must be repaired or purchased and manages supply and maintenance processes and the repair and overhaul of weapon systems and components.

The Department of Defense (DOD) has recognized in recent years that its logistics activities, including depot maintenance performed in both the public and private sectors, need to become more efficient. Accordingly, it has initiated efforts to improve logistics activities by incorporating many best business practices that commercial companies have used to become more efficient and effective. For its part, the Air Force began to reengineer its supply and maintenance operations. Its plan, broadly stated, called for steps to be taken to reduce the time required to repair components and aircraft, reduce the amount and costs of supply inventories, match the repair of items with the demand from customers, prioritize repairs when multiple priorities exist, and rapidly move components and spare parts to and from customers. This effort, known as Agile Logistics, focuses on three principal initiatives. More specifically,

- The depot enhancement initiative applies to the repair of reparable spare parts such as aircraft landing gears, wheels, and avionics, and is aimed at limiting repairs to those items that customers need and have

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<sup>1</sup>The Air Force is now closing the Sacramento and San Antonio Air Logistics Centers based on recommendations of the 1995 Base Realignment and Closure Commission.

requisitioned, and meeting customers' needs faster by prioritizing repairs daily.

- The aircraft enhancement initiative applies to performance of scheduled maintenance to keep aircraft operational or upgrade their capabilities and is designed to reduce repair turnaround times and costs through improved teamwork and communication.
- The contract enhancement initiative applies to depot reparable workloads performed by contractors and is designed to reduce repair turnaround times and reduce costs.

In the past, GAO has reported on inefficiencies in DOD's logistics systems and processes and pointed out the need for them to be more efficient, less costly, and more responsive to customer needs. GAO has supported the application of best practices in this area. The Air Force's three enhancement initiatives represent an effort to achieve these ends.

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## Results in Brief

The Air Force is now implementing all three enhancement initiatives at its logistics centers, but the extent of implementation has varied. The Air Force's plans established broad goals of increased operational efficiency and reduced costs, as well as an approach to implementing the initiatives. However, the plans did not include specific criteria for determining that the initiatives are successfully achieving stated goals. Likewise, AFMC did not establish clear and consistent measures to facilitate tracking progress and assessing the initiatives' success. Therefore, limited data are available to quantify the initiatives' success in achieving desired goals such as expediting repairs and reducing costs. To the extent data were available, they indicated mixed results.

GAO identified a number of management changes that would better support implementation of the initiatives and provide more accurate and complete data for evaluating the implementation. These changes include

- developing an implementation plan that establishes standard measures for assessing whether process improvement initiatives are achieving desired goals and results,
- assessing progress toward implementing standard organizational structures and processes,
- addressing weaknesses in information management systems used to manage the process and assess activity performance, consistent with the Clinger/Cohen Act and Year 2000 requirements,

- identifying costs of fully implementing the initiatives and avoiding premature budget reductions in anticipation of savings, and
- developing effective working agreements with other defense logistics activities that are key to timely access to needed repair parts and successful implementation of logistics reforms.

GAO makes recommendations to the Secretaries of Defense and the Air Force that will enhance implementation of the three depot maintenance initiatives.

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## Principal Findings

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### Implementation Varies Among Initiatives

The three enhancement initiatives vary in the extent to which they have been implemented at AFMC centers. AFMC did not establish consistent measures by which to assess each initiative's success in achieving Agile Logistics objectives, such as reducing repair time and costs. However, based on available data, GAO provides information on the status of the initiatives:

- The depot reparable initiative has been applied to about 31 percent of the Air Force's depot reparable items with mixed results in such areas as improving repair times and mission capability rates. AFMC officials continue to assess the extent to which other items should be brought under the initiative, or whether some items originally included were the right candidates.
- The aircraft enhancement initiative has been applied to an estimated 65 percent of the 10 aircraft systems that receive periodic programmed depot maintenance. AFMC officials report that turnaround times for periodic overhauls and repairs of aircraft have been reduced, but cost reductions have not been determined because the Air Force has no system for tracking such costs. Officials are still considering whether the initiative should be applied to all aircraft in the depot maintenance program.
- The contract enhancement initiative has been implemented to varying degrees at each AFMC center, and in varying degrees within individual contracts. While AFMC officials believe the program has been useful in reducing repair time and costs, these officials have no data on actual reductions in turnaround times and costs that are specifically related to the initiative. At the same time, these officials believed that contract costs could increase if contractors are required to stock supply parts in advance of need to meet the initiative's new requirements.

**Management Changes Can Improve Implementation of Initiatives**

All three Air Force initiatives could be more effectively implemented through management changes that would help in achieving program objectives. Also, the Air Force has adopted a new vision statement for logistics management. However, it is not clear how well the new vision will be integrated with or address these issues because the Air Force has not developed a detailed plan for implementing the vision.

**Standard Organizational Structures and Processes Not Fully Implemented**

One objective of the Agile Logistics program is to improve the effectiveness and efficiency of depot operations through the use of standard organizational structures and processes. However, AFMC centers have implemented only parts of the standardized process and structure. Thus, AFMC does not yet have the more streamlined and standardized organization originally envisioned to improve personnel and equipment efficiency.

**Greater Organizational Support Would Facilitate Effective Initiative Implementation**

Implementation of each of the reengineering initiatives could benefit from greater support from managers and workers to ensure the acceptance of change and to facilitate greater worker flexibility. One of the greatest challenges to the success of the initiatives, according to AFMC officials, is convincing supervisors and workers at the centers to accept the new way of doing business. Increased and sustained emphasis by top-level command officials is a best management practice for encouraging commitment to new initiatives at lower levels. Developing a multi-skilled workforce is equally important and equally challenging. Having the flexibility to move maintenance workers from one shop to another, depending on shifting work priorities, is critical to the success of the initiatives.

**Standard Measures Could Help Assess Initiative Impact and Effectiveness**

AFMC headquarters developed some initial measures to assess the performance of its depot enhancement prototype initiative, but dropped them as the initiative was expanded AFMC-wide. AFMC headquarters and the centers have not since agreed upon standard measures to assess individual and collective performance of the initiatives.

**Improved Information Systems Are Needed to Fully Implement Initiatives and Assess Success**

Continuing system weaknesses have made it difficult for AFMC to implement and assess the effectiveness of its enhancement initiatives.<sup>2</sup> Much of the data used to manage the Agile Logistics prototype initiative

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<sup>2</sup>In Best Management Practices: Reengineering the Air Force's Logistics System Can Yield Substantial Savings (GAO/NSIAD-96-5, Feb. 21, 1996), GAO reported that information system deficiencies were an obstacle to the Air Force's reengineering of its logistics system.

were collected manually—a task that project leaders said would be impossible under an Air Force-wide program. After years of minimal progress in trying to develop DOD-wide logistics information systems, DOD recently returned responsibility for logistics information systems to the services. It is unclear what impact this will have on the development of essential system improvements critical to the successful implementation of the Agile Logistics program. However, it will be important for the Air Force to ensure that future system changes are made in accordance with relevant legislative and departmental policy guidance, including the Clinger/Cohen Act of 1996, which requires federal agencies to have processes and information in place to help ensure that information technology projects (1) are implemented at acceptable costs, within reasonable and expected time frames and (2) are contributing to tangible, observable improvements in mission performance. These actions need to be done in concert with DOD's actions to remediate the Year 2000 problem.

**Greater Attention to Cost and Savings Issues Needed to Avoid Premature Budget Reductions**

AFMC headquarters' planning for the new initiatives did not include a means of adequately identifying or tracking costs of implementing them or for evaluating the resulting savings. Without this information, decisionmakers made premature budget reductions based on anticipated savings estimates. However, operation and maintenance funding reductions of \$386 million in fiscal year 1997, \$289 million in fiscal year 1998, and \$323 million in fiscal year 1999 resulted in critical shortages of repair parts and spare parts. AFMC headquarters officials subsequently requested additional funding and no longer plan to reduce future budgets in anticipation of cost savings. According to AFMC headquarters officials, achieving cost savings will require reductions in inventories of major and secondary items and faster logistics response time. Reductions in aircraft inventories, based upon faster turnaround times, will also be key to achieving future savings. Unless inventories are reduced, the three initiatives might end up costing more than the current system because of the costs to implement the program.

**Improved Supply Support Needed**

Improving the efficiency and cost-effectiveness of depot maintenance depends on the timely availability of repair parts. Unavailability of parts has been a long-standing problem. AFMC headquarters officials believed that their parts suppliers must improve the timely availability of parts to effectively support the new initiatives. Without resolution of continued problems, it will be difficult for the AFMC to achieve the objectives of its initiatives. GAO supports the use of best inventory management practices,

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such as prime vendor support,<sup>3</sup> where there is potential to reduce costs and provide improved service. Although DOD has made limited use of prime vendor support for hardware items such as spare and repair parts, the Air Force may have greater opportunities in this area to improve supply support for its enhancement initiatives.

### New Vision

In January 1998, the AFMC Commander announced a new vision for logistics management, outlining a number of goals for changing logistics management policies and practices. Among the vision's goals were matching repair to demand and setting and filling appropriate inventory levels. These and other goals build on the enhancement initiatives. However, AFMC has not developed a detailed implementation plan with criteria for measuring achievement of its goals and objectives. Thus, it is not clear whether planned improvement initiatives from this effort would address specific problems identified in this report.

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### Recommendations

Chapter 3 includes several GAO recommendations intended to help the Air Force effectively implement its three depot maintenance initiatives.

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### Agency Comments

GAO requested comments on a draft of this report from the Secretary of Defense. Air Force officials provided oral comments on behalf of DOD stating that the Department agreed with GAO's findings and with the intent of its recommendations. In acknowledging that measures were needed to better ensure success of its reform initiatives, the Air Force offered a general description on a number of actions that it had taken or planned to take to improve the reengineering of its industrial operations. However, the Air Force's responses were too general to determine to what extent GAO's concerns would be addressed. GAO, in evaluating the Air Force's comments, outlined additional information that would be needed for a complete evaluation of the Air Force's cited actions. DOD's comments and GAO's evaluation with additional amplification of suggested actions are more fully discussed at the end of chapter 3 and in appendix II.

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<sup>3</sup>Prime vendors are contractors that buy inventory items from a variety of suppliers, store them in commercial warehouses, and ship them to customers as needed.

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**Abbreviations**

AFMC	Air Force Materiel Command
DLA	Defense Logistics Agency
DOD	Department of Defense
DRI	Defense Reform Initiative
EXPRESS	Execution and Prioritization of Repair Support System
IG	Inspector General
QDR	Quadrennial Defense Review

# Introduction

Annually, the Department of Defense (DOD) spends a reported \$14 billion for depot-level maintenance programs and activities. DOD has recognized the importance of ensuring that all its logistics support activities, including depot maintenance, are run as efficiently and cost-effectively as possible, given the changed threat environment and declining budgets. In 1994, the Department began efforts to streamline logistics operations through the use of best commercial business practices. For its part in improving depot maintenance activities, the Air Force has three primary initiatives designed to provide better service to its customers by reducing repair turnaround times, reducing supply inventories and costs, prioritizing repairs appropriately, and providing spare parts rapidly. As we have noted in previous reports, the use of best commercial practices can result in improvements in the Air Force's reengineering of logistics operations.

## DOD Recognizes the Need to Improve Its Logistics Activities

DOD has recognized that the changing threat environment and declining budgets require that the military services seek ways to improve the efficiency and cost-effectiveness of all of their logistics support activities, including depot maintenance. Thus, in 1994, DOD initiated efforts to incorporate best commercial business practices into its logistics activities. These initiatives were later reflected in DOD's May 1997 Quadrennial Defense Review report and November 1997 Defense Reform Initiative report.<sup>1</sup> The waste and inefficiency in DOD's logistics activities, including the management of its depot maintenance program, are key reasons we previously identified DOD's infrastructure activities as 1 of 24 high-risk areas in the federal government.<sup>2</sup>

DOD components are now implementing a number of initiatives to improve operations and enhance the effectiveness and efficiency of their logistics support activities. These initiatives include competitive sourcing and privatization, acquisition reform, organization streamlining and consolidations, base realignment and closures, personnel reductions, inventory reduction, and management process reengineering.

<sup>1</sup>DOD undertook the Quadrennial Defense Review to comprehensively examine the national security threats, risks, and opportunities the United States faces from 1997 to 2015. The Defense Reform Initiative addressed DOD's corporate vision for reforming its management techniques and business practices.

<sup>2</sup>In 1990 we began a special effort to review and report on federal program areas we identified as high risk because of vulnerabilities to waste, fraud, abuse, and mismanagement. For our most recent report on high risk associated with DOD's support infrastructure, see [High Risk Series: Defense Infrastructure](#) (GAO/HR-97-7, Feb. 1997).

Legislative requirements also play a role in the management of DOD's logistics activities and reengineering programs. For example, 10 U.S.C. section 2464 requires the Secretary of Defense to identify and maintain a "core"<sup>3</sup> logistics capability unless he waives this requirement for national defense reasons. The legislation states that not more than 50 percent of funds for depot maintenance activities may be used for the performance of depot maintenance by nonfederal personnel. It also states that DOD-performed depot maintenance and repair workloads valued at \$3 million or more cannot be changed to contractor performance without the use of competing the work among public and private sector entities. The requirement for in-house capabilities reinforces the need to ensure they are efficient and cost effective.

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## Structure of Air Force Depot Maintenance Operations

Depot maintenance is a key part of the total DOD logistics system. The Air Force Materiel Command (AFMC) and its five air logistics centers manage the Air Force's wholesale logistics system and perform depot-level maintenance, repair, overhaul, and modification on an array of aircraft, systems, weapons, and components. At Air Force bases around the world, base maintenance personnel make minor repairs, using replacement parts ordered from the centers. Broken reparable parts are sent to the centers as are entire aircraft and weapon systems if overhaul and modifications are required. Work may be done there by the military depots or contracted out to private sector firms. Parts used in overhaul and maintenance operations are manufactured almost exclusively by the private sector.

The Defense Logistics Agency (DLA) handles warehousing and distribution of repair parts at each of the five centers.<sup>4</sup> DLA manages about 93 percent of the consumable items that the Air Force uses. In general, new and repaired parts are stored at each center in DLA warehouses until they are needed. DLA also stores broken items until the centers' repair shops are ready to fix them. Depending on the provisions of the contract, contractors may receive items for repair from DLA or directly from Air Force customers as government-furnished items, and they may purchase parts for

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<sup>3</sup>Core is the capability, including personnel, equipment, and facilities, to ensure a timely response to a mobilization, national contingency, or other emergency requirement.

<sup>4</sup>DLA is a combat support agency that provides material and supplies to the military services and supports their acquisition and maintenance of weapon systems and other equipment.

use in repair operations from DLA or private-sector vendors. Once a repair is completed, contractors can ship the items to DLA for storage and distribution or ship them directly to Air Force customers.

Financial management is a key aspect of the Air Force's logistics operations. Logistics activities, including depot maintenance, are financed through working capital funds. Under the working capital fund concept, activities sustain their operations by charging their customers for goods and services based on predetermined rates designed to recover the costs of operations.<sup>5</sup> For the Air Force, the working capital fund has two primary groups—the Supply Management Activity Group and Depot Maintenance Activity Group.

The Supply Group supports its customers, such as Air Force depots, by procuring critical material and making repair parts available to the appropriate activities.<sup>6</sup> The Supply Group also manages some Air Force—unique consumable items and almost all reparable items—those identified as being economical to repair at Air Force bases or at the depot level by Air Force-owned depots or contractors. Material is procured from vendors and stored until needed. The reported value of the Supply Group-managed items is about \$2.4 billion for consumable items and about \$25 billion for reparable items. From the Supply Group, the Depot Maintenance Group finances the purchase of supplies and services that are used for depot maintenance in-house and contracted for. We have reported that the Air Force's working capital funds have had long-standing financial management weaknesses impairing the Air Force's ability to (1) ensure that customers can purchase inventory items when needed and (2) achieve the goals of the working capital funds, which are to focus management attention on the full costs of carrying out operations and to manage those costs effectively.<sup>7</sup>

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<sup>5</sup>Separate working capital funds exist for the Army, Navy, Air Force, and Defense-wide activities.

<sup>6</sup>The Supply Group is responsible for about two million items, including weapon system spare parts, fuels, food, medical-dental supplies, equipment, and uniforms.

<sup>7</sup>Air Force Supply Management: Analysis of Activity Group's Financial Reports, Prices, and Cash Management (GAO/AIMD/NSIAD-98-118, June 8, 1998).

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## Air Force Efforts to Reform Its Depot Operations

The Air Force recognized that it had inefficiencies in its depot maintenance operations. As a result of previous practices, its depots incurred net operating losses during fiscal years 1993-97. In 1996, the Air Force began testing initiatives that incorporated best commercial practices designed to improve its depot operations, and it is now implementing those initiatives.

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## Past Practices Resulted in Inefficiencies

While having weaknesses and limitations in precision, data systems that the Air Force uses to analyze its depots' operations' cost and productivity provide a general indication of inefficiencies in the current operating environment. On the basis of these data, the Air Force reported that for fiscal years 1993-97, its depots incurred a net operating loss of \$216.7 million. For the same time, reported worker productivity remained relatively constant. Although the Air Force has not formally analyzed why this situation has not improved, it has observed several contributors. Among these have been difficulties in forecasting future workloads, setting appropriate rates to recover costs, and underutilizing depot industrial repair and overhaul facilities. Underuse of these facilities increases costs of operations because the depot infrastructure is larger than needed to accomplish identified maintenance workloads. Using current and future workload estimates, AFMC headquarters officials projected that, for fiscal year 1999, its depots have about 18 percent excess capacity in facilities and equipment.<sup>8</sup> However, we reported that using criteria established during the 1995 base realignment and closure process, excess capacity in the five Air Force depots was closer to 65 percent in 1999.<sup>9</sup> The impending closure of two of the five depots should reduce some of this excess.

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## Air Force Plans for Reengineering Logistics Activities

Under an umbrella concept initially called Lean Logistics but later renamed Agile Logistics, the Air Force began exploring ways to adopt concepts and practices used in the private sector commercial firms to reengineer costly

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<sup>8</sup>DOD's estimates are determined by dividing projected workload of about 22 million hours for fiscal year 1999 by the amount of available capacity estimated at 27 million hours. DOD normally measures capacity by an analysis that constrains facility and equipment capacity availability by the availability of trained personnel and the organization of work stations, assuming an 8-hour work day and a 5-day-a-week operation. During the 1995 base realignment and closure process, DOD used a measure called maximum potential capability that was intended to capture the potential capacity of industrial facilities and equipment unconstrained by the number of trained personnel currently assigned to these facilities.

<sup>9</sup>Defense Depot Maintenance: Uncertainties and Challenges DOD Faces in Restructuring Its Depot Maintenance Program (GAO/T-NSIAD-97-111, Mar. 18, 1997).

and inefficient logistics activities. Using the Agile Logistics program as the cornerstone for improving its logistics activities, the Air Force began to consider ways to

- expedite the repair of components and aircraft,
- reduce the amount and costs of supply inventories,
- match the repair of items with the demand from customers,
- prioritize repairs when multiple priorities exist,
- rapidly move components and spare parts to and from customers, and
- improve contracting for logistics support.

The Air Force's efforts to implement Agile Logistics ultimately focused on three specific initiatives for reforming current logistics activities—the depot repair enhancement initiative, the aircraft repair enhancement initiative, and the contract repair enhancement initiative. These initiatives are targeted at specific areas of maintenance noted above, but they are intended to address all logistics activities necessary for effective support of the warfighter.

#### Depot Enhancement Initiative

The depot enhancement initiative affects the repair of reparable spare parts such as aircraft landing gears, wheels, and avionics. This initiative seeks to reengineer the old “batch processing” approach by repairing only the items for which customers have an immediate need. The initiative also seeks to improve support to depot customers by meeting their needs for components on a faster basis—reducing the requirement to store additional inventory in anticipation of need. Under the depot enhancement initiative, depots prioritize repairs on a daily basis, using automated systems that establish the next day's repair requirements and distribution priorities. Also, the Air Force expected to change the depots' organizational structures by placing key supply and maintenance personnel under a single manager, rather than having them reporting to several managers. This new approach was to be more conducive to effective teamwork and communication for reparable item management.

#### Aircraft Enhancement Initiative

The aircraft enhancement initiative is for aircraft that are periodically scheduled or programmed for extensive maintenance at Air Force depots to keep them operational or to upgrade their capabilities. The initiative was designed to improve repair turnaround times for these aircraft. This was to be accomplished by reengineering the existing repair process to improve teamwork and communication for more effective management of supply

and maintenance during the programmed maintenance process. The concept of matching repair with demand did not apply to the aircraft initiative since aircraft are prescheduled for this extensive maintenance.

Contract Enhancement Initiative

The contract enhancement initiative applies to depot reparable workloads performed by contractors. Like the depot initiative, this initiative also called for improving operational performance by reducing repair turnaround times and doing repairs on demand. The Air Force's logistics centers were to apply the new initiative to terms of existing and future contracts whenever possible.

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**Previous GAO  
Observation on Air  
Force Agile Logistics  
Initiatives**

We have previously recommended that the Air Force reengineer its logistics activities, and we identified additional best commercial practices that could result in further improvements. In our February 1996 report on the Air Force reengineering efforts,<sup>10</sup> we generally supported the Air Force's reengineering efforts. Noting that some of the results to date were promising, we concluded that the Air Force efforts should be supported and expanded. We also noted that the success of the Air Force in achieving a "quantum leap" in system improvements hinged on its ability to address and overcome certain barriers, such as inherent organizational resistance to change.

In agreeing with our previous recommendations to build on the existing Air Force reengineering efforts, DOD stated that the Air Force's logistics reform strategy should receive top-level DOD support in achieving its goals. DOD also agreed that the Air Force should consider adding other leading-edge logistics concepts into its reengineering efforts, for example, installing commercially available management information systems to track inventory amounts, location, condition, and requirements and reorganizing depot workshops to reduce the time it takes to repair components. The Air Force enhancement initiatives represent efforts to deal with these issues.

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<sup>10</sup>Best Management Practices: Reengineering the Air Force's Logistics System Can Yield Substantial Savings (GAO/NSIAD-96-5, Feb. 21, 1996).

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## Recent Air Force Analyses

Two recent Air Force studies—an Air Force Inspector General report (Dec. 1997) on the implementation and maturity of Agile Logistics and the effect of the initiatives on combat readiness and an Air Force board report (Mar. 1998) on the management of reparable spares—identify weaknesses in the Air Force's implementation of its enhancement initiatives. They also show that the Air Force has a number of significant issues to address if it is to succeed in its reengineering efforts. Appendix I provides additional details from these reports.

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## Objectives, Scope, and Methodology

As requested by the Chairman and Ranking Minority Member, Subcommittee on Readiness, Senate Armed Services Committee, we reviewed the status of the Air Force's three depot maintenance enhancement initiatives and management issues related to the initiatives.

Although the Air Force's management data and accounting systems have many problems that can affect their reliability, Air Force officials use them to manage and track their logistics and other programs. They provide the best available trend information on depot maintenance effectiveness and efficiency. We used this data in analyzing the Air Force's reported financial and productivity measures for fiscal years 1993-97. We did not independently test the accuracy of this data or any data on logistics operations AFMC headquarters or its centers provided. We also reviewed AFMC and center business plans for the Air Force working capital funds to identify program budget issues and costs of operations.

To determine the status of the enhancement initiatives' implementation, we analyzed AFMC and center (1) program management plans, (2) analyses of costs and benefits of the depot initiative prototype demonstration, (3) performance indicator reports that were used for maintenance shops participating in the prototype demonstration, and (4) reports on initiative implementation and results being achieved. We examined AFMC and center analyses of automated system requirements, reports of problems encountered during initiative implementation, and the status of corrective actions planned or taken. We also interviewed logistics managers and depot managers at AFMC and three air logistics centers to obtain their views on the logistics enhancement initiatives, the impact the program was having or expected to have on depot maintenance operations, and other related logistics issues. In addition, we interviewed DLA headquarters officials to discuss DLA's role in the Air Force's reengineering initiatives and specific issues related to DLA supply support at the Air Force centers.

We made extensive use of our prior work in identifying and evaluating issues that challenge the Air Force's success in implementing the Agile Logistics initiatives. We also reviewed recent studies of the Agile Logistics Program by the Air Force Inspector General and a group of active and retired military representatives and private industry representatives appointed by the AFMC Commander to evaluate AFMC's management of reparable items.

We performed work at AFMC, Wright-Patterson Air Force Base, Dayton, Ohio; Warner Robins Air Logistics Center, Warner Robins, Georgia; Ogden Air Logistics Center, Hill Air Force Base, Ogden, Utah; and Oklahoma City Air Logistics Center, Tinker Air Force Base, Oklahoma City, Oklahoma. We did not visit the two remaining centers—Sacramento Air Logistics Center, McClellan Air Force Base, Sacramento, California, and San Antonio Air Logistics Center, Kelly Air Force Base, Texas—because of their impending closure.

We conducted our review from October 1997 to March 1999 in accordance with generally accepted government auditing standards.

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# Status of Implementation of the Enhancement Initiatives

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The Air Force's plans for implementing its enhancement initiatives were largely focused on broad concepts and principles to implement the initiatives and achieve the intended improvements. Included in the approach to implementation was use of standard organizational structures and employee position descriptions, a description of the new process, and an assessment of required automated system support. Currently, the Air Force is in the process of implementing the three initiatives.

In its plans for implementation, the Air Force did not establish clear and consistent measures to facilitate tracking progress and measuring the success of the initiatives. Thus, it cannot conclusively determine whether the goals of the Agile Logistics program, that is, increased operational efficiency and reduced costs, are being achieved. However, limited information indicates that the initiatives have been implemented piecemeal and have had mixed results. As discussed in chapter 3, key management changes, including the addition of measures for determining the achievement of initiative goals, could facilitate implementation of the initiatives and provide for a clearer evaluation of the implementation.

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## Depot Repair Enhancement Initiative

**Implementation status:** Partial implementation.

**Reported results:** Some improvement in supply status; mixed results in maintenance activities.

As noted, the depot enhancement initiative pertained to the repair of reparable spare parts such as aircraft landing gears, wheels, and avionics, with an emphasis on meeting customer needs for components on a faster basis. This initiative has been applied to about one-third of the Air Force's stock-numbered depot reparable items. AFMC officials continue to assess the extent to which other items should be brought under the initiative.

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## Implementation History

The depot enhancement initiative began as an AFMC headquarters-sponsored prototype effort from June 1996 to June 1997 and afterward was expanded AFMC-wide. For the prototype effort, AFMC selected 10 depot shops, 2 at each of the 5 centers. The prototype effort included a workload of less than 1 percent of the Air Force's inventory of reparable items. AFMC required the five centers to collect and report data in four areas: customer impact, responsiveness to the customer, repair depot efficiency, and

operating costs. AFMC used this data to conduct a cost/benefit analysis of the prototype program and to determine whether the initiative should be expanded Air Force-wide.

AFMC expanded the initiative AFMC-wide beginning in June 1997. As of September 30, 1998, the three AFMC centers we visited reported that they had applied the depot initiative to about 31 percent of the stock-numbered reparable items they managed, representing about 68 percent of the items' total dollar value. Table 2.1 provides details regarding the extent to which the three centers applied the depot enhancement initiative to their reparable stock-numbered items.

**Table 2.1: Stock-Numbered Reparable Items Reported Under the Depot Enhancement Initiative as of September 30, 1998**

Dollars in millions

Center	Reparable items managed		Items under the enhancement initiative		Initiative items to total	Percent Value of initiative items to total
	Total number	Total value	Total number	Total value		
Ogden	23,391	\$4,227.6	3,057	\$300.4	13	7
Ok. City	14,833	226.1	2,509	85.9	17	38
Warner Robins	39,443	11,220.0	18,335	10,325.0	46	92
<b>Total</b>	<b>77,667</b>	<b>\$15,674.7</b>	<b>23,901</b>	<b>\$10,711.3</b>	<b>31</b>	<b>68</b>

Source: Data provided by each center.

Officials at the centers we visited identified several types of items that are not yet included in the depot enhancement initiative. For example, they have not included items with low or infrequent demands, items that have dual sources of repair, and items that are on aircraft undergoing programmed depot maintenance. Center officials said that they recognized many additional items should be added to the initiative and they were trying to identify those items. AFMC has not made final decisions as to whether some of the items included in the initiative were not good candidates. AFMC officials said that unique considerations such as long lead times, repair complexities, or the routine size of the daily repair schedule suggest that repair forecasting may in some cases be more cost effective than daily demand schedules called for by the initiative.

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## Supply Availability

Available data collected during the prototype period (June 1996 to June 1997) showed that the number of components awaiting repair due to the lack of spare parts decreased 25 percent. This data essentially indicated that more repair parts were available to complete needed component repairs—a measurement of improvement in the supply function.

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## Change in Maintenance Processes

Implementation of a repair-on-demand concept was a significant change from the previous Air Force process. Under the old system, repair levels were negotiated quarterly based on projections of what items would fail or require scheduled repair. The new system requires daily changes in maintenance processes in response to the latest assessment of the most urgent requirements. According to maintenance officials at the three centers, this change initially disrupted the maintenance process throughout the shops participating in the pilot effort. Available data collected during the prototype period showed that the average repair time increased in 6 of the 10 shops; 2 of the 6 shops' repair times increased over 100 percent.

In its October 1997 report, an AFMC analysis group found that after the year-long depot enhancement prototype initiative, performance indicators showed negative trends for some maintenance shops. For example, the total number of aircraft that were reported as mission incapable was 50 percent higher than before the initiative, and the total number of hours these aircraft remained mission incapable increased by 77 percent. However, this performance could have been partly the result of an Air Force-wide problem in fiscal year 1997 involving underfunding of inventory requirements. This issue is addressed more fully in a separate report on the Air Force's Supply Management Group.<sup>1</sup>

Overall, AFMC's analysis of the prototype effort showed that conditions related to shop performance and cost outcomes generally worsened during the prototype period, even though the depots were operating under enhanced conditions that were not representative of the normal repair environment. For instance, some shops were allowed to add additional workers, others were fully funded for repair work, and some shops had piece parts required for component repair already in place to avoid delays due to awaiting parts. These conditions would not exist once the initiative was expanded AFMC-wide.

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<sup>1</sup>Air Force Supply Management Actions Create Spare Shortages and Operational Problems (GAO/NSIAD/AIMD-99-77, Apr. 29, 1999).

We observed that because of the enhanced conditions, such as fully funding the repair work and having piece parts already in place, one shop at the Warner Robins Center was able to reduce the frequency that aircraft were reported as mission incapable<sup>2</sup> due to maintenance problems. After the prototype demonstration ended and the special conditions were eliminated, the number of hours that aircraft were mission incapable increased, though not to as high a level as when the prototype period began. For example, when the shop began the prototype initiative, the number of mission incapable hours reported was about 2,700. This number fluctuated during the 12-month prototype period, but at the end of the period in June 1997, the total number of mission incapable hours reported was 324. After the prototype period ended, the mission incapable hours began increasing, and for the 5-month period August to December 1997 averaged 1,938 hours.

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### Results of Initiative Since the Prototype

In analyzing project data as of September 30, 1998, we found that results achieved at various AFMC centers continues to be mixed. For instance:

- Officials in the Ogden center's depot avionics shop reported that between October 1997 and September 1998, the depot reduced by 45 and 38 percent, respectively, the number of times and hours that aircraft were reported as mission incapable because the shop did not provide a reparable item in a timely manner. For the same period of time, the shop had little or no improvement in other areas such as repair times.
- Officials at the Oklahoma City center reported that between March 1998 and September 1998, the availability of reparable components to base-level customers increased by 22 percent. For the same time period, the number of times that aircraft were reported as mission incapable decreased by 8 percent, but the number of hours during which they were incapable increased by 28 percent.
- Officials at the Warner Robins center reported that the number of aircraft that were mission incapable fluctuated throughout the year, but increased 10 percent overall for the period October 1997 to September

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<sup>2</sup>The Air Force measures the availability of aircraft through the use of mission-capable rates that represent the reported percent of unit aircraft that are capable of performing at least one of their assigned missions. Aircraft that are not capable of accomplishing any of the missions are classified as (1) "not mission capable supply" if they cannot accomplish the missions because of parts shortages, (2) "not mission capable maintenance" if they cannot accomplish the missions because of required base-level maintenance, or (3) "not mission capable both" if both parts problems and required base-level maintenance are preventing the aircraft from accomplishing the missions.

1998; the number of hours incapable increased 12 percent. Other depot performance measures did not show significant improvement.

According to AFMC officials, difficulties in obtaining repair parts when needed were a key factor in the maintenance depots' inability to reduce repair times.

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## Aircraft Repair Enhancement Initiative

**Implementation status:** Partial implementation.

**Reported results:** Reduced programmed aircraft maintenance time.

As noted, the aircraft repair enhancement initiative affects aircraft that are periodically scheduled or programmed for extensive maintenance at Air Force depots, and emphasized faster turnaround times for this maintenance. Implementation of this initiative has been piecemeal and incomplete, largely because of resource constraints. Officials at the three centers believed that the initiative was having a positive impact on improving the time and costs of periodic programmed maintenance of aircraft. Due to a lack of data, however, it is unclear to what extent the initiative has resulted in these improvements or what cost savings may have resulted. The Air Force has not decided whether this initiative should be applied to all aircraft.

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## Implementation History

The aircraft enhancement initiative began as a joint effort by the Oklahoma City and Warner Robins centers in March 1996. AFMC headquarters later assumed leadership of this initiative in August 1998.

Because AFMC made the depot enhancement initiative a higher priority, resources for implementing the aircraft enhancement initiative were constrained. Therefore, rather than reengineer the entire process for programmed depot maintenance, the centers emphasized identifying the most immediate problems that could be corrected and applying quick fixes that could be executed with available resources. They repeated this cycle for the next most pressing issues. Officials at the three centers estimated that as of October 1, 1998, the date that AFMC directed them to formally implement the program, the initiative had been used on an average of 65 percent of the 10 aircraft systems that received periodic programmed depot maintenance.

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## Results of the Initiative

Officials at the three AFMC centers believed that, due to the aircraft initiative, they have reduced the time needed to complete tasks during programmed depot maintenance for some aircraft. For example:

- Officials at the Ogden depot reported that the aircraft initiative facilitated innovative approaches in work on C-130 aircraft that reduced the aircraft stripping and painting time by 200 hours.
- Officials at the Oklahoma City depot noted that their workload for the E-3 aircraft increased 100 percent over the last 3 fiscal years because of the need for modifications, upgrades, and more extensive repairs aging aircraft need. Although they anticipated a corresponding increase in repair times, under the initiative they accomplished the increased workload more efficiently with an actual increase in repair time of only 46 percent.
- Officials at the Warner Robins Center reported that they had reduced programmed depot maintenance time for the F-15 about 42 percent, from 154 to 89 days. They also reported that using the aircraft initiative's principles helped them to win a public-private competition for maintenance on the C-5 aircraft. For fiscal year 1997, center officials reported that quicker turnaround times allowed them to reduce the number of other aircraft at the center awaiting or undergoing programmed depot maintenance, thus freeing up depot maintenance capacity to accommodate the C-5 work.

In analyzing the reported initiative results, we observed that none of the three centers had calculated the amount of cost reductions that could be attributed to use of the aircraft enhancement initiative. Officials at all three centers told us that they do not yet have sufficient systems in place to track actual reductions in costs. They anticipated that these systems would be in place during fiscal year 1999. However, they believed that the centers can achieve reductions in aircraft repair times by using principles of the aircraft enhancement initiative without adding costs.

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## Issues Associated With Future Application of the Initiative

The Air Force factors depot maintenance time into aircraft fleet requirements to ensure that sufficient aircraft are available to meet mission requirements while providing adequate time to provide needed maintenance. Consequently, while not a goal of the initiative, the Air Force may be able to reduce its aircraft inventory through the use of the initiative, since accomplishing maintenance more quickly could reduce the number of aircraft required to meet mission needs. Further, a smaller inventory of aircraft should allow the Air Force to reduce the costs of holding and

maintaining aircraft. Whether reductions in turnaround time will ultimately allow the Air Force to reduce its inventory of aircraft is unclear.

Also, according to an AFMC headquarters official, the Air Force and AFMC headquarters have not determined whether the initiative should be applied to all programmed depot maintenance aircraft or the extent to which aircraft inventories should be reduced as a result of faster repairs. AFMC officials stated that, when evaluating whether to implement proposed maintenance time reduction activities, it is important to evaluate the cost-effectiveness of the time reduction activities, determining whether additional costs are involved in achieving reductions in repair times.

Another consequence of reduced repair turnaround times is an expansion of excess depot capacity. Action could be needed to deal with current and additional future excess capacity to minimize overhead costs. The Air Force believes that the reduction from five to three depots would eliminate any potential excess capacity related to aircraft hangar space.

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## Contract Repair Enhancement Initiative

**Implementation status:** Partial implementation.

**Reported results:** Reduced costs and repair times.

As noted, the contract repair enhancement initiative applies to depot reparable workloads performed by contractors and emphasizes reducing repair turnaround times. Application of this initiative involves contract restructuring or modifications as necessary, or incorporating applicable provisions in new contracts. Implementation of this initiative has varied at each AFMC center, with most use being made by the Warner Robins center. Although officials report improvements in contract costs and turnaround times, the Air Force has no system for tracking whether reported results are actually being achieved. Also, the issue of whether the initiative should be applied to all contracts has not been decided.

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## Implementation History

The contract enhancement initiative was officially adopted in January 1997 after having been applied to a small number of contracts at each of the centers beginning in May 1996. During the pilot effort, the five centers applied aspects of the contract initiative to 14 contracts—1 at the Ogden center, 4 at the Oklahoma City center, 5 at the San Antonio center, 1 at the Sacramento center, and 3 at the Warner Robins center. Although the

centers did not prepare cost/benefit analyses, they concluded that the initiative could be useful in reducing repair times and costs.

AFMC headquarters' implementation approach was to identify and prioritize assets for repair, similar to the depot enhancement initiative. Under the contract initiative, AFMC centers hoped to reduce repair turnaround times by enhancing contractor performance whenever possible by (1) establishing priorities for the release of parts to the repair line to support the repair of items with the highest need, (2) encouraging contractors to obtain repair parts in advance to help minimize the time that components await parts, (3) using parts from less critical components to repair more critical ones, and (4) allowing contractors to reclaim usable parts from condemned components, thus reducing costs and returning assets to operational units in a shorter period of time. Additionally, AFMC headquarters and the centers identified several actions to be taken when contracting for the repair of reparable items with the overall goal of reducing repair times, contract repair costs, and eliminating excess inventory. These actions included allowing contractors to become more involved in the planning process such as helping develop the scope of work; using incentives to increase contractor performance; and negotiating longer-term performance periods.

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### Application of the Contract Initiative

As of September 30, 1998, the three centers reported that they had applied some aspects of the enhancement initiative to 258 maintenance contracts—about 61 percent of 421 contracts that were in effect at that time. As shown in table 2.2, the Warner Robins center, which was the first center to use this initiative, has applied the initiative to more contracts than the other two. Most contracts focused on the goals of reducing repair time and fast transportation of the components needing repair from and to the customers.

**Table 2.2: Contracts Including Selected Goals of the Contract Enhancement Initiative as of September 30, 1998**

Goals	Contracts at Ogden	Contracts at Oklahoma City	Contracts at Warner Robins	Total
Reduce repair time	18	22	85	125
Reduce inventories	1	2	10	13
Reduce repair costs	1	7	40	48
Repair on demand	3	2	81	86
Fast transportation	2	53	94	149

Note: Individual aspects of the initiative were applied to more than one contract.

Source: Data provided by each center.

Like the depot repair enhancement initiative, the contract repair enhancement initiative was originally intended to use a daily forecast for repairs on demand. However, none of the centers had implemented the concept of daily repair on demand. AFMC headquarters allowed the centers to adopt a longer forecast period because automated data systems were not yet adequate to support contract repair-on-demand.

The Warner Robins center was the only center using a prototype planning tool for automating the identification and prioritization of work to be done under contract. However, the prototype allows use of a 30-day forecast for repair contractors, while the Air Force depots were expected to respond to daily forecast changes. Oklahoma City and Ogden officials said they did not believe it was practicable to adjust contract workloads frequently. They said that depot maintenance contractors want to know in advance what the workload will be so that they can stabilize their workforce and ensure they have required parts available.

## Results of Initiative

Officials at the three centers reported to AFMC headquarters their estimated impact of the contract repair initiative in reducing repair time, maintenance costs, and inventories of reparable items. However, it is difficult to assess these reported estimates of success because the centers had no system for tracking actual results. An AFMC program official said that AFMC headquarters was evaluating the interfaces needed between automated systems to be able to measure outcomes such as turnaround time reductions.

Although no overall quantifiable data readily exists, center officials cited examples they believed showed that the application of the initiative allowed them to reduce contract costs and repair turnaround times. For example, the Warner Robins center reported that it reduced costs on a contract for the F-15 aircraft's radar system by \$450,000 and avoided costs of about \$1.4 million for the C-130 aircraft due to overall improvements in the repair process. An Ogden center official told us that use of the initiative had benefited the center through improved teamwork, greater contractor involvement in the process, and reduced time spent processing paperwork.

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### Issues Associated With Future Application of the Initiative

An important issue associated with future use of the initiative is the extent to which contractors can be encouraged to accept and implement the initiative objectives. According to a Warner Robins official responsible for overseeing the initiative's implementation, the repair-on-demand concept could be disruptive for contractors because fluctuations in the workload require them to accept more flexible and potentially more costly working arrangements than they currently use. Also, he said that the Air Force would likely face difficulties in obtaining contractors' voluntary acceptance of some major changes, such as the use of contractor funds for obtaining repair parts in advance to reduce turnaround times, and taking other actions necessary to improve the efficiency of their operations. Such changes could require contract modifications, which could result in increased costs.

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### Conclusions

Each of the three initiatives are in various stages of implementation. However, only broad goals were established for the initiatives and the Air Force did not establish tracking measures to assess whether the three depot enhancement initiatives were achieving the desired results. While there are indications of some positive outcomes, the initiatives have not yet achieved the desired goals of increased operational efficiency and reduced costs. Chapter 3 discusses issues that must be addressed to facilitate implementation of the initiatives and provide a clearer basis for assessing results.

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# Management Issues Need Attention to Aid Implementation of Reform Initiatives

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The implementation of the three initiatives could be enhanced if the Air Force took management action to (1) set up organizational structures and processes as originally planned, (2) support initiative implementation, (3) develop standard measures to assess performance, (4) improve automated management information systems, (5) avoid premature budget reductions, and (6) improve supply management support. Addressing these issues is vital to the success of AFMC headquarters' vision for reengineering its logistics activities. AFMC headquarters has recently adopted a new vision for logistics management but has not yet made clear how this new vision will be integrated with or address the management issues associated with the three ongoing reengineering initiatives.

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## Standard Organizational Structures and Process Not Fully Implemented

Our prior assessments of Defense reform initiatives have noted the difficulties of implementing reforms when corrective actions require the development and use of common systems and processes across organizational boundaries.<sup>1</sup> An objective of the enhancement initiatives was to improve the effectiveness and efficiency of depot operations through the use of standard organizational structures and processes. This objective has not been fully achieved because the centers have not fully incorporated standardization requirements into their maintenance and supply organizations. Lack of standardization among the centers for the aircraft enhancement initiative program is partly due to the fact that the initiative was originally center-sponsored and only came under direct AFMC oversight in August 1998. AFMC has expressed interest in closer integration of the programs, which could facilitate greater standardization.

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## Advantages of Standard Structures and Processes

According to an AFMC official, implementing the enhancement initiatives with standardized organizational structures and processes would allow depot workers to be moved within and among the depots without the costs and time delays for training or for learning a new process or management structure. Standardization also would help (1) provide managers and workers a common understanding of program objectives and (2) simplify program management and oversight by having standard operating procedures that allow AFMC-wide refinements without the added costs and time to tailor such actions to individual operations at the Air Force depots. Officials also said that a waiver of the standardization requirements would be approved if the impact of a center's request did not significantly change the standard requirements.

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<sup>1</sup>Defense Reform Initiative: Organization, Status, and Challenges (GAO/NSIAD-99-87, Apr. 21, 1999).

While the depot enhancement prototype initiative was under way, AFMC began developing an implementation plan that provided broad direction on the use of a standard process and organizational structure for AFMC depot facilities, as well as position descriptions, for converting depot shops to the new process. For example, the new organizational structure called for collocation of supply managers, item managers, and other key players with a single manager over both supply and maintenance operations. The new structure placed accountability and authority with a single manager to remove impediments and constraints to the repair of items.

The two centers that sponsored the aircraft enhancement initiative did not develop a detailed plan for implementing it, but they did prepare a manual in July 1996 that described the initiative's management structure. This structure, referred to as the weapons system support center, called for collocation of key individuals in planning, supply, contracting, and engineering support. The centers expected that, as the focal point for parts, tools, and equipment, this management structure would improve teamwork and communication for more effective management of supply and maintenance issues during the programmed depot maintenance process.

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### AFMC Has Identified Need for Greater Efforts in This Area

Although program officials at AFMC said that standardization is necessary for the Air Force to have an effective depot enhancement initiative, the centers were ultimately responsible for determining how they would implement the initiative. The centers implemented the following structures with the following variations:

- Officials at the Ogden depot established two shop service centers rather than one standard center because the maintenance workload was not housed in a single location and they believed that repair processes should be tailored to the depot's unique work requirements. As of December 1998, the depot had made six requests to deviate from the standardization process: AFMC approved one, and five were pending.
- Officials at the Oklahoma City depot decided that their service center chief would report to a material manager instead of the standard repair manager position because they believed the material manager was in the best position to be a problem solver. In April 1998, AFMC headquarters denied the depot's request to make this change, and as of December 1998, the depot was implementing the standard structure.
- Officials at the Warner Robins depot changed some standard position requirements by using nonstandard positions such as supply technicians and material handlers. In their opinion, their structure recognized the

need to use less costly positions to support standardization requirements. As of December 1998, AFMC headquarters had not approved the depot's request to add these nonstandard positions.

In September 1998, after AFMC assumed management control of the aircraft enhancement initiative, it directed the centers to follow a standard organizational structure with standard personnel descriptions for the support center. In early 1999, AFMC headquarters officials evaluated the extent to which the three centers had implemented the standard and found mixed results. They found that implementation of objective standardized structures at Warner Robins, Ogden, and Oklahoma City was about 70 percent, 30 percent, and 5-10 percent complete, respectively. AFMC officials told us that they expected to further evaluate progress in this area next year.

AFMC headquarters officials have stated that they want closer integration of the three initiatives in the future. Management and oversight for both depot and contractor repair options could be enhanced to the extent that both sources of repair can use the same system tools, be monitored by the same measures, and make repairs to the items using the same logic rules. While recognizing this, AFMC headquarters has not yet outlined how or when they expect to better integrate management of the three initiatives.

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## Greater Organization Support Would Enhance Initiative Implementation

Our prior work examining Defense reform initiatives has also noted the importance of top management commitment and sustained support for reform initiatives, and overcoming cultural barriers and resistance to change. The Air Force has recognized that its corporate culture is an important factor in whether it achieves its reengineering goals. AFMC believes that changing the mindset of the current workforce will be a challenge because (1) its organizations have often found change threatening and have been unwilling to modify behavior until proposed ideas are proven, (2) the enhancement initiatives call for organizational and process changes and many personnel have difficulty understanding how they will be affected and are reluctant to embrace the initiatives, and (3) essential employee groups have not yet fully supported the implementation of the new initiatives. Particularly important is management emphasis on workers becoming skilled in multiple areas and greater worker flexibility in work assignments. Also, as we stated in our February 1996 report on the Air Force's reengineering efforts, top-level management has not always provided the support necessary for successful implementation of the reengineering initiatives.

A key need, according to AFMC's plan for implementing the depot initiative, is for workers to be multiskilled. Our prior work has shown that multiskilling can be an important concept in fostering improved worker productivity.<sup>2</sup> A multiskilled workforce gives depot managers the flexibility to shift workers among different skill areas and offers better opportunities to effectively move workers to areas with increased workloads. According to depot officials, the ability to shift workers among various tasks allows them to adjust to unanticipated work stoppages due to parts shortages, technical problems, temporary labor imbalances, or changes in work priorities. Without a multiskilled staff, AFMC officials believe it will be difficult to efficiently manage a repair-on-demand logistics system where workload instability is likely to increase. However, the centers do not yet have many workers trained to perform multiple tasks. Officials at the three centers we visited estimated that only about 10 percent of their workers were multiskilled because employee bargaining agreements between Air Force management and worker unions generally have not supported this concept.

Currently, depot workers are trained in specific technical areas and perform work within their specific specialization, and labor agreements usually require that workers only perform work in their specialized area. Therefore, depot managers have limited ability to move workers to other areas when there are unanticipated changes in work priorities. According to an AFMC headquarters official, the Command has made progress by negotiating an agreement on training the workforce to perform multiple tasks. However, officials at the centers we visited said that they had made little progress in training workers because of the cost and time involved.

In a previous report, we noted that the Navy adopted a program to improve its cost-effectiveness and responsiveness through multiskilling at an intermediate repair activity in Pearl Harbor, Hawaii.<sup>3</sup> When the Navy transferred civilians from the shipyard to an intermediate activity at the same location, it implemented a program to train workers in a second complementary skill area, allowing them to perform multiple tasks. Maintenance facility managers said under this program, they used a limited number of workers more cost-effectively and were more responsive to

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<sup>2</sup>Army Industrial Facilities: Workforce Requirements and Related Issues Affecting Depots and Arsenals (GAO/NSIAD-99-31, Nov. 30, 1998).

<sup>3</sup>Army Industrial Facilities: Workforce Requirements and Related Issues Affecting Depots and Arsenals (GAO/NSIAD-99-31, Nov. 30, 1998).

emerging requirements. The shipyard and intermediate repair activity at Pearl Harbor is attempting to expand on the program to improve productivity and reduce costs. We are evaluating this effort as a part of a separate review.

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## Standard Set of Measures Could Help in Measuring Program Impact

Our prior reporting on Defense reform initiatives has also shown the importance of clear results oriented goals and performance measures. The Air Force's Baseline Agile Logistics Master Plan and Road Map cited the need for performance measures to provide management with information that will "identify problems, suggest solutions, lead to changes in behavior, and set or reset correct incentives at all levels of operations." While some initial steps were taken to develop such measures for the depot enhancement initiative, they were not completed, nor were measures developed for the other initiatives.

While AFMC headquarters developed some initial measures to assess the performance of its depot enhancement prototype initiative, they were used in a limited way initially and were later dropped as the initiative was expanded AFMC-wide. AFMC headquarters and its centers were unable to agree on appropriate measures of performance associated with the initiatives. AFMC has collected some measures that provide partial information on the three enhancement initiatives, but it lacks standard measures that would provide a comprehensive perspective on the initiatives' performance and their impact on the overall logistics system. Available measures developed by the individual centers offer limited insight into the collective performance impact of the depot, aircraft, and contract enhancement initiatives.

AFMC headquarters and the centers collect data on a number of measures for evaluating performance aspects of the overall supply and maintenance functions, but not specifically for the enhancement initiatives. In the absence of initiative specific measures and because the enhancement initiatives have been only partially implemented, available metrics developed by the centers offer limited insight into the collective performance impact of the three enhancement initiatives.

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## Improved Management Information Systems Would Aid in Implementing and Assessing Initiatives

AFMC headquarters recognized that effective automated data systems support was fundamental to successful implementation of its three enhancement initiatives. However, its decision to develop new systems concurrently with upgrading legacy systems impaired its ability to track implementation of the initiatives. Although AFMC headquarters and the centers have made progress in identifying and correcting deficiencies in automated data systems support, system weaknesses have made it difficult for AFMC to implement and assess the effectiveness of its enhancement initiatives.

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## Long-standing System Problems

The Air Force's problems with automated systems support are not new. For example, we reported in February 1996 that existing systems were an obstacle to the Air Force's reengineering of its logistics system.<sup>4</sup> In that report, we noted that, according to AFMC's Deputy Chief of Staff for Logistics, AFMC headquarters was working with systems that have not been significantly improved in 15 years. As a result, much of the data used to support the enhancement initiatives has been collected manually, a task that project leaders said would be impossible under an Air Force-wide program. Also, we noted that required management actions and funding decisions related to systems improvement were outside the responsibility of managers of the enhancement initiatives and the entire Air Force. This report noted that improvements to existing systems would not be fully deployed throughout the Air Force for 5 to 10 years. Until recently, the Joint Logistics Systems Center had responsibility for improving existing systems by standardizing data systems across DOD. However, in September 1998, DOD disbanded the Joint Logistics Systems Center and returned responsibility for automated system improvements to each service.

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## Enhancement Initiatives' Information System Approach

AFMC headquarters and its centers recognized that to support the enhancement initiatives, existing automated management information systems must be upgraded as new systems were being developed. According to AFMC headquarters program plans, the depot enhancement initiative required significant upgrades to 15 legacy systems and the development of 3 new systems—changes and upgrades that are now in

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<sup>4</sup>Best Management Practices: Reengineering the Air Force's Logistics System Can Yield Substantial Savings (GAO/NSIAD-96-5, Feb. 21, 1996).

process. The aircraft enhancement initiative required one new system to support reengineering of the programmed depot maintenance process, and the contract initiative required changes to two existing systems that interface between the centers' and contractors' systems.

Our analysis of the status of AFMC headquarters' systems improvement showed that, as of October 1998, work was completed on 73 proposals for system changes to correct problems with existing or new systems. AFMC headquarters reported that as of October 1998, it had 43 pending changes, most of which related to its prototype EXPRESS<sup>5</sup> software that was used to prioritize customer needs. Officials reported that these changes could take up to 4 or 5 years to complete. Also, after the latest changes were incorporated in October 1998, AFMC headquarters planned to change EXPRESS from a prototype system to a production system with new computer servers and other hardware added to support EXPRESS.

A different but time-consuming approach to deal with AFMC's system information needs would have been for AFMC to use the depot prototype initiative to identify key system requirements, develop and test those requirements, and have critical system support in place prior to AFMC-wide implementation. AFMC did not use this approach because of the long lead time this approach would have required. Instead, the Air Force directed its efforts at improving data systems as the enhancement initiatives were being implemented. This resulted in implementation problems and a lack of data to track and assess the success of the initiatives. According to logistics managers, inadequate data systems support was the primary limitation on evaluating the impact of the enhancement initiatives on logistics operations.

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## Information Systems Implementation Problems

Problems with automated data systems emerged as implementation of the enhancement initiative progressed. Information systems were unable to provide data on critical issues, such as whether data being generated on current operations was reliable for decision-making purposes and whether concepts such as repair on demand were producing desired results. Inadequate automated system support was a key concern for full implementation of the depot enhancement initiative because the centers recognized that EXPRESS was not working as anticipated. For example, (1) items with high repair costs and long repair times were not identified

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<sup>5</sup>EXPRESS stands for execution and prioritization of repair support system.

for repair, (2) inaccurate data was fed from AFMC's central stock leveling system that sets base peacetime operating stocks of repair parts, (3) repairs were delayed because some items were erroneously shown to be awaiting parts, and (4) items with configurations similar to the original items were not identified for potential use in filling customer requisitions.

Similarly, problems occurred in linking legacy and new automated data systems to achieve total integration of the aircraft schedule, bill of materials, and resource allocation. Center program officials considered these linkages crucial to the success of the aircraft enhancement initiative in reducing repair times and costs. Interfaces have been established for some systems, but interfaces involving four key legacy systems are pending funds for design and development. Logistics managers told us they resorted to less optimal and time-consuming manual intervention to enhance data integrity and used temporary fixes to link some systems.

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## Future Directions

AFMC must ensure that decisionmakers have timely, accurate, and complete information to help them resolve overall logistics problems. At the same time, the Air Force must ensure that it has explored alternatives for addressing information system needs within the bounds of relevant legislative and departmental policy guidance, including

- the Clinger/Cohen Act of 1996, which requires federal agencies to have processes and information in place to help ensure that information technology projects (1) are implemented at acceptable costs, within reasonable and expected time frames, and (2) are contributing to tangible, observable improvements in mission performance and
- DOD requirements to ensure that systems are economically justified and comply with DOD technical and data standards—which are intended to help pave the way toward an interoperable systems environment.

Additionally, AFMC efforts to improve its information systems capabilities must be in concert with departmental efforts to remediate the Year 2000 problem. The Year 2000 problem is rooted in the way dates are recorded, computed, and transmitted in automated information systems. With the typical two-digit format for recording dates, the year 2000, for example, is indistinguishable from 1900. Efforts are required and under way to correct this problem; failure to do so could cause DOD mission-critical operations to be degraded or disrupted.

## Greater Attention to Cost and Savings Issues Could Help Avoid Premature Budget Reductions

We have previously reported concerns about the abilities of DOD and the services to fully account for the costs associated with implementing various reform initiatives and concerns about premature reductions in operating budgets in anticipation of projected savings. Because AFMC headquarters did not adequately identify or track the upfront costs of implementing the new initiatives, budget reductions based on anticipated savings from them may have been premature. AFMC headquarters has identified the need for additional implementation funding and is undertaking an analysis to determine whether the initiatives are achieving anticipated savings.

AFMC headquarters and center officials told us that they do not know how much it has cost to implement the depot, contract, and aircraft enhancement initiatives, but they estimated that millions of dollars were being spent and additional funds were required. They pointed out that AFMC's June 1997 deployment plan for the depot initiative forecasted an implementation cost of about \$18.6 million. In addition, AFMC's Depot Maintenance Activity Group business plan for fiscal years 1998 and 1999 showed that the depot initiative needed funding of \$9 million for each year for spare parts procurement. This amount was unfunded because the funds had been taken from the budget in anticipation of cost reductions based on repair times being reduced.

Notwithstanding a lack of complete information on implementation costs, the Air Force anticipated savings from the three initiatives. On the basis of this assumption, it reduced the working capital fund \$336 million in fiscal year 1997, \$289 million in fiscal year 1998, and \$323 million in fiscal year 1999. However, AFMC headquarters officials determined that it had not achieved this level of savings and the resulting funding shortfall was adversely affecting support to its customers.<sup>6</sup> Although these officials believed that they were achieving savings from the initiatives, the exact savings cannot be determined because the Air Force does not have a system for tracking savings. Because of the funding shortfall in maintenance and operations, AFMC headquarters has requested that the Air Force provide additional funding and no longer plans to reduce future budgets in anticipation of cost savings from the new initiatives.

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<sup>6</sup>Air Force Supply Management Actions Create Spare Shortages and Operational Problems (GAO/NSIAD/AIMD-99-77, Apr. 29, 1999).

According to AFMC headquarters, achieving actual cost savings will require reductions in inventories of major and secondary items and faster maintenance response times. For example, if the aircraft initiative achieves its goal of moving aircraft through the repair process and returning them to the customer on an accelerated schedule, the Air Force should eventually be able to reduce the number of aircraft that are in the inventory. However, if excess aircraft are not retired from inventory or fewer aircraft are acquired in the future, the Air Force may not achieve the significant savings the initiatives anticipated.

Ogden Center officials said that the primary means to achieve cost savings from the depot initiative is reducing the amount of supply inventory. By repairing and returning secondary items to the customers faster, the centers can reduce the number of secondary items they maintain to support longer repair schedules—known as the maintenance float. Without reductions in the number of items dedicated to maintenance float or airplanes in the inventory to offset the increased cost of the depot initiative, overall costs could increase because of additional costs for improvements.

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## Improved Supply Support Needed for Effective Implementation of the Initiatives

Our prior reporting has emphasized the need for DOD to apply best practices in order to obtain more efficient and effective supply support at less cost.<sup>7</sup> Effective supply support is critical to achieving the enhancement initiatives' objectives. To accomplish repairs on demand and reduce turnaround times, the Air Force depots must have obtained or be able to obtain in a timely manner the parts and reparable components that are required to accomplish the overhaul and repair of reparable items. Air Force data indicate that parts and components required from both the Air Force Supply Group and DLA are sometimes unavailable, and according to AFMC headquarters officials, these supply activities do not provide acceptable support to their enhancement initiatives.

Parts availability is a key measure of the ability of the supply system to satisfy requests in a timely way.<sup>8</sup> According to AFMC headquarters

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<sup>7</sup>Inventory Management: Greater Use of Best Practices Could Reduce DOD's Logistics Costs (GAO/T-NSIAD-97-214, July 24, 1997).

<sup>8</sup>Parts availability measures how often the supply system had a part or component in stock to meet an Air Force customer's requirement. If the customer's requirement could not be filled when requested, the supply system generally backordered the part or component.

personnel, parts availability at 90 percent or above could be required to support the Agile Logistics initiatives. However, the Air Force Supply Group averaged 50 percent overall in parts availability for April through September 1998. For the same period, DLA averaged 77 percent in availability of repair parts. We have reported in recent years that implementing best inventory management practices such as prime vendor support may be a feasible option for improving customer responsiveness and reducing inventory costs. However, DOD has made little progress in expanding the use of prime vendors for parts and components, and it is unclear to what extent this option will prove to be cost-effective for military-unique items.

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### Air Force Supply Management Group Support

Air Force customers, including maintenance depots, obtain parts and components that are used in accomplishing maintenance tasks from the Air Force Supply Management Group. The Supply Group-managed reparable items are unique to Air Force weapon systems and are not readily available in the commercial sector. These items are often of high-dollar value and require lengthy lead times to procure if they are not in stock or on order.

Air Force data show that the Supply Group's performance in providing items has declined steadily in recent years.<sup>9</sup> Key indicators also show that support to AFMC depot maintenance customers is generally less effective than that to other Air Force customers such as operational fighting units. For instance, the Supply Group's parts availability for AFMC between April to September 1998 ranked sixth out of the nine Air Force commands the Group served. For example, the percent of availability averaged 50 percent, ranging from a low of 46 percent to a high of 53 percent. Officials at the three centers we visited said that inadequate supply support contributed to extended overhaul and repair times for some items. They noted that a critical factor in implementing the repair-on-demand concept is that required parts and components be available in a timely manner to accommodate repair schedules.

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<sup>9</sup>In a separate ongoing assignment we are assessing overall Air Force Supply Group effectiveness. We are also finalizing the results of a separate review of the Supply Management Activity Group and its impact on the ability of its customers to obtain aircraft spare parts when needed. Since the early 1990s, Air Force data have shown increased instances of aircraft that were not mission capable due to spare parts shortages. We found that shortages of inventory items were due, at least in part, because the Air Force did not achieve the reduced pipeline processing time goals that are the cornerstone of its reform initiatives.

The Supply Group's inability to support its customers meant that too many items were in the supply pipeline (items in transit from bases to depots and items being repaired) and not enough usable items were available at bases. Two major causes of the problem were (1) a lack of accurate data and effective procedures for monitoring pipeline processing times and taking timely and appropriate corrective action, when necessary and (2) the depot maintenance activities' inability to repair items because of shortages of parts, repair shop personnel, and testing equipment.<sup>10</sup>

The Supply Group's strategic plan for fiscal years 1999 to 2005 does not address what measures, if any, it plans to take to increase parts availability. However, the plan does include strategies to improve stockage effectiveness—another measure of supply support effectiveness.<sup>11</sup> Additionally, the Supply Group intends to have memorandums of agreement with each supplying depot maintenance manager to help reduce repair times, ensure time-definite delivery, and ensure parts support for items being repaired in depot shops. Also, AFMC headquarters depot maintenance officials said that they were working with officials in the Supply Group to identify additional actions to improve supply support.

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## DLA Support

DLA is the primary supplier of parts the AFMC centers need for depot maintenance repairs and operates all depot supply distribution functions. However, unavailability of repair parts at depots has been a chronic problem.<sup>12</sup> The impact of these problems was severe under the old approach, but it is even more critical for successful implementation of the repair-on-demand approach. This makes updating AFMC's previous support agreement with DLA imperative.

AFMC headquarters data on parts availability for March through September 1998 showed that DLA generally met the Air Force's goal of 75 percent availability, averaging 77 percent for the period. However, in an AFMC

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<sup>10</sup>See Air Force Supply: Management Actions Create Spare Shortages and Operational Problems (GAO/NSIAD/AIMD-99-77, Apr. 29, 1999) and Defense Inventory: Continuing Challenges in Managing Inventories and Avoiding Adverse Operational Effects (GAO/T-NSIAD-99-83, Feb. 25, 1999).

<sup>11</sup>Stockage effectiveness measures the percentage of time the supply system satisfies a requisition for items that have an authorized stockage level, whereas parts availability measures how often the supply system satisfies a requisition for any item—regardless of whether or not it has an authorized stock level.

<sup>12</sup>Air Force Supply: Management Actions Create Spare Shortages and Operational Problems (GAO/NSIAD/AIMD-99-77, Apr. 29, 1999).

official's view, this rate is not adequate to support the new initiatives that require a 90 percent or more availability rate. According to AFMC headquarters logistics personnel, the extent to which items critical to repairs are provided on a timely basis cannot be easily evaluated with current data, but the answer is key to the success of the new initiatives.

The new initiatives have increased the need for significant changes in business relationships between AFMC and DLA. As AFMC implemented the enhancement initiatives, it sought accelerated deliveries of repair parts and transportation of items to and from the customers. Negotiations have taken place between DLA and AFMC to develop an updated support agreement to ensure that parts are made available on an expedited basis, as needed, to support the new initiatives. However, AFMC headquarters and DLA have not been able to agree on the details of the new agreement. According to an AFMC headquarters official, progress in negotiating an agreement for DLA support of the enhancement initiatives has been slow and difficult, with little progress since early 1998. Neither AFMC headquarters nor DLA officials were optimistic about when an agreement would be reached. AFMC headquarters officials said that they want an agreement that specifies support arrangements and contains measures that will be used for evaluating DLA supply support performance. On the other hand, DLA officials want an agreement that contains broader, more general language to allow flexibility in support arrangements. Also, in contrast to AFMC headquarters, which wants each center to receive individual attention, DLA wants only one operating agreement covering both AFMC headquarters and its centers.

Aside from negotiations over the interagency agreement, AFMC headquarters officials expressed concern over specific aspects of their working relationship with DLA that were often rooted in problems associated with their management information systems.

According to headquarters officials, AFMC's working relationship with DLA could be improved in areas such as supply quantity and ownership data, visibility of orders and location of parts, questionable cost charges, and reconciliation of discrepancies between the two organizations' databases. AFMC headquarters officials said that these issues have caused the centers and DLA to take time-consuming and costly actions to manually intervene and work around problems. For example, AFMC's systems, in

particular the requisitioning for inventory system,<sup>13</sup> do not interface with DLA's new automated system for inventory management. The new system includes the tracking and reporting of stock transactions between the two organizations. Manual intervention is required to match item numbers, quantities, and ownership information.

AFMC headquarters and the centers have identified numerous discrepancies between their records and DLA's since DLA brought its new system on line at the three centers between August 1997 and January 1998. The three centers reported progress in resolving these discrepancies. For example, since the new DLA system was implemented, the three centers reported making inventory record adjustments totaling \$4 billion to reconcile records, stock orders, and requisition returns between the centers' records and DLA records.

DLA officials said that in addition to the new systems, the Air Force has a number of legacy systems that do not interface effectively with DLA's automated supply systems. This lack of effective interface is causing some problems at the center level with timely receipt of orders. Also, DLA and the Air Force have not yet settled on what performance indicators to use and how they will be tracked to evaluate problems existing in supply and transportation support. However, DLA officials said that DLA fully supports the Air Force's initiatives and is working with the centers to improve supply support.

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### Opportunities to Increase Use of Best Inventory Management Practices

In recent years we have recommended that DOD consider the use of prime vendors<sup>14</sup> and other best management practices to improve supply support responsiveness and reduce the cost of DOD's logistics system. The services and DLA have pursued a number of initiatives to improve supply support of weapon system parts and components, including limited use of prime vendors, but significant supply support weaknesses remain.

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<sup>13</sup>This system is called the DO35. It is the Air Force's Stock Control and Distribution System. This system tracks depot supply stocks and their distribution and provides information on backorders, supply balances, daily transactions, and floating stock balances.

<sup>14</sup>A prime vendor is a single vendor that buys inventory from a variety of suppliers and stores the inventory in its warehouses until ordered by the customers. The prime vendor then ships the inventory to the DOD activity as ordered. This process is intended to improve support to the customer by reducing delivery time and reducing costs for maintaining, warehousing, and distributing inventory.

Starting in 1993, DOD began prime vendor initiatives for the procurement of items readily available in the commercial sector, such as medicines and food products. DOD has reported benefits such as inventory reduction; reduced response time; and reduced purchase, storage, and distribution costs. We have recommended that DOD expand its prime vendor initiatives to other areas, including the supply of parts and components required in the depot maintenance process.<sup>15</sup> To date DOD has made limited progress in this area. Recently, the Congress enacted legislation requiring DLA and the military services to develop and submit schedules for implementing best commercial practices in their acquisition and distribution of inventory items.<sup>16</sup> The legislation calls for the implementation of best practice initiatives to be completed within the next 3 years in the case of DLA and 5 years for the services. We are currently reviewing the implementation of these initiatives.

DOD officials have observed difficulties in effectively using prime vendors to provide spare and repair parts for several weapon system programs. They noted that military-unique items with low or infrequent demand do not lend themselves to the new management concepts embodied in the commercial sector's prime vendor programs. Thus, it is uncertain how cost-effective this concept will be in supplying military-unique items with uncertain requirements and only one customer. On the other hand, it remains a viable option that merits further consideration as the Department continues to strive to improve its spare and repair parts supply support responsiveness.

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## New Vision for Logistics Management

In January 1998, the Air Force announced a new vision for its logistics management that builds on its current initiatives. However, it is not clear from the new vision statement how the Air Force is going to deal with the specific problems identified in this report related to the initiatives already under way.

In response to two recent Air Force studies addressing implementation of Agile Logistics, the Air Force established a new vision for its logistics management program. More specifically, in January 1998, the AFMC

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<sup>15</sup>Inventory Management: Greater Use of Best Practices Could Reduce DOD's Logistics Costs (GAO/T-NSIAD-97-214, July 24, 1997).

<sup>16</sup> Section 347 of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (P.L. 105-261).

Commander presented five major goals for changing logistics management policies and practices. These goals were to

- set appropriate inventory levels and fill them;
- match repair to demand;
- develop better cost estimates and use them to cost-effectively execute inventory actions and the concept of repairs on demand;
- quickly identify and react cost-effectively to surprises; and
- continuously reduce total costs, improve cost estimation, and reduce cycle times.

Although these goals appear to be consistent with its enhancement initiatives, AFMC headquarters has not yet provided a detailed plan for implementation of this vision. An effective implementation plan should provide details regarding how to achieve these goals. Further, such a plan should identify whether, and to what extent, the command will address needed improvements in the implementation and management of the depot, contract, and aircraft enhancement initiatives.

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## Conclusions

Progress in implementing the initiatives is difficult to measure because only broad goals of increased operational efficiency and reduced costs were established, along with an approach to implementing the initiatives. No agreed upon metrics were established for measuring progress in implementing the initiatives. Moreover, available data indicates only limited progress has been made in implementing the initiatives, and decisions are yet to be made regarding the extent to which the initiatives should be applied to all reparable items and aircraft. Also, implementation of the initiatives has been affected by various management problems, including limited implementation of standard organizational structures and processes, lack of a multiskilled workforce training plan, lack of standard measures to assess performance, inadequate automated management information systems to support analysis and decision-making, and lack of reliable information on investment costs and expected savings. Progress has also been hampered by incomplete action on reaching agreements that are essential for achieving program goals (such as identifying ways to improve supply support from the Air Force Supply Group and updating AFMC's support agreement with DLA). To what extent other options, such as prime vendor, offer a viable alternative to mitigate supply support weaknesses remains to be determined.

AFMC has recently set forth a new vision for logistics reform that appears to be consistent with the goals for its three enhancement initiatives.

Although over a year has passed since the vision and goals were announced, the Air Force has not yet provided details on how these goals will be achieved. Precisely how AFMC headquarters plans address implementation and management problems we identified is unclear. Without a detailed implementation plan, it is unclear whether or to what extent the new vision may further the Air Force's objective of improving the economy and efficiency of its logistics system.

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## Recommendations

We recommend that the Secretary of Defense direct the Secretary of the Air Force to require the Air Force Materiel Command to refine and improve its implementation and management of the three reengineering initiatives by taking the following actions:

- Develop an implementation plan that details the specific criteria for determining if the initiatives are successfully achieving stated goals and desired results.
- Determine the extent to which the enhancement initiatives should be applied to all reparable items to ensure optimum benefits.
- Assess progress in implementing the standardized organizational structures and processes and the extent to which they are achieving the objectives of better teamwork.
- Develop and implement a transition plan to ensure sufficient numbers of trained multiskilled personnel are available to meet requirements and produce needed operational efficiencies.
- Upgrade automated management information systems needed to support the initiatives in keeping with DOD and Clinger/Cohen Act requirements associated with acquiring information systems support and ensuring Year 2000 compliance.
- Develop and implement improved strategies for providing more effective supply support to depot maintenance customers, including the exploration of prime vendor or other best inventory management practices and agreements with the Air Force Supply Group and DLA.
- Reassess the extent to which costs have been fully identified and budgeted to avoid funding shortfalls and to ensure that operating funds are not prematurely reduced in anticipation of savings from the initiatives.

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## Agency Comments and Our Evaluation

We requested comments on a draft of this report from the Secretary of Defense. Air Force officials provided oral comments, stating that the Department agreed with our findings and with the intent of our recommendations. In acknowledging that measures were needed to better ensure success of its reform initiatives, the Air Force offered a general description of actions it had taken or planned to take to improve the reengineering of its industrial operations.

However, given the general nature of the comments, it is uncertain to what extent the Air Force will address the concerns we have raised. For example, the Air Force said it would address the need for an initiative implementation plan through a DOD-wide planning effort. We reviewed a draft of the DOD-wide plan and could not determine how the Air Force's initiatives were addressed. We had similar type questions regarding other points made by the Air Force and they are presented in appendix II.

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# Recent Air Force Studies on Agile Logistics

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Two recent Air Force studies on the Air Force's Agile Logistics initiatives provide additional insight into problems experienced with implementation of Agile Logistics: (1) a December 1997 report by the Air Force Inspector General (IG) on the implementation and maturity of Agile Logistics and the effect on combat readiness and (2) a March 1998 report by a Repairable Spares Management Board. The Board consisted of a group of active and retired military representatives and private industry representatives appointed by the Commander of Air Force Materiel Command (AFMC) to identify management changes that the Air Force could implement within the next 12 to 24 months to help reverse negative performance and financial trends associated with repairable spares management.

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## Air Force Inspector General Audit Report

Key findings of the Inspector General's December 1997 report included .

- Three special factors skewed the results of the prototype depot initiative that were difficult to duplicate for subsequent shops: additional resources, high priority handling and movement of assets destined to the shops throughout all segments of the logistics pipeline, and a funding anomaly.
- The Air Force needed usable, meaningful measures that are deployed and used throughout the logistics community because, overall, the current Agile Logistics measures process was not effective. The IG found that AFMC and the centers had jointly developed measures, but only two centers knew of specific measures and no center used the AFMC developed package as the measures baseline. Selective measures were being used but few personnel knew of these measures, how to track them, or the source of the data.
- The centers used temporary arrangements to reorganize their workforce. Long-term support of the depot initiative requires movement of workers from one organizational area to another (matrixing) and having some workers qualified to perform additional duties (multiskilling). However, reclassification actions were not accomplished to formally allow matrixing and multiskilling.
- The centers implemented the depot initiative in spite of system deficiencies. System limitations and inaccurate data were the largest barrier to success. Erroneous data entry, time disconnects, and software errors corrupted the information generated by existing computer systems. The depots did not have an operational network to fully implement the depot initiative and without the benefit of an approved network layout, had some network infrastructure in place, had acquired some, and had other purchases planned. Funding was not available for

all network requirements and funding requirements had not been identified for personal computer upgrades.

- The Defense Logistics Agency (DLA) was critical to the success of Agile Logistics and the duties and responsibilities for both DLA and the Air Force must be clearly defined and achievable. The scope of DLA responsibilities to support agile logistics was not clearly defined and the significant ramifications and costs of these changes were not sufficiently addressed to ensure DLA could respond to Air Force needs.
- People across the board showed dedication, flexibility, and adaptability as their logistics world fundamentally changed. However, the level of buy-in varied widely at the commands and few knew the overall flow or were aware of long term changes due to Agile Logistics. Also, Agile Logistics was poorly understood at the field level due to the lack of adequate policy and guidance, which also hindered the long-term success of Agile Logistics.

The IG's report noted corrective action underway by AFMC. For example, AFMC had taken action to adopt a more realistic schedule to develop and test automated system changes, to scrub information sources and data bases and correct erroneous data, and awarded a contract to correct problems with EXPRESS. The report also made a number of recommendations addressing each of its findings. For instance, the report recommended that AFMC (1) specify DLA requirements to support Agile Logistics implementation, (2) jointly, with DLA, determine the cost for DLA to meet Air Force requirements, and (3) negotiate and formalize coverage of Agile Logistics in the agreement between the Air Force and DLA. Although AFMC did not provide a formal written response to each of the IG's findings, conclusions and recommendations, it stated that corrective action would be taken as implementation of Agile Logistics matured.

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## Reparable Spares Management Board Report

In December 1997, the Commander of AFMC appointed the Board to focus on ways to improve AFMC's (1) financial management process that plans, programs, budgets for, and executes supply chain management activities, (2) performance measures, and (3) accountability in the supply chain. The Board's final report dated March 30, 1998, proposed a number of actions that the Air Force could initiate to improve the management of reparable spares. Overall, the Board concluded that the Air Force now faces the following problems that must be resolved quickly: (1) the requirements process, which defines what the Air Force should buy and repair, is broken and must be rebuilt; (2) the budgeting processes underestimate support costs and, as a result, fail to execute support budgets properly;

(3) obligation authority for logistics services is not executed cost-effectively; (4) new information systems under development will not support the seamless logistics system needed for the new environment; (5) despite all the changes, the Air Force has not reengineered any single process in its entirety to reflect the new environment; and (6) the basic management culture in AFMC resists change.

Some of the report's key findings were:

- Air Force logistics has changed fundamentally during the past 15 years, provoking many changes in logistics policy and practice. Although each change felt like a major adjustment at the time, the Air Force did not develop a system-wide vision to coordinate the changes. As a result, changes from the late 1980s and 1990s had only incremental effects and often unintended negative consequences.
- Changes resulting from Agile Logistics initiatives did not provide the cost savings necessary to meet budget reductions because “the Air Force often used unrealistic expectations about future performance, failed to anticipate implementation and transition costs, or double-counted cost savings.” With anticipated costs and savings overstated, the Air Force cut its support budget more than it cut support costs. Because the Air Force did not develop a system-wide vision, logistics managers cut support for discretionary activities faster than depot repair activities, delayed sending assets for depot repair as long as possible, and, where possible, postponed work from one fiscal year to the next.
- Individual organizations within the Air Force implemented the initiatives without the benefit of a coordinated, Air Force-wide look at how the required changes would fit together. Such initiatives required new forms of material management discipline that material managers were not prepared to provide. Thus, a set of uncoordinated changes, each producing unforeseen problems did not achieve all of the anticipated benefits.
- The Air Force had measures, but would benefit from a better understanding of how the commercial sector used measures to drive improvement in a supply chain.
- For the mid-term, EXPRESS can help the Air Force implement the repair on demand concept, but this concept required adequate capability to be available for a repair action to occur when a demand occurs. The Air Force needed a planning process that can anticipate future customer demands and mobilize all relevant processes to prepare for that demand. Such a concept is likely to work only if providers and

customers communicate with one another more effectively than today and have access to better analytic tools to support joint planning. Current Air Force plans for integrating its logistics information systems would not lead to complete integration.

- The Air Force cannot achieve a seamless logistics information management system as envisioned under Agile Logistics until it specifies which databases are to be shared and identifies common applications for base and depot-level maintenance and material management.
- In contrast to the experience of successful commercial firms, the Air Force initiatives will not succeed unless the leadership is committed to a program of long-term, strategic, system-wide change and, without this leadership, the planned logistics changes will become a few more incremental adjustments with little effect.

The Board made no specific recommendations for AFMC but suggested several actions that AFMC could consider for improving the management of reparable spares. Among these suggestions were that the Air Force leadership needed (1) clear top-down information on corporate goals, guidance on who is accountable for meeting these goals, and sufficient resources for achieving them, (2) training and other arrangements to ensure that communication and teamwork help link segments of the supply chain, and (3) a formal process to design changes to the logistics process and then implement, monitor, evaluate, and correct changes for system improvement. The Board suggested that the Air Force should (1) integrate its logistics information systems to allow all players in the logistics pipeline access to accurate and timely cost, schedule, and performance data and (2) improve discipline during data entry to significantly improve the accuracy of data produced by automated systems. Also, the Air Force should use a small number of system measures to define and potentially quantify the broad goals of the organization as a whole, motivational measures for specific teams or managers to apply to particular situations, and diagnostic measures to help decisionmakers track particular processes in order to diagnose and overcome problems with pursuing motivational measures.

The Board noted that the Commander of AFMC was initiating a new management approach that, if properly implemented, should allow AFMC to address the problems noted by its report. AFMC made no formal written response to the Board's findings and suggested actions.

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# GAO Evaluation of Air Force Comments

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Presented below is our evaluation of the specific oral comments provided on a draft of this report.

1. Concerning our recommendation to develop a detailed implementation plan, the Air Force stated that it has begun implementing the three enhancement initiatives as outlined in DOD's report Product Support for the 21st Century, which covers current and future logistics reform initiatives. We examined the Air Force's input to a March 1999 draft of this report because no final report had been issued. Information in that draft provided some general information on the overall objectives and goals of the Air Force's Agile Logistics program. However, this input did not relate what plans the Air Force had to better manage the implementation and execution of either the existing enhancement initiatives or those being planned for the future. With only this information, we cannot determine to what extent the Air Force intends to address the specific problems discussed in our report.
2. Regarding our recommendation that a determination be made concerning whether the enhancement initiatives should be applied to all reparable items, the Air Force said it is making such an assessment. While the Air Force officials stated that all aircraft would be included in the aircraft initiative, the Air Force did not identify the criteria it used in making that determination.
3. Regarding our recommendation concerning the use of standardized organizational structures and processes to help achieve the objectives of the enhancement initiatives, the Air Force agreed that greater standardization might improve the effectiveness and efficiency of depot operations. However, it noted that process flexibility may be needed in some instances to ensure readiness. The Air Force did not indicate whether it would require its depots to comply with standard processes and organizational structures or the basis on which the depots would be allowed to deviate from standard requirements.
4. Regarding our recommendation for the development and implementation of a transition plan to ensure sufficient numbers of trained multiskilled personnel, Air Force officials said they recognized the importance of a multiskilled workforce to enhance operational efficiencies. However, they did not identify a plan for developing a multiskilled workforce or say when this training would be completed, what worker classifications were needed to be multiskilled, or how the training would be accomplished. We would expect a multiskilling plan to have these types of details.

5. Regarding our recommendation to develop standard measures to evaluate the three enhancement initiatives, Air Force officials stated that they were developing such measures. However, they did not indicate how they plan to resolve the long-standing impasse between AFMC and its centers on the appropriate criteria for measuring the effectiveness of the initiatives. Also, they did not indicate either a time frame for developing and implementing the measures or features of the initiatives that would be monitored and evaluated. In finalizing our report we combined this recommendation with our first recommendation to address goals and results.

6. Regarding our recommendation to upgrade automated management information systems needed to support the reengineering alternatives, Air Force officials said they were now developing new logistics systems that will communicate together, share data, and have common applications. They said that these new systems will be consistent with the Clinger/Cohen Act and be Year 2000 compliant. They did not specifically address the automated system weaknesses identified in our report or indicate how the new systems correspond to the Air Force's actions taken or planned to improve automated systems support for the three enhancement initiatives.

7. Regarding our recommendation to develop and implement improved strategies for providing more effective supply support to depot maintenance customers, Air Force officials stated that AFMC is already engaged with DLA on prime vendor initiatives. However, it is not clear how current initiatives would address specific problems identified in this report. Also, the officials did not address how or when it planned to improve the support from its supply management group.

8. Finally, regarding our recommendation to reassess the extent to which costs for the enhancement initiatives have been fully identified, Air Force officials did not comment on any reassessment of funding requirements. At the same time, they said they did not have a system for tracking savings by individual initiatives. They also stated that in a resource-constrained environment, the Air Force has no alternative to taking savings based on the best estimates known at the time to fund high-priority requirements. However, the resource-constrained environment the officials described makes it important to avoid reducing operating accounts in anticipation of savings that may not be realized.

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# GAO Contacts and Staff Acknowledgments

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## **GAO Contacts:**

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## **Acknowledgments**

In addition to those named above, Bobby Worrell, Terry Wyatt, Bruce Fairbairn, and Frederick Naas made key contributions to this report.



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# Related GAO Products

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Army Industrial Facilities: Workforce Requirements and Related Issues Affecting Depots and Arsenals (GAO/NSIAD-99-31, Nov. 30, 1998).

Air Force Supply Management: Analysis of Activity Group's Financial Reports, Prices, and Cash Management (GAO/AIMD/NSIAD-98-118, June 8, 1998).

Outsourcing DOD Logistics: Savings Achievable but Defense Science Board's Projections Are Overstated (GAO/NSIAD-98-48, Dec. 8, 1997).

Defense Depot Maintenance: Challenges Facing DOD in Managing Working Capital Funds (GAO/T-NSIAD/AIMD-97-152, May 7, 1997).

Defense Depot Maintenance: Uncertainties and Challenges DOD Faces in Restructuring Its Depot Maintenance Program (GAO/T-NSIAD-97-112, May 1, 1997) and (GAO/T-NSIAD-97-111, Mar. 18, 1997).

Best Management Practices: Reengineering the Air Force's Logistics System Can Yield Substantial Savings (GAO/NSIAD-96-5, Feb. 21, 1996).