

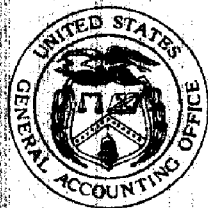
GAO

Report to the Chairman, Subcommittee
on Oversight of Government
Management, Committee on
Governmental Affairs, U.S. Senate

June 1994

COMMERCIAL PRACTICES

DOD Could Reduce Electronics Inventories by Using Private Sector Techniques



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**National Security and
International Affairs Division**

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June 29, 1994

The Honorable Carl Levin
Chairman, Subcommittee on
Oversight of Government Management
Committee on Governmental Affairs
United States Senate

Dear Mr. Chairman:

This report was prepared as part of your request that we continue to compare commercial logistics practices with similar Department of Defense operations. It summarizes the results of our review of inventory management practices used by leading private sector companies and the Department of Defense to provide electronics supplies. It describes various private sector initiatives that could be applied to the Department of Defense's maintenance and repair facilities.

We plan no further distribution of this report until 30 days from the date of the report, unless you publicly announce its contents earlier. We are sending copies of this report to appropriate congressional committees; the Secretaries of Defense, the Air Force, the Army, and the Navy; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others on request.

If you have any questions, please call me on (202) 512-8412. Other major contributors are listed in appendix II.

Sincerely yours,

A handwritten signature in cursive script that reads 'Donna M. Heivilin'.

Donna M. Heivilin
Director, Defense Management and
NASA Issues

Executive Summary

Purpose

The value of the Department of Defense's (DOD) secondary inventories, which include spare parts for weapon systems, electronics, and other hardware items, increased by \$60 billion between 1980 and 1988. Because of this significant increase, the Chairman, Subcommittee on Oversight of Government Management, Senate Committee on Governmental Affairs, asked GAO to compare DOD's logistics practices with similar practices of private industry.

In previous reports, GAO identified ways that DOD could incorporate commercial logistics practices to better manage its inventories of aircraft engines, medical items, food, clothing, and maintenance and repair supplies. In this review, GAO focused on DOD's logistics practices for electronics supplies used at maintenance and repair facilities. GAO's specific objectives were to (1) compare DOD's inventory practices with innovative private sector practices and (2) determine the extent to which DOD has adopted commercial practices to achieve cost savings, while still meeting customer needs.

Background

The Defense Logistics Agency (DLA) is responsible for providing logistics support, including procuring, stocking, and issuing items to the military services and other government agencies for their use. DLA manages over 1 million electronics items such as resistors, fuses, switches, computer supplies, and communication equipment. As a wholesaler, DLA generally buys electronics supplies in large quantities, stores them until they are requested by the military services, and then ships them to the appropriate service facility. In fiscal year 1993, DLA purchased about \$344 million in electronics items from suppliers. The military services store these same electronics supplies at repair centers or bases, where the supplies are used to maintain and repair such things as radar and navigation aids and communication systems. These service facilities are comparable to a number of private sector companies because they use similar supplies in large quantities to maintain and repair machinery and equipment. Service facilities and private sector companies share similar challenges in their management of these supplies, namely to be responsible to the needs of the end user and to control operating costs as prices for supplies escalate.

Results in Brief

Private sector companies are streamlining their logistics operations by adopting innovative inventory management strategies that reduce costs and improve the quality of service. However, in most areas DOD has not streamlined its operations and continues to buy and store redundant levels

of electronics items, valued at over \$2 billion. DOD's practice of storing multiple layers of electronics inventories at DLA and service facilities increases the amount of inventory held. The size of DOD's electronics inventory reflects, in part, a philosophy of meeting customer needs by having large stocks on hand. DLA's large inventory (1) turns over slowly (about once every 4 years on average), (2) contains large levels of excess or obsolete items, and (3) costs DOD millions of dollars each year to hold.

During the past decade, many private sector companies have adopted modern inventory management practices that have significantly reduced electronics inventories, decreased procurement times, and saved millions in associated operating costs while improving the availability of stock. The companies rely on established commercial distribution networks to manage, store, and directly deliver inventory on a frequent, regular basis.

DOD is working to improve its logistics system. DLA has used private sector practices (long-term contracting, electronic ordering systems, and direct delivery programs) to manage some electronics supplies. Efforts to implement these practices, however, affect only a small portion of electronics supplies. DLA recently established a pilot program to test innovative commercial practices at two maintenance and repair facilities. Because this test will include electronics items, we are not making a recommendation in this report. Critical to DLA's success in increasing the use of commercial practices will be DLA's ability to (1) change its overall inventory management philosophy and (2) implement these practices while still meeting government procurement requirements. GAO believes that these tasks are challenging, but feasible.

Principal Findings

DOD Holds Costly and Excessive Inventories

DLA stores over \$2 billion of wholesale electronics supplies at 28 distribution depots and other storage locations. This large level of inventory reflects DLA's practice of buying and storing electronics supplies to ensure they are available to customers—sometimes several years in advance of when the supplies are actually needed. The turnover of DLA's electronics inventory is slow. GAO calculates that, on the basis of the approximately \$577 million of electronics supplies DLA issued to the services in fiscal year 1993, the wholesale inventory of electronics supplies would turn over once every 4 years. In comparison, private sector

suppliers often turn their stock over 4 times a year. The slow turnover of inventory costs DOD millions of dollars. By applying a rate that some private sector companies use to estimate costs for buying and storing inventory (estimated to be at least 15 percent or higher) to DOD's September 1993 electronics inventory, GAO estimates DOD's annual inventory cost to be as much as \$330 million.

DLA considers about 10 percent of its electronics inventory as excess. In fiscal year 1993, DLA disposed of over 123,000 different electronics items that it determined were excess to DOD's needs. DLA valued these items at over \$516.8 million on the basis of their latest acquisition cost. Of these 123,000 different items, over 39,000 items of them (valued at over \$48 million) had not had a demand from the services within the past 5 years. DLA officials estimated that DLA receives only about 2 percent of the items' latest acquisition cost once it disposes or sells excess electronics stock.

The military services hold a layer of these same electronics supplies in warehouses at or near their maintenance facilities until the supplies are needed by the mechanics or end users. GAO did not ascertain the dollar value of the inventory held at all of these facilities. However, three service locations GAO examined held electronics inventories that could last, on average, for 8 months to approximately 11 months. By holding inventory at this level, DOD compounds the slow turnover rate, high holding costs, and problems with excess stocks it experiences at the DLA wholesale level.

Private Sector Companies Have Reduced Inventory Costs

Many private sector companies have adopted modern inventory management practices, including long-term relationships with suppliers, direct delivery programs, and direct communication channels between suppliers and end users. With these practices, companies do not store supplies at intermediate handling and storage locations, as DOD does. Instead, they arrange for suppliers to deliver inventory items directly to the end user's facility close to the time when the items are needed.

One company GAO visited, Bethlehem Steel Corporation, reduced its maintenance and repair inventory (including electronics) by about \$16 million, or 71 percent, and estimates that it has avoided over \$47 million in inventory costs and related expenses since 1984. By establishing long-term agreements with 21 suppliers and giving them the responsibility to manage and deliver stock directly to end users, Bethlehem Steel (1) eliminated the need to store and distribute supplies

from a central warehouse, (2) increased its access to suppliers' technical expertise, and (3) consolidated and standardized the types of items used. Several other companies have developed similar techniques to reduce inventories of maintenance and repair items.

DOD Has Implemented Commercial Practices to a Limited Extent

DOD's primary initiatives for electronics supplies involve some combination of long-term contracting agreements, direct delivery of items from suppliers to the services, and electronic data interchange for streamlining the ordering process. The use of these initiatives allows DLA to (1) decrease procurement lead times, (2) increase accuracy in forecasting future item demands, (3) reduce paperwork, and (4) reduce inventory levels. While DLA has used these commercial practices, the initiatives have been limited in scope and represent only a small portion of its overall operations. For example, DLA used direct delivery programs with suppliers for approximately 4 percent of its annual orders for electronics items and purchased 3 percent of its items under long-term contracts (representing 17 percent of its total dollar obligations) in fiscal year 1993.

DOD agrees that inventories can be reduced and costs avoided through the use of commercial practices. In fact, in response to a recommendation GAO made in a 1993 report on maintenance and repair inventories,¹ DLA began a 15-month program in September 1993 at two military maintenance facilities to test commercial practices. According to DLA, electronics items will be included in the test.

DOD officials believe government procurement requirements complicate the use of commercial practices in DOD's logistics operations. These requirements, some of which are based on federal laws, serve a variety of objectives, including providing equal opportunity to all potential contractors and promoting social and economic programs. Despite the additional burdens these requirements might create, DOD has begun to incorporate commercial practices in its operations. These efforts suggest that DOD can satisfy procurement requirements as it establishes new inventory management practices. Also, there are several legislative proposals to reform the government procurement system that, if enacted, could make it easier for DOD to implement commercial practices.

Recommendations

GAO is not making any recommendations in this report.

¹Commercial Practices: DOD Could Save Millions by Reducing Maintenance and Repair Inventories (GAO/NSIAD-93-155, June 7, 1993).

Agency Comments

In commenting on a draft of this report, DOD generally agreed with the findings and conclusions and stated that increased use of commercial practices can lead to reduced inventories. DOD stated that DLA has initiated an aggressive program to adopt and implement the best commercial practices. For example, one of DLA's goals is to implement direct vendor delivery practices by fiscal year 1997 for half of all sales. DOD also stated that expanded use of commercial practices, such as long-term contracting and electronic ordering, will reduce inventory, lower costs, and improve response times.

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Abbreviations

DLA	Defense Logistics Agency
DOD	Department of Defense

Introduction

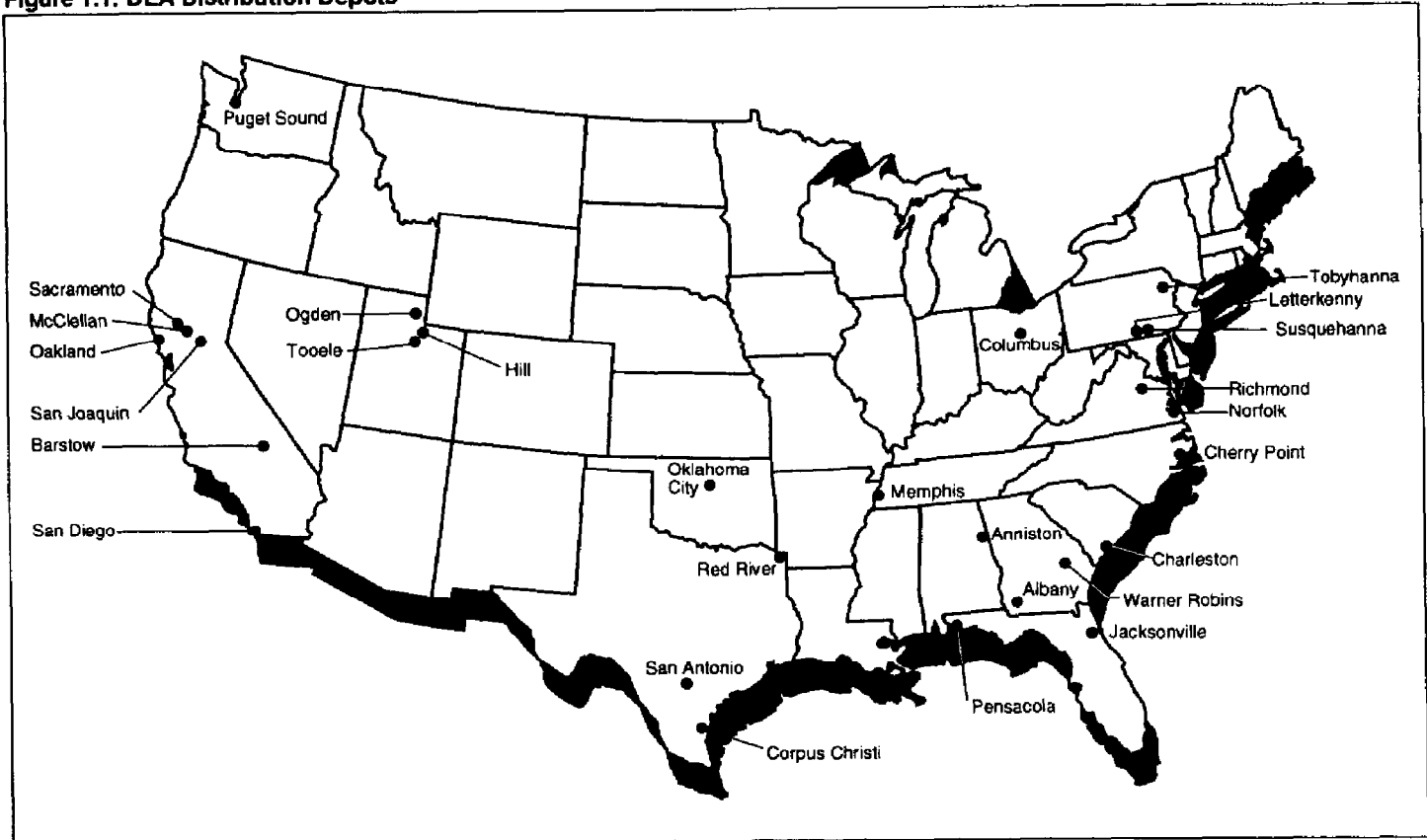
The Department of Defense (DOD) operates a worldwide logistics system that uses 1,400 warehouses at 28 distribution depots and other locations to provide supplies such as electronics, construction, and industrial items to the military services. For this report, we looked at electronics items managed and distributed to the services by the Defense Logistics Agency (DLA).

DOD's Supply System

The Secretary of Defense created DLA in 1962 to be the wholesale manager of "consumable supplies" commonly used by the military services, other DOD components, and federal agencies. Consumable supplies are items that are discarded after use rather than repaired. Through its wholesale system, DLA manages over 3.3 million consumable items, of which over 1 million are classified as electronics items, such as resistors, fuses, switches, computer supplies, and communication equipment. About 75 percent of the electronics items distributed by DLA in fiscal year 1993 had a unit cost of \$50 or less.

As a wholesaler, DLA generally buys electronics supplies in large quantities, stores items until they are requested by the services, and then ships the items to the service facility. DLA stores over \$2 billion of electronics items at 28 distribution depots and other storage locations throughout the United States. Distribution depots are DOD facilities with several large warehouses that store a variety of supplies. In fiscal year 1993, these depots, shown in figure 1.1, received over 115,000 shipments of electronics items from suppliers and filled over 2.2 million requests from the services for these supplies.

Figure 1.1: DLA Distribution Depots



Note: The Susquehanna and San Joaquin depots have facilities in more than one location.

Source: DLA.

The military services use large amounts of these electronics items to maintain and repair weapon systems and other equipment. For example, the three services operate a total of about 25 facilities that perform detailed, time-consuming maintenance of major weapon system components such as radars, navigation aids, and various types of communication equipment. Some of these facilities are collocated with DLA distribution depots. The services also store electronics supplies (known as retail inventory) in warehouses at or near these maintenance facilities. From these warehouses, electronics supplies are distributed to the

mechanics or end users when needed. The mechanics also hold some of these same items in nearby storage bins.

Objectives, Scope, and Methodology

On April 5, 1993, the Chairman, Subcommittee on Oversight of Government Management, Senate Committee on Governmental Affairs, asked that we examine DOD's logistics practices involving electronics supplies and identify commercial practices that DOD could adopt to improve its operations and reduce the costs of these supplies. Our specific objectives were to (1) compare DOD's inventory practices for electronics supplies with leading-edge private sector practices and (2) determine the extent to which DOD has adopted commercial practices to achieve cost savings, while still meeting customer needs. This report is the sixth in a series of reports comparing DOD's logistics practices with those of the private sector.¹

To obtain information on DOD's logistics practices, policies, and procedures, we contacted officials from the following organizations:

- Office of the Under Secretary of Defense, Logistics, Washington, D.C.;
- Headquarters, Defense Logistics Agency, Alexandria, Virginia;
- Defense Electronics Supply Center, Dayton, Ohio;
- Air Force Materiel Command, Dayton, Ohio; and
- Army Depot System Command, Letterkenny, Pennsylvania.

Our discussions focused on the current inventory management practices used by DOD for electronics supplies, any planned changes, and DOD officials' positions on the use of commercial practices as alternatives to current inventory practices. We reviewed and obtained detailed inventory statistics on annual usage amounts, inventory levels, and other relevant factors.

The private sector operates maintenance and repair facilities that require electronics items and other supplies. These facilities are similar to military service facilities, such as maintenance depots and weapon support centers, that operate at the retail level within the DOD supply system. Both private and military facilities at this level represent end users in the sense that they stock maintenance and repair supplies for their own consumption, rather than for distribution to other activities.

¹See Related GAO Products.

We focused our analysis of best practices at the maintenance and repair facilities level of operation. Accordingly, we visited two of DLA's largest electronics customers—the Naval Surface Warfare Center in Crane, Indiana, and the Tobyhanna Army Depot in Tobyhanna, Pennsylvania. At these two service facilities, we identified the size and characteristics of their electronics inventories, their supply needs, and the inventory practices they followed—including their interface with DLA. This information supplemented data we obtained from other service facilities during previous assignments.

To identify new inventory management systems being used by comparable facilities in the private sector, we visited Bethlehem Steel Corporation's Burns Harbor Plant in Chesterton, Indiana, and Martin Marietta Energy Systems, Inc., in Oak Ridge, Tennessee. These commercial facilities are comparable in size and function to military service facilities. They require a large volume of electronics and other supplies to maintain and repair machinery and equipment. Both firms had a reputation in the industry for having adopted advanced initiatives to reduce inventory costs. Specifically, we discussed the results of their initiatives, the impact they have had on supply operations, and the feasibility of applying these initiatives at DOD facilities. We also met with suppliers to these facilities, including WESCO in Hammond, Indiana; Berry Bearing Company in Gary, Indiana; and Resource Electronics in Oak Ridge, Tennessee.

We conducted a literature search to identify inventory management practices being used by private sector companies, and we examined information obtained during other GAO reviews comparing DOD's logistics practices to those of the private sector. This information includes inventory management practices used by PPG Industries, Inc., and The Timken Company. We did not test or validate DOD's inventory data. We conducted our review from April 1993 to March 1994 in accordance with generally accepted government auditing standards.

DOD Holds Significant Amount of Unneeded Inventory and Incurs Unnecessary Holding Costs

DOD holds a much larger inventory of electronics supplies than is needed to meet customer demands. DOD's inventory has a slow turnover rate and contains a significant level of obsolete or excess items. Buying and carrying such a large inventory is costly. DOD sells excess items for a fraction of their original cost. Somewhat less obvious, but more significant, are the overhead costs associated with maintaining stock that moves slowly. Several factors contribute to DOD's large electronics inventories and slow turnover, including (1) DOD's philosophy of relying on large stock levels at wholesale and retail locations to readily meet customer needs and (2) the long procurement lead times that require DOD to hold inventory to ensure that items are available until ordered supplies are received from suppliers.

DOD's Large Electronics Supply Inventory Moves Slowly

As of September 1993, DLA's wholesale electronics inventory was valued at over \$2 billion, as shown in table 2.1.

Table 2.1: DLA's Inventories of Electronics Supplies Managed by the Defense Electronics Supply Center (as of September 1993)

Dollars in millions	
DLA's electronics inventory	Dollar value^a
Resistors, capacitors, fuses, filters, and networks	\$179
Switches, connectors, and circuit breakers	369
Solenoids, relays, and transformer coils	228
Electron tubes	220
Microcircuits, semiconductor devices, and modules	267
Antennas, waveguides, and related equipment	139
Electronic assemblies, boards, cards, and associated hardware	167
Communication, radiation, and detection equipment, including headsets, handsets, microphones, and speakers	287
Aircraft, guided missiles, and fire control items	131
Other electronics and related items	211
Total	\$2,198

^aValued at latest acquisition cost.

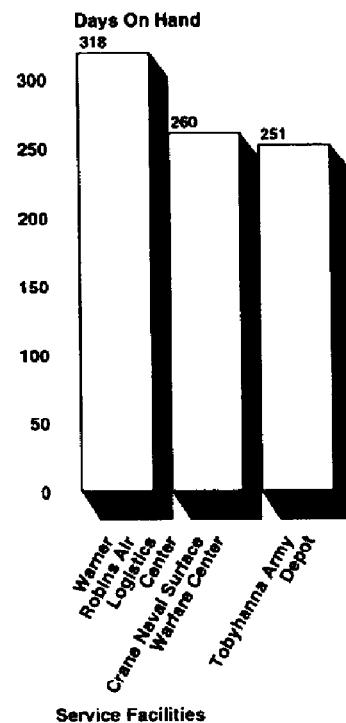
Source: DLA.

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DLA's turnover of electronics inventory is slow. The turnover rate is a measure of how efficiently a business uses its inventory investment and is expressed as the ratio of sales to average inventory. On the basis of the approximately \$577 million of electronics supplies DLA issued to the services in fiscal year 1993, we calculate that the wholesale inventory of electronics supplies would turn over once every 4 years. In comparison, private sector suppliers often turn their stock over four times a year.

In addition to DLA's wholesale level, each service holds an additional layer of electronics supplies at its repair facilities. When end users need electronics supplies, the supplies are sent from the DLA warehouse to the military service facilities. The services order material from DLA using forecasts based primarily on the past usage rates of repair operations. The services then store these same electronics items in retail warehouses. We calculated the number of days it would take three service facilities to use the electronics supplies stored in their warehouses, on the basis of the usage rates for a recent 12-month period (see fig. 2.1).

Figure 2.1: Days of Inventory Supply at
Three Service Facilities



Source: GAO analysis of military service data.

As the figure shows, these three facilities stored enough retail inventory to last from 8 to almost 11 months. We did not ascertain the dollar value of the inventory held at all retail facilities.

A Significant Amount of DOD's Electronics Inventory Is Excess

As of September 1993, DLA categorized \$231.4 million of its electronics inventory, or 10.5 percent, as excess. Excess items are those that DOD determines are no longer needed in the inventory and can be disposed of or sold at salvage prices to other government agencies or the general public. During fiscal year 1993, DLA disposed of or sold 123,114 items of excess inventory valued at its latest acquisition cost of \$516.8 million. Over 39,000 of these items—valued at \$48.2 million—had not had a demand from the services within the past 5 years. Disposing of unneeded inventory results in smaller inventories and lower holding costs in the future, but the

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salvage value returns only a fraction of the cost incurred in buying and holding the inventory. For example, DLA officials estimated that DLA receives only about 2 percent of the items' latest acquisition cost once it disposes or sells excess electronics stock.

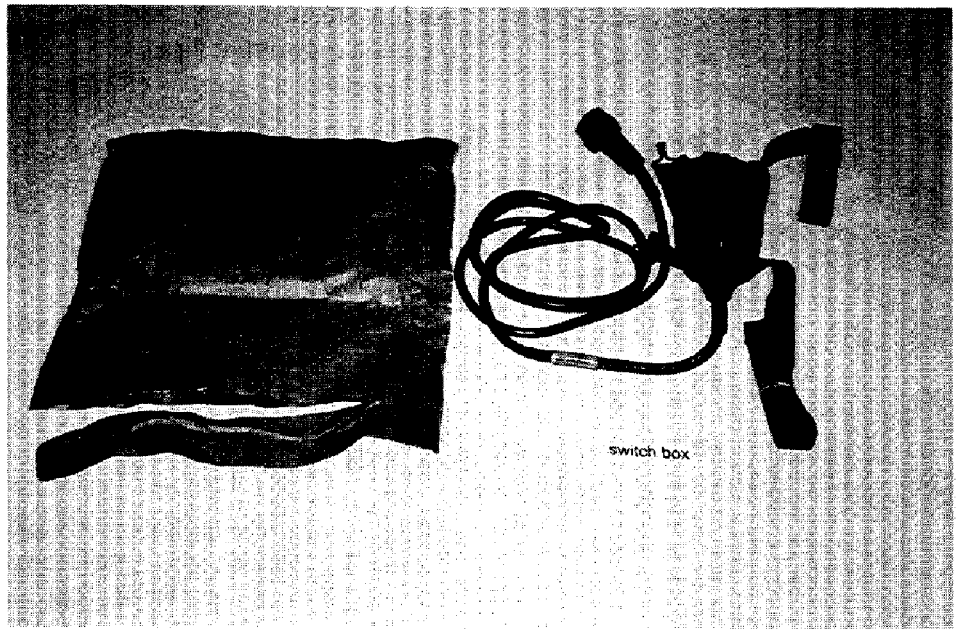
Excess inventory occurs principally because DOD tries to forecast the services' requirements far in advance using past demand as its guide. Past demand, however, is often not an accurate indication of the services' future needs. The services' demands often decrease from year to year due, for example, to the modification or retirement of a weapon system. DOD's efforts to downsize will add to a general decrease in demands for many items as weapon system operating levels decrease and troop reductions occur. In addition, when DLA and the service facilities store supplies for too long, they can deteriorate or become obsolete because of technological advances.

Following are five examples of electronics items that, while perhaps among the more extreme cases, nonetheless illustrate the problems confronting DOD's supply system.

- DLA currently has 18,289 switch boxes in storage, valued at \$1,755,744. The agency last bought these boxes about 7 years ago. In the past 5 years, DLA has issued only 152 of them to the military services and expects to issue only 4 more in the next 12 months. DLA has stored the switch box shown in figure 2.2 for over 25 years.

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Figure 2.2: Switch Box—Used to
Connect Headsets and Microphones to
Radio Equipment



- DLA is storing 23,629 circuit breakers, valued at \$1,181,923. DLA last bought circuit breakers in March 1991, when they were expected to be used to repair and maintain the B-52 aircraft. Through the first 10 months of fiscal year 1993, DLA issued 334 circuit breakers. On the basis of forecasted demands, DLA expects to issue 552 circuit breakers during the next 12 months. At this rate, DLA will hold this inventory for over 42 years. Therefore, DLA has classified 17,781 of the circuit breakers, valued at \$889,406, as excess inventory.
- DLA made its last purchase of variable resistors, which are used on F-14 and A-6 aircraft, in 1985. As a result of a significant decrease in demand from 1,318 variable resistors in 1984 to 75 resistors in fiscal year 1993, DLA disposed of 12,565 resistors, valued at \$348,553. DLA still holds 1,355 resistors valued at \$37,588, and, on the basis of past usage rates, DLA could hold them for another 18 years.
- In fiscal year 1993, DLA disposed of 22,470 capacitors valued at \$82,914 because the services had only requested one capacitor in the past 2 years. These capacitors, which are used on communication equipment on various Navy ships, were last purchased in 1974 and have been stored in DOD

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warehouses since that time. DLA plans to retain 254 of them to meet future demands from the services.

- DLA has stored 10,762 multimeters valued at about \$658,527 since it last bought the item from a vendor in 1987. DLA experienced a significant decrease in demand for multimeters from 7,417 units per year in fiscal year 1986 to 192 units in fiscal year 1992. According to an official, DLA suspended the issuance of these multimeters in September 1992 because many of these items had been stored for such long periods in sealed packages that they corroded and became brittle. As a result, this material must be either disposed of or repaired to a usable condition. Figure 2.3 shows an example of a multimeter stored by DLA.

Figure 2.3: Multimeter—Used to Measure Electrical Voltages



Excess items are held at the retail level as well. During our visits to service repair facilities, we found items in storage bins—such as rotary switches, tubes, connectors, and capacitors—that were over 10 years old. At the time of our review, the Tobyhanna Army Depot reported that almost \$1.5 million, or 17.4 percent, of the electronics items it held were excess to its needs. The depot also reported that it had disposed of over \$1.9 million of electronics items during fiscal year 1993 that it determined were no longer needed to meet requirements. The disposed material included items

such as 1,068 microcircuits valued at \$82,866 and 9,300 resistors valued at \$54,219. At another depot, an electrical coil had been in DOD's supply system since 1957.

DOD's Inventory Practices Result in Significant Costs

DOD incurs significant inventory costs by buying and storing electronics supplies to ensure they are available to meet customer needs. Because DOD's accounting systems are not designed to capture the total cost of its logistics system, DOD is unable to provide an estimate of the actual total costs associated with investing in over \$2.2 billion of electronics stocks. In December 1993, DLA calculated the costs to store electronics supplies at about \$15 million on the basis of a cost per square foot of occupied storage space. However, there are additional costs associated with DLA's large investment in electronics supplies other than storage costs, even though DOD's accounting systems do not currently capture these costs.

The costs associated with buying and storing inventory include a finance charge for borrowing funds to purchase the inventory, storage costs, and a cost for losses due to forecast errors and obsolescence. These costs most often occur when inventory is bought and stored well before the items are actually needed. While it is difficult to precisely determine these costs, some private sector companies have estimated them to be least 15-percent, or higher, of the average annual inventory value on hand. To estimate what these additional annual costs could be for DOD, we applied a 15 percent rate to DLA's electronics inventory. On the basis of this calculation, we estimate that DLA's annual inventory costs could be as much as \$330 million. This estimate excludes costs associated with inventory held at the retail level by the service facilities.

DLA does charge its customers 34.7 percent above the original cost of the electronics supplies to account for inflation costs and recoup operating and other related expenses. This charge becomes a part of the services' total costs of performing operations and maintenance activities. In fiscal year 1993, this surcharge amounted to over \$175 million for electronics items.

Several Factors Contribute to DOD's Unnecessarily Large Inventory

DOD's multilayered supply system is a key factor contributing to the large inventories of electronics supplies. DOD's large inventory of electronics supplies, in part, reflects a philosophy in which customers' needs are met by having a large supply of items readily available. DOD meets its customers needs by holding inventory at both the wholesale and retail

levels, which increases the amount of supply on hand and drives up the cost of holding inventory. This is a philosophy that private firms have moved away from in an attempt to lower the cost of doing business, provide better service, and remain competitive.

Another related factor is DLA's practice of procuring electronics items using long-range forecasts based on past demands from the services. DLA uses long-range forecasts because the procurement lead time for electronics items is over 10 months. That is, on average, it takes about 10 months from the time a need for an item is identified by an inventory manager until the item is received in a supply depot. As a result, DLA holds inventory to meet the service's needs and to ensure that items are available until ordered supplies are received from suppliers. The longer the procurement lead time, the more on-hand and on-order stock is needed to meet customer demands and ensure a continuous supply of stock items. If the expected demand for these items decreases or does not materialize, inventories may not be needed.

DLA divides its procurement lead time into two segments. First, about 4 months comprises administrative activities, such as soliciting, evaluating, and awarding contracts. These activities take place when DLA orders supplies because, for the most part, DLA's contracts with suppliers are short-term.¹ Because DLA wants to have short-term control over contracts, most contracts have a duration of 1 year or less, forcing DLA to frequently repeat the contract cycle and the associated administrative lead times.

The other 6 months of lead time comprises supplier production and delivery activities. Because many suppliers have short-term relationships with DLA, they do not regularly base their production schedule on DLA requirements. When DLA contracts with a supplier to produce large quantities of electronics items, the supplier is often not prepared to immediately produce and deliver them. As a result, suppliers may have to re-establish production capability each time they renew a contract, thus increasing production lead times.

In commenting on a draft of this report, DOD indicated that, although it is adopting commercial practices to meet its mission requirements, there are items with commercial support arrangements that may still require some

¹In fiscal year 1993, DLA purchased only 3 percent of its electronics items under long-term contracts, or 17 percent of its total dollar obligations.

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inventory on the shelf to meet emergency or geographic requirements or to support minimum shipping quantities of small vendors.

Commercial Logistics Practices Have Reduced Inventory Costs

During the past decade, many private sector companies have streamlined their inventory management operations to reduce inventories and associated operating costs. These companies have adopted leading-edge strategies that shift responsibilities for storing and managing inventory to suppliers. Some companies no longer store supplies at all; suppliers deliver these companies' supplies as they are needed. Some key techniques companies are using to eliminate the need to store inventory include (1) establishing long-term relationships with suppliers, (2) improving communications channels between end users and suppliers, and (3) establishing direct delivery programs.

Private Sector Companies Have Changed the Way They Buy, Store, and Deliver Supplies

Many private sector companies believe that holding large inventories can obscure problems such as low product quality, operational inefficiencies, and inaccurate or inadequate inventory information. Private sector companies have recognized that inventories can be reduced without affecting supply availability. To accomplish this, companies have developed new logistics practices.

A major characteristic of these new logistics practices is the way the companies buy supplies. Companies have reduced the number of suppliers they use by establishing long-term agreements with only a few key suppliers. Typically, suppliers are contracted to provide a company's supplies for a particular commodity. Thus, most of the management responsibilities are shifted from the company to the suppliers. The suppliers take on these responsibilities because they are promised a long-term relationship with the company.

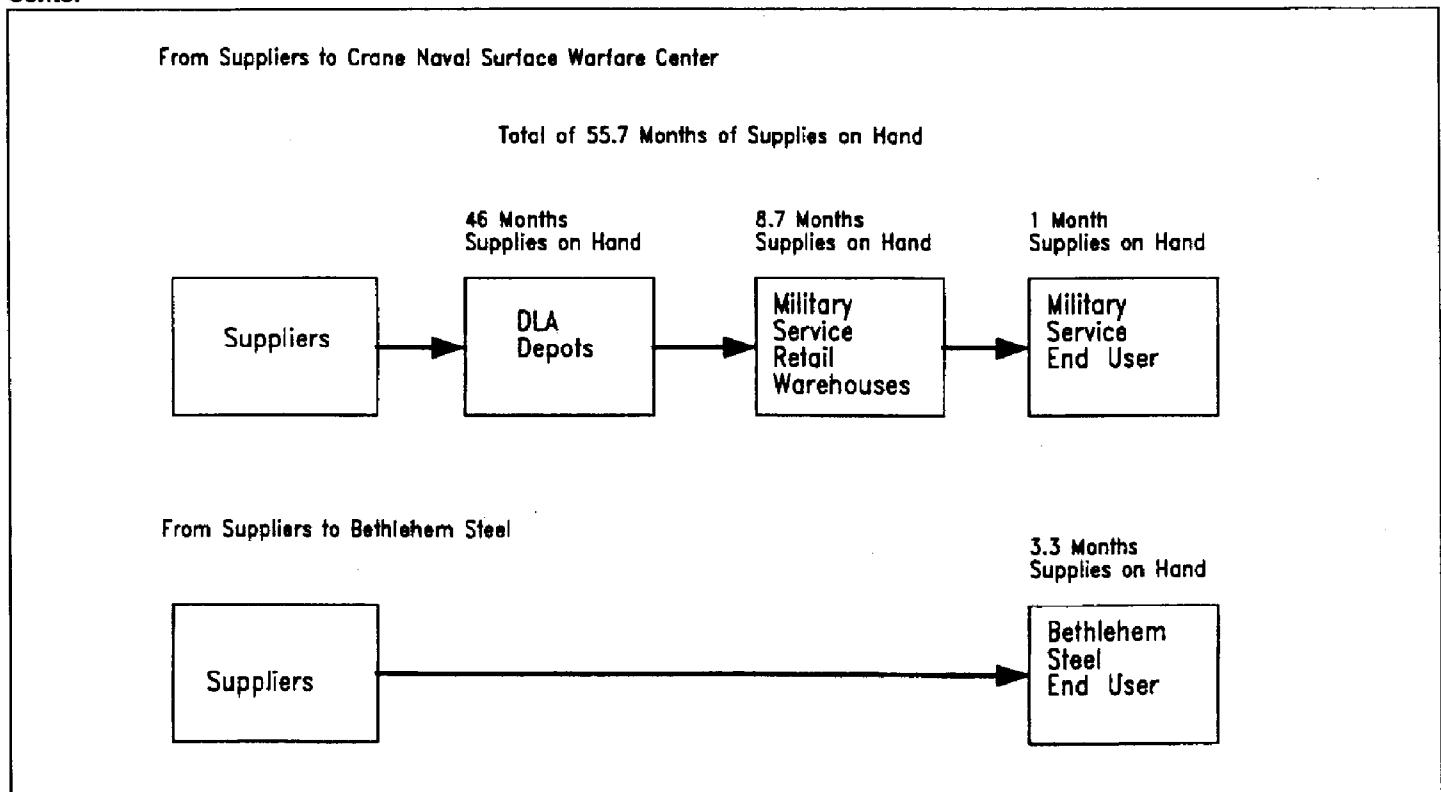
Other steps companies have taken to change their inventory management practices include using direct delivery programs. By using direct delivery programs, companies bypass the need for intermediate storage and handling locations. Once the end users order supplies, the suppliers deliver the items directly to the user's facility close to the time when the items are needed. In some cases, companies have suppliers repurchase items the end users do not use. This allows end users to reduce or eliminate on-hand inventories so direct delivery programs can be used. Also, because the end users no longer store most of the supplies, they must have dependable, direct communication channels with the suppliers to ensure that supply needs are always met. To facilitate this communication, electronic ordering systems are often used to eliminate paperwork and speed up the ordering process.

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Some companies have improved their inventory management with the use of bar codes and through the standardization of inventory (the reduction of the variety of items used). Other companies consolidate suppliers' activities at one location (called a supplier park) near the facility where the supplies are used. This way, several suppliers can consolidate shipments of items and deliver them several times a day to the end user.

Private sector companies are using combinations of these new inventory management practices to eliminate intermediate storage locations and reduce inventory costs. Figure 3.1 illustrates the multilayered system used by the military service facilities (specifically, the Crane Naval Surface Warfare Center) and compares it with an inventory system private companies (specifically, Bethlehem Steel Corporation) use.

Figure 3.1: Comparison of Inventory Logistics Systems of Bethlehem Steel Corporation and Crane Naval Surface Warfare Center



Source: GAO analysis of data from Bethlehem Steel Corporation, DLA, and Crane Naval Surface Warfare Center.

As figure 3.1 indicates, companies such as Bethlehem Steel work without the two inventory storage levels that military service facilities such as the Crane Naval Surface Warfare Center use. Even though the inventory logistics systems of the private sector companies and the military differ, similarities exist between their supply needs. Both groups use similar supplies for repairing and maintaining machinery and equipment. These supplies are used in large quantities and are low cost, generally standard, and commonly stocked by several suppliers. The supplies comprise electronics, industrial, and other hardware items.

Two Companies' New Inventory Practices Reduce Supply Costs

We examined in detail the inventory practices of two companies—Bethlehem Steel Corporation and Martin Marietta Energy Systems, Inc.—that successfully implemented new inventory practices and significantly reduced inventory and costs. These companies are roughly analogous to the service facilities in DOD's supply system. Of particular note is the fact that these companies deal directly with suppliers, that is, without a wholesale supply level. These companies are discussed below to illustrate some of the leading-edge strategies being used in private industry.

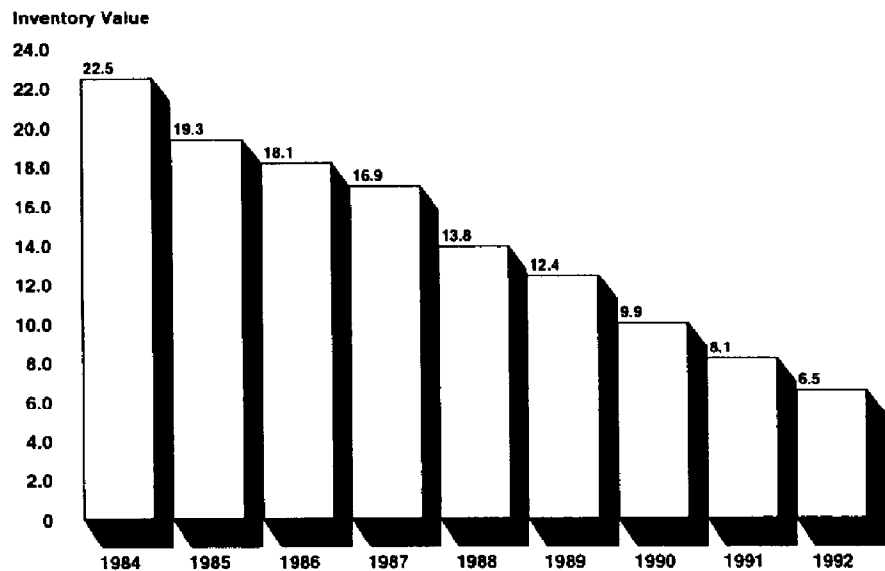
Bethlehem Steel Corporation

To reduce inventory management costs, the Bethlehem Steel Corporation's factory in Chesterton, Indiana, has established long-term agreements with 21 suppliers to deliver and stock maintenance and repair items at over 60 locations within its facility. Once the agreements were established, Bethlehem Steel and the suppliers developed direct communication channels to streamline the order and distribution process. Bethlehem Steel does not use an electronic data interchange system for placing orders and settling accounts with its suppliers but requires direct communication between the personnel using the items and the suppliers.

Bethlehem Steel shifts its inventory management function to the suppliers by providing them with a history of the demand for items and key inventory data and allowing open access to its facility. The suppliers work closely with the users of the supplies to establish minimum and maximum inventory levels for each item used by Bethlehem Steel. Then, on a weekly basis, the suppliers inventory the items on the basis of the established levels and deliver and stock the items at the different locations throughout Bethlehem Steel's facility.

Since 1984, when the new inventory practices were adopted, Bethlehem Steel has benefited from greater access to suppliers' technical expertise and inventory management experience and has paid, on average, 5 percent less for supplies. The company has eliminated about \$16 million, or 71 percent of its on-hand inventory. Figure 3.2 shows Bethlehem Steel's inventory levels from 1984 through 1992.

Figure 3.2: Bethlehem Steel Inventory Levels (1984-92) (in Millions of Constant-Year 1992 Dollars)



Source: GAO analysis of Bethlehem Steel's data.

Bethlehem Steel estimated that it reduced inventory levels from 8.3 months of supplies on hand to approximately 3.3 months without impacting the availability of supplies to the mechanics or other users.

According to Bethlehem Steel, since converting to the new inventory system in 1984, the company has saved over \$47 million in operating costs. As shown in table 3.1, Bethlehem Steel estimates that it saved over \$9 million in 1992 compared with costs that would have been incurred under the old inventory system.

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**Table 3.1: Bethlehem Steel's Calendar
Year 1992 Estimated Cost Savings**

Dollars in millions	
Category	Estimated savings
Search time reduction	\$3.5
Inventory reinvestment income	1.2
Administrative costs	1.3
Unit price reductions	1.3
Supplier cost saving ideas	1.7
Total	\$9.0

Table 3.1 shows that the estimated \$9 million savings results from several factors. First, a Bethlehem Steel official estimates that the time spent by end users searching or retrieving items has been reduced by 95 percent, resulting in a \$3.5-million savings. Second, according to this official, the reduction in the amount of inventory held provides an opportunity to earn interest on funds previously invested in inventory, providing a savings of \$1.2 million. This official also estimates the company saves over \$1.3 million through reduced paperwork and administrative costs. Bethlehem Steel estimates it saved another \$1.3 million because it pays about 5 percent less for its supplies under the arrangement. Finally, it saved \$1.7 million from cost saving ideas generated by the suppliers.

**Martin Marietta Energy
Systems**

In 1987, Martin Marietta Energy Systems, Inc., which operates the National Laboratory in Oak Ridge, Tennessee, for the Department of Energy, changed its inventory practices in an effort to reduce inventories and operating expenses. Since that time, Martin Marietta has established agreements with 32 suppliers to provide items such as electrical supplies, electronics, and other hardware items. Martin Marietta agrees to purchase items from the suppliers for up to 5 years if they meet the established performance standards. The suppliers benefit from an increase in volume, a 7-day payment cycle for delivered items, and improved business stability, which allowed them to reduce prices to Martin Marietta by an average of 9 percent.

Once the agreements were established, Martin Marietta developed electronic communications to directly link the end users and suppliers to streamline the ordering and bill-paying process. Through this system, Martin Marietta and the suppliers have reduced paperwork and decreased the amount of time to order and deliver the items. In addition, Martin Marietta and the suppliers use strict delivery schedules and bar coding to expedite the receiving and distribution process. Suppliers now deliver

shipments of items between 1 to 5 days after the items are ordered. As a result, Martin Marietta estimates that in 1992 it avoided the cost associated with handling and maintaining over \$31 million of inventory that it previously would have stored in intermediate storage locations until needed by a mechanic or other user.

As a result of establishing long-term agreements with key suppliers, using electronic communications, and streamlining the receiving and delivery process, Martin Marietta has reduced its inventory by more than \$8 million and saved millions of dollars annually in operating costs.

Other Companies Have Reduced Similar Inventories

In our June 1993 report on maintenance and repair inventories, we identified several other private sector companies that used combinations of new management practices to reduce maintenance and repair inventory. Two of these companies—PPG Industries, Inc., and The Timken Company—implemented several major changes. For example, PPG Industries established a supplier park where 10 of its suppliers provided items as needed throughout each day. This park is in a central location close to PPG's industrial center where the items are used. With the supplier park concept, PPG (1) reduced or eliminated the need to store inventory, (2) increased the suppliers' responsibility for managing and maintaining inventory, (3) developed electronic communications systems, and (4) standardized the types of items used. As a result, PPG eliminated \$4.5 million, or 80 percent, of its maintenance and repair inventory and saved \$600,000 annually in operating costs.

The Timken Company reduced inventory levels at one location by \$4 million, or 33 percent, by using direct delivery programs and customized agreements with suppliers. Timken has set a goal to reduce its inventory by an additional 50 percent over the next few years by expanding these initiatives and establishing a supplier park facility.

DLA's Use of Commercial Inventory Practices for Electronics Parts Has Been Limited

DOD's guidance encourages the use of commercial practices to reduce inventories and cut operating costs. However, to date, DLA's efforts to implement these practices affect only a small portion of electronics supplies. Recently, however, there appears to be increased emphasis on the implementation of commercial practices. DOD issued guidance in 1993 that seeks to maximize the use of commercial practices and DLA has established a pilot program to test innovative commercial practices at two service facilities for maintenance and repair inventories, such as electronics and industrial items. It is too early to assess the results of DLA's test program. However, because the test will include electronics items, we are not making a recommendation in this report.

Critical to DLA's success in increasing the use of commercial practices will be its ability to (1) change its overall inventory management philosophy and (2) implement these practices while still meeting government procurement requirements. DLA has already shown that it can overcome the burden of these requirements.

DOD Guidance Emphasizes Use of Commercial Practices

DOD has directed DLA and the military services to use commercial practices in order to achieve cost savings and improve its logistics operations. In 1990, the former Under Secretary of Defense for Acquisition established an inventory reduction plan, which emphasized pursuing alternatives to DOD's current logistics systems. In this plan, DOD states that inventories can be reduced and costs avoided through the use of commercial practices. In January 1993, DOD issued guidance for all DOD components on alternatives for managing inventory at the DLA wholesale and service retail levels. This guidance specifically states that the use of existing commercial distribution systems shall be maximized when it is cost-effective and responsive to the end user's requirements. The guidance also states that all DOD components are to employ direct delivery from vendors to end users wherever it is cost-effective and responsive to the end user's requirements.

In addition, the guidance states that specific consideration should be given to items with high potential benefits from using commercial logistics practices. These would include consumable items that are commercial in nature, bulky, frequently requested, hazardous, or fragile. Electronics supplies fall within this definition.

DLA's Use of Commercial Practices Has Been Limited for Electronics Supplies

While, in the past, DLA has used three primary commercial practices for managing its electronics inventories, its efforts have been limited in scope and represent only a small part of its logistics operations. DLA acknowledges, however, that the use of these practices provide several benefits, including shorter procurement lead times, less paperwork, better accuracy in forecasting future item demands, and reduced inventory levels. DLA's primary initiatives for improving its management of electronics items are as follows:

- **Long-Term Contracting.** DLA agrees to purchase items from a supplier for 1 to 5 years. These agreements can be for one item or for groups of items with common characteristics. Through these long-term contracts, DLA reduces the amount of (1) time it takes to complete the procurement process and (2) inventory it orders each time. Thus, DLA benefits from lower administrative and holding costs. In addition, long-term contracts provide for cost savings because suppliers benefit from an increase in volume and business stability and can pass these savings on to DLA in the form of lower prices.
- **SAMMS Procurement by Electronic Data Exchange.**¹ With this system, DLA can purchase supplies using electronic data communications for orders under \$2,500. DLA electronically receives price quotes from suppliers and transmits orders and award notifications. This automated system reduces paperwork, lead times, and mailing costs. DLA plans to expand this system to make it accessible to more suppliers, which could result in lower item prices and may reduce the need to evaluate item pricing.
- **Paperless Order Placement System.** The use of this direct vendor delivery program allows DLA to reduce its inventory levels and reduce administrative paperwork. Using long-term contracts, DLA uses this system to electronically order items from suppliers that are common to both commercial and military end users. The suppliers agree to obtain the appropriate electronic computer equipment to communicate with DLA and to use existing commercial distribution networks. The supplier directly delivers the items to the using facility. DLA began using this system for electronics supplies in 1987.

Although DLA has increased the use of these initiatives over the past few years, they cover only a small part of DLA's total operations (see table 4.1).

¹Standard Automated Materiel Management System.

Chapter 4
DLA's Use of Commercial Inventory
Practices for Electronics Parts Has Been
Limited

Table 4.1: Use of DLA Commercial Practices Initiatives for Electronics Supplies (Fiscal Year 1990 Through 1993)

Dollars in millions				
DLA initiative	1990	1991	1992	1993
Long-term contracting				
Contract line items		1,616	3,214	3,936
Percentage of total lines awarded		<1%	2%	3%
Funds obligated	\$38.5	\$55.3	\$49.2	\$59.4
Percentage of total obligations	10%	14%	18%	17%
Paperless Ordering and Placement System				
Contract lines items	1,815	4,639	8,584	5,511
Percentage of total lines awarded	1%	3%	5%	4%
Funds obligated		\$5.9	\$17.5	\$19.9
Percentage of total obligations		1%	6%	6%
SAMMS procurement by electronic data exchange				
Contract line items		10,503	13,253	15,918
Percentage of total lines awarded		6%	8%	11%
Funds obligated		\$7.5	\$7.6	\$8.3
Percentage of total obligations		2%	3%	2%

In fiscal year 1993, DLA purchased only 3 percent of its electronics items under long-term contracts, or 17 percent of its total dollar obligations. It awarded only 4 percent of its contracts (6 percent of its total obligations) through the Paperless Order Placement System. Finally, it used the electronic data exchange system to place 11 percent of its orders with suppliers (2 percent of its total obligations in fiscal year 1993).

In commenting on a draft of this report, DOD indicated that DLA has initiated an aggressive commercial practice program intended to increase the use of direct vendor delivery, long-term contracting, and electronic ordering. It stated that DLA has established the following goals for all its commodities, including electronics items: (1) 50 percent of sales will use direct vendor delivery by fiscal year 1997, (2) 80 percent of dollars obligated will be under long-term contracts by fiscal year 1997, and (3) 70 percent of the requisitions submitted will be electronically transmitted by fiscal year 1995.

In response to a recommendation we made in our June 1993 report on maintenance and repair inventories, DLA has established a pilot program that involves locating DLA personnel at a military service facility to test the

applicability of using innovative private sector inventory practices. In September 1993, DLA began a 15-month test program at two service facilities, Warner Robins Air Logistics Center, Warner Robins, Georgia, and North Island Naval Aviation Depot, San Diego, California. Under this program, DOD plans to test practices such as reducing unnecessary inventory requirements at the service facilities; establishing electronic ordering, invoicing, and bill-paying functions between suppliers and DOD facilities; using supplier parks near the facilities that use the supplies; and eliminating the need to store supplies in DLA distribution depots. As part of the test, DOD will determine the monetary benefits of the pilot program.

Commercial Practices Can Be Implemented While Meeting Procurement Requirements

According to DOD officials, government procurement requirements make it difficult to use commercial practices in DOD's logistics operations. Government procurement requirements, some of which are based on federal laws, serve a variety of objectives such as providing equal opportunity to all potential contractors and promoting small and minority business opportunities. The private sector places few, if any, restrictions on the sources a firm may use. For example, a commercial firm is not required to conduct competitions for its contracts and, if it does so, it may limit such competitions to a few selected sources.

DOD's Advisory Panel on Streamlining and Codifying Acquisition Laws, known as the Section 800 Panel, identified more than 600 such laws affecting defense procurements. Although some of these laws, regulations, and policies were developed to ensure fairness in the procurement system or protect the government's interest in response to past abuses, they may be inconsistent with private sector practices, and therefore, may be barriers to commercial firms that want to do business with the government.

For example, the Truth in Negotiations Act was enacted to put the government on an equal footing with vendors in sole-source negotiations and to provide a basis for ensuring that the government pays reasonable prices when competition is not available. It requires a contractor to provide certified cost or pricing data. However, a commercial company may lack an accounting system capable of providing the data to satisfy this requirement or may be unwilling to accept government business on these terms. During a recent review, we learned that some firms refuse to do business with the government if it means having to provide certified cost data or comply with government accounting requirements.

Despite the additional burdens these requirements sometimes create, DOD has begun to incorporate commercial practices in its operations. For example, DOD has established a prime vendor program for medical supplies at over 65 military hospitals that closely emulates practices pioneered by the private sector. DLA's Defense Personnel Support Center developed an implementation plan, including a study of existing government procurement requirements, to determine how a prime vendor program could be successfully developed for medical supplies. This effort suggests that DOD can satisfy government procurement requirements as it establishes new and more efficient inventory management practices.

In addition, there are currently a number of legislative proposals pending to reform the government procurement system. A major objective of these proposals is to enhance the acquisition of commercial items and make the government more accessible to the commercial marketplace by alleviating some of the inconsistencies between government and commercial contracting. Enactment of legislation addressing these objectives could make it easier for DLA to implement commercial practices.

Conclusions

We believe DLA's pilot test program at maintenance and repair facilities for items such as electronics is a key step in adopting new and more efficient inventory management practices. The test program will provide DOD an opportunity to address procurement constraints and find ways to overcome them while reducing inventories and logistics costs. We believe that DOD can balance the government's socioeconomic responsibilities and the need to protect government interests while adopting new business practices, if its efforts are properly planned and implemented. After the practices have been adequately tested and constraints overcome, the practices could then be expanded to the inventory systems at other service facilities. We believe that the potential benefits to be gained from adopting commercial practices are strong incentives for DOD to continue working at overcoming constraints and obstacles and changing the decades old way it manages inventory.

Agency Comments

In commenting on a draft of this report, DOD generally agreed with the findings and conclusions and stated that increased use of commercial practices can lead to reduced inventories. DOD stated that DLA has initiated an aggressive program to adopt and implement the best commercial practices. For example, DLA has established as a goal the use of direct vendor delivery for half of all sales by fiscal year 1997. DOD also stated that

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expanded use of commercial practices, such as long-term contracting and electronic ordering, will reduce inventory, lower costs and improve response times. DOD's complete comments are provided in appendix I.

Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



ACQUISITION AND TECHNOLOGY

(L/MRM)

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON DC 20301-3000

9 MAY 1994



Mr. Frank C. Conahan
Assistant Comptroller General
National Security and International
Affairs Division
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Washington, D.C. 20548

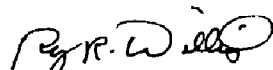
Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "COMMERCIAL PRACTICES: DoD Could Reduce Electronics Inventories by Using Private Sector Techniques," dated March 28, 1994 (GAO Code 709007), OSD Case 9646. The Department generally concurs with the draft report.

The Department agrees that increased use of commercial practices can lead to reduced inventory. The Defense Logistics Agency initiated an aggressive program to adopt and implement the best commercial practices, and established as a goal the use of direct vendor delivery for half of all sales by FY 1997. Expanded use of such commercial practices as long-term contracting and direct vendor delivery, with increased emphasis on electronic commerce, will reduce inventory, lower costs, and improve response times.

The detailed DoD comments on the report findings are provided in the enclosure. The DoD appreciates the opportunity to comment on the draft report.

Sincerely,


Roy R. Willis
Principal Assistant Deputy Under
Secretary of Defense (Logistics)

Enclosure



GAO DRAFT REPORT - DATED MARCH 28, 1994
(GAO CODE 709007) OSD CASE 9646

"COMMERCIAL PRACTICES: DOD COULD REDUCE ELECTRONICS
INVENTORIES BY USING PRIVATE SECTOR TECHNIQUES"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

FINDING A: The DoD Supply System. The GAO observed that the Defense Logistics Agency was created to be the wholesale manager of "consumable supplies" commonly used by the Military Services, other DoD components, and Federal agencies. The GAO explained consumable supplies are those items that are discarded after use, rather than repaired. The GAO noted that the Defense Logistics Agency manages--through its wholesale system--over 3.3 million consumable items, of which over 1 million are classified as electronics items--such as resistors, fuses, switches, computer supplies, and communication equipment. The GAO further noted that about 75 percent of the electronics items distributed by the Defense Logistics Agency in FY 1993 had a unit cost of \$50 or less.

The GAO pointed out that, as a wholesaler, the Defense Logistics Agency buys electronics supplies in large quantities, stores items until requested by the Services, and then ships the items to the Service facility. The GAO observed that the Defense Logistics Agency stores over \$2 billion of electronics items at 28 distribution depots and other storage locations throughout the United States. The GAO explained the distribution depots are DoD facilities with several large warehouses that store a variety of supplies. The GAO determined that, in FY 1993, the depots received over 115,000 shipments of electronics items from suppliers and filled over 2.2 million requests from the Services for those supplies.

The GAO further reported that the Military Services store those same electronics supplies at repair centers or bases, where the supplies are used to maintain and repair radar, navigation aids, and communication systems. The GAO concluded that the Service facilities are comparable to a

Appendix I
Comments From the Department of Defense

Now on pp. 2, 10-12.

number of private sector companies because they use similar supplies in large quantities to maintain and repair machinery and equipment. (pp. 2-3, pp. 10-12/GAO Draft Report)

DOD RESPONSE: Concur.

FINDING B: The DoD Large Electronics Supply Inventory Moves Slowly. The GAO determined that, as of September 1993, the Defense Logistics Agency wholesale electronics inventory was valued at over \$2 billion. The GAO found that the turnover rate was slow. The GAO explained that the turnover rate is a measure of how efficiently a business uses its inventory investment and is expressed as the ratio of sales to average inventory. The GAO calculated that, on the basis of the approximately \$577 million of electronics supplies the Defense Logistics Agency issued to the Services in FY 1993, the wholesale inventory of electronics supplies would turn over once every 4 years. In comparison, the GAO indicated that private sector suppliers often turn their stock over four times a year.

The GAO further reported that, in addition, each Service holds an additional layer of electronics supplies at repair facilities. The GAO observed that the supplies are sent from the Defense Logistics Agency warehouse to the Military Service facilities when end-users need electrical supplies. The GAO pointed out that the Services (1) order material from the Defense Logistics Agency using forecasts based primarily on the past usage rates of repair operations and (2) store the same electronics items in retail warehouses. In calculating the number of days it would take three Service facilities to use the electronics supplies stored in their warehouses, on the basis of the usage rates for a recent 12-month period, the GAO determined that the facilities stored enough retail inventory to last from 8 months to almost 11 months. (pp. 4-5, pp. 15-18/GAO Draft Report)

Now on pp. 3-4, 14-16.

DOD RESPONSE: Concur. The DoD agrees that the aggregate turnover rate is about four years, based upon total assets on-hand. However, it should be noted that the on-hand figure cited by the GAO includes approximately \$283 million of materiel for which there is no longer a supplier (diminishing manufacturing sources items). Commercial support methods are not an option for those items.

FINDING C: A Significant Amount of DoD Electronics Inventory Is Excess. The GAO reported that, as of September 1993, the Defense Logistics Agency categorized \$231.4 million of the electronics inventory, or 10.5 percent, as excess. The GAO explained that excess items are those that the DoD determines are no longer needed in the inventory and can be disposed of or sold at salvage prices to other Government agencies or the general public. The GAO observed that, during FY 1993, the Defense Logistics Agency disposed of or sold 123,114 items of excess inventory, valued at the latest acquisition cost of \$494 million. The GAO noted that over 39,000 of the items--valued at \$48.2 million--had not had a demand from the Military Services within the past 5 years.

The GAO concluded that excess inventory occurs principally because the DoD tries to forecast the Service requirements so far in advance using past demand. The GAO observed, however, that past demand often was not an accurate indication of future needs. The GAO indicated that the demands of the Military Services often decrease from year to year due, for example, to the modification or retirement of a weapon system. The GAO further concluded that DoD efforts to down-size will add to the general decrease in demands for many items, as weapon system operating levels decrease and troop reductions occur. The GAO cited five examples of electronics items that, while perhaps among the more extreme cases, nonetheless illustrated the problems confronting the DoD supply system.

The GAO concluded that excess items are held at the retail level as well. During visits to Service repair facilities, the GAO observed items in storage bins--such as rotary switches, tubes, connectors, and capacitors--that were over 10 years old. The GAO noted that, at the time of its review, the Tobyhanna Army Depot reported that almost \$1.5 million, or 17.4 percent, of the electronics items held were excess to the needs of the Depot. The GAO also noted the Depot reported disposing of over \$1.9 million of electronics items during FY 1993--items that were no longer needed to meet requirements. The GAO determined that the disposed of material included items such as 1,068 microcircuits, valued at \$82,866, and 9,300 resistors valued at \$54,219. The GAO also observed that, at another depot, an electrical coil had been in the supply system since 1957. (pp. 4-5, pp. 18-23/GAO Draft Report)

DDP RESPONSE: Concur. It should be noted that while it is a common practice to call inventories exceeding known requirements "excess," formal DoD definition classifies materiel that is excess as materiel which has been processed

to the Defense Reutilization and Marketing Service for reutilization, sale, or destruction. Some DoD wholesale inventory may be classified as Potential Reutilization, indicating that such materiel should be considered for disposal or reclassification. That portion which is, in fact, processed to disposal then becomes "DoD excess." During FY 1993, the Defense Logistics Agency disposed of \$1.9 billion in inventory, of which \$516.8 million was electronics materiel.

FINDING D: Unnecessarily Large Inventories Increase Holding Costs. The GAO explained that the DoD accounting systems are not designed to capture the total cost to hold inventory in depots; therefore, the DoD is unable to provide an estimate of the actual costs associated with holding electronics stock. The GAO noted, however, that the DoD had developed an annual estimated holding cost rate for each commodity to use in calculating appropriate quantities to buy. The GAO pointed out that the DoD holding cost estimate included investment (the cost of having funds tied up in inventory), storage, and obsolescence costs. The GAO observed that the DoD sets the holding cost rate for electronics at 19 percent of the purchase price. While the DoD rate did not include all cost factors normally included in a financial analysis of holding costs, the GAO indicated that the figure is nonetheless useful as a rough approximation of the costs the DoD is incurring.

By applying the DoD holding cost rate to the electronics inventory as of September 1993, the GAO estimated the annual carrying cost to be as high as \$418 million. The GAO noted that, in December 1993, the Defense Logistics Agency calculated the costs to store electronics supplies at about \$15 million on the basis of a cost per square foot of occupied storage space. The GAO pointed out, however, there are additional costs associated with managing the large investment in electronics supplies--other than storage costs--even though the DoD accounting systems do not currently capture those costs.

The GAO determined that, based on an inventory turnover rate on the average of once every 4 years, the holding cost for an item is four times the annual rate, or 76 percent of the item's acquisition cost. The GAO noted that the costs excluded the inventory held at the retail level by the Service facilities. The GAO also noted that the Defense Logistics Agency charged customers 34.7 percent above the original cost of the electronics supplies to recoup inflation costs and operating and other related expenses. The GAO explained that the charge becomes a part of the total

costs of the Services in performing operations and maintenance activities. The GAO determined that, in FY 1993, the surcharge amounted to over \$175 million for electronics items. (pp. 4-5, pp. 23-24/GAO Draft Report)

DOD RESPONSE: Concur. The Department agrees that unnecessarily large inventories increase holding costs. However, it should be recognized that the 19 percent holding cost cited by the GAO is the rate established for use in computing economic order quantities. The rate was specifically developed in order to determine an appropriate purchase quantity for inventory that had not yet been bought. Therefore, factors are included that do not apply to the actual cost to hold and store existing inventory. For example, 10 percent is an investment charge that represents the cost to the private sector to have money tied up in investments in the public sector. For inventory already bought, the investment has already been made. If the DoD disposed of excess inventory, it could not recoup 10 percent per annum of the value of the inventory. Another 8 percent of the holding cost rate cited by the GAO is the obsolescence rate. That portion of the economic order quantity holding cost is included as a deterrent to prevent the acquisition of stock that might otherwise end up as excess. Excess inventory is already "obsolete." Therefore, the DoD cannot continue to charge eight percent per annum against it.

The Department also notes that materiel retention policy is not based on an extrapolation from the storage rate. For example, the Defense Logistics Agency retains inventory for a maximum of five years after the last recorded demand.

Finally, the Department acknowledges that while, as discussed above, the holding cost rate from the economic order quantity computation includes factors not appropriate for determining the cost to hold existing inventory, a rate greater than the storage cost alone may be appropriate. For example, reducing inventory by a quantity sufficient to enable a warehouse to be closed would result in a saving exceeding the extrapolation of storage cost rate alone to the value of the inventory reduced.

FINDING E: Several Factors Contribute to the Unnecessarily Large DoD Inventory. The GAO concluded that the large DoD inventory of electronics supplies, in part, reflected a philosophy whereby customer needs are met by having a large supply of items readily available. The GAO noted that the DoD meets customer needs by holding inventory at both the wholesale and retail levels--which (1) increases the amount

Now on pp. 3-4, 20.

See comment 1.

of supply on hand and (2) drives up the cost of holding inventory. The GAO pointed out, however, that is a philosophy private firms have moved away from in an attempt to lower the cost of doing business, provide better service, and remain competitive. The GAO further concluded that another related factor in the large DoD inventory is the Defense Logistics Agency practice of procuring electronics items by using long-range forecasts, based on past demands from the Military Services. The GAO observed that the Defense Logistics Agency uses long range forecasts because the procurement lead time for electronics items is over 10 months. The GAO explained that, on average, it takes about 10 months from the time a need for an item is identified by an inventory manager until the item is received in a supply depot. The GAO pointed out that, as a result, the Defense Logistics Agency holds inventory to meet the needs of the Military Services and to ensure that items are available until ordered supplies are received from suppliers. The GAO also pointed out that the longer the procurement lead time, the more on-hand and on-order stock is needed to meet customer demands and ensure a continuous supply of stock items. In addition, the GAO noted that, if the expected demand for the items decreases or does not materialize, inventories may not be needed. (pp. 4-5, pp. 24-25/GAO Draft Report)

Now on pp. 3-4, 20-22.

DOD RESPONSE: Concur. The GAO accurately depicts the traditional DoD approach of buying, storing, selling, and distributing materiel. It should be recognized that the DoD is now adopting a new approach to materiel management involving management of items in the most cost effective manner to meet the mission requirements. Commercial practices, such as long-term contracting and direct vendor delivery with increased emphasis on electronic commerce, will reduce inventory, lower costs, and improve response time. Even items with commercial support arrangements, however, may still require some inventory on the shelf to meet emergency requirements or certain geographic requirements, or to support minimum shipping quantities of small vendors.

The Defense Logistics Agency uses history-based forecasting because that method has proven to be the most accurate. Lead time does not directly affect inventory. Lead time has an indirect impact on inventory, since increases in lead time lead to increases in safety level. Safety level, however, represents only about one-eighth of the Defense Logistics Agency inventory.

FINDING F: Private Sector Companies Have Changed the Way They Buy, Store, and Deliver Supplies. The GAO explained that private sector companies have recognized that inventories can be reduced without impacting supply availability. The GAO noted that a major characteristic of new logistics practices is the way the companies buy supplies. The GAO explained that the companies had reduced the number of suppliers used by establishing long-term agreements with only a few key suppliers who are contracted to provide supplies for a particular commodity. The GAO pointed out that most of the management responsibilities, therefore, are shifted from the company to the suppliers and the suppliers take on the responsibilities because they are promised a long-term relationship with the company.

The GAO explained that, by using direct delivery programs, companies bypass the need for intermediate storage and handling locations. The GAO noted that, once the end-users order supplies, the suppliers deliver the items directly to the user facility close to the time when the items are needed. The GAO pointed out that, because the end-users no longer store most of the supplies, dependable, direct communication channels with the suppliers are necessary to ensure supply needs are always met. The GAO determined that electronic ordering systems are often used to facilitate such communication and eliminate paperwork--thus, speeding up the ordering process. The GAO reported that some companies have improved their inventory management with the use of bar codes and through the standardization of inventory (the reduction of the variety of items used). The GAO also reported that other companies consolidate activities of suppliers at one location (called a supplier park) near the facility where the supplies are used. The GAO pointed out such an arrangement allows several suppliers to consolidate shipments of items and deliver them several times a day to the end-user.

The GAO also observed that, even though the inventory logistics systems of the private sector companies and the military differ, similarities exist between their supply needs, because both groups use similar supplies for repairing and maintaining machinery and equipment. The GAO further pointed out that those supplies--electronics, industrial, and other hardware items--are low cost, used in large quantities, generally standard, and commonly stocked by several suppliers. (pp. 5-6, pp. 26-28/GAO Draft Report)

DOD RESPONSE: Concur. The Defense Logistics Agency initiated an aggressive program to review and implement the best commercial practices to enhance support to the Services at the least possible cost to the taxpayer. Initial

commercial practice initiatives focused on items low in cost, used in large quantities, generally standard, and stocked by several suppliers as immediate targets of opportunity. The entire item population for which the Defense Logistics Agency has responsibility as an integrated materiel manager has a much more diverse profile, including widely ranging unit prices, volatile peacetime/wartime demand, multiple applications, and special packaging and handling requirements. In coordination with the customer, the Defense Logistics Agency's commercial practice initiatives are seeking to eliminate unjustified, unique requirements whenever possible. However, legitimate mission needs will be reflected in an item population that continues to be more diverse than the private sector. The low unit cost of items, coupled with low demand, often makes it more difficult to encourage a profit-oriented industrial base. That, in turn, inhibits the development and use of commercial practices, such as direct vendor delivery, since contractors are hesitant to commit to partnerships unless there is a minimum production run or minimum buy. The wide range of items will remain a challenge to finding customer oriented, yet cost effective, methods of support in lieu of depot inventory.

FINDING G: The New Inventory Practices of Two Companies Reduce Supply Costs. The GAO examined in detail the inventory practices of two companies--Bethlehem Steel Corporation and Martin Marietta Energy Systems, Inc.--that successfully implemented new inventory practices and significantly reduced inventory and costs. The GAO noted that the companies are roughly analogous to the Service facilities in the DoD supply system. The GAO particularly noted that the companies deal directly with suppliers--that is, without a wholesale supply level. The GAO illustrated some of the leading-edge strategies being used in private industry.

- **Bethlehem Steel Corporation.** The GAO reported that to reduce inventory management costs, the Bethlehem Steel Corporation factory in Chesterton, Indiana, has established long-term agreements with 21 suppliers to deliver and stock maintenance and repair items at over sixty locations within its facility. The GAO noted that once the agreements were established, Bethlehem Steel and the suppliers developed direct communication channels to streamline the order and distribution process. The GAO also noted that Bethlehem Steel does not use an electronic data interchange system for placing orders and settling accounts with suppliers, but requires direct communication between the personnel

using the items and the suppliers. The GAO observed that Bethlehem Steel shifts the inventory management function to the suppliers by providing a history of the demand for items and key inventory data and allowing open access to the facility. The GAO explained that the suppliers work closely with the users of the supplies to (1) establish minimum and maximum inventory levels for each item used and (2) inventory--on a weekly basis--the items based on the established levels and deliver and stock the items throughout the facility.

The GAO reported that since the new inventory practices were adopted in 1984, Bethlehem Steel has benefited from greater access to technical expertise and inventory management experience of suppliers and has paid, on average, 5 percent less for supplies. The GAO pointed out that the company has eliminated about \$16 million, or 71 percent of the on-hand inventory. In addition, Bethlehem Steel advised the GAO that the company has saved over \$47 million in operating costs since converting to the new inventory system.

- Martin Marietta Energy Systems. The GAO reported that, in 1987, Martin Marietta Energy Systems, Inc., which operates the National Laboratory in Oak Ridge, Tennessee, for the Department of Energy, changed inventory practices in an effort to reduce inventories and operating expenses. According to the GAO, since that time, Martin Marietta has established agreements with 32 suppliers to provide items such as electrical supplies, electronics, and other hardware items. The GAO explained that Martin Marietta agrees to purchase items from the suppliers for up to 5 years if they meet the established performance standards. The GAO pointed out that the suppliers benefit from an increase in volume, a 7-day payment cycle for delivered items, and improved business stability, which allowed them to reduce prices to Martin Marietta by an average of 9 percent.

The GAO observed that, once the agreements were established, Martin Marietta developed electronic communications to directly link the end-users and suppliers to streamline the ordering and bill-paying process. The GAO noted that, through that system, Martin Marietta and the suppliers have reduced paperwork and decreased the amount of time to order and deliver the items. The GAO further noted that Martin Marietta and the suppliers use strict delivery schedules and bar coding to expedite the receiving and

distribution process. The GAO reported that Martin Marietta estimates that in 1992 it avoided the cost associated with handling and maintaining over \$31 million of inventory that it previously would have stored in intermediate storage locations until needed by a mechanic or other user. The GAO determined that, as a result Martin Marietta has reduced its inventory by more than \$8 million and saved millions of dollars annually in operating costs.

- Other Companies Have Reduced Similar Inventories. The GAO identified several other private sector companies that used combinations of new management practices to reduce maintenance and repair inventory. The GAO noted that two of the companies--PPG Industries, Inc., and The Timken Company--implemented several major changes. The GAO explained that PPG Industries established a supplier park where 10 of its suppliers provided items as needed throughout each day. The GAO explained that, with the supplier park concept--located in a central location close to its industrial center where the items are used--PPG Industries; (1) reduced or eliminated the need to store inventory, (2) increased the suppliers' responsibility for managing and maintaining inventory, (3) developed electronic communications systems, and (4) standardized the types of items used. The GAO determined that PPG Industries eliminated \$4.5 million, or 80 percent, of its maintenance and repair inventory and saved about \$600,000 annually in operating costs.

The GAO reported that the Timken Company reduced inventory levels at one location by \$4 million, or 33 percent, by using direct delivery programs and customized agreements with suppliers. The GAO noted that the Timken Company has set a goal to reduce its inventory by an additional 50 percent over the next few years by expanding the initiatives and establishing a supplier park facility. (pp. 5-6, pp. 29-33/GAO Draft Report)

Now on pp. 4-5, 25-28.

DOD RESPONSE: Noted. The DoD has no basis for further comment.

FINDING H: The DoD Guidance Emphasizes Use of Commercial Practices. The GAO reported that the DoD directed the Defense Logistics Agency and the Military Services to use commercial practices in order to achieve cost savings and improve logistics operations. The GAO further reported that, in 1990, the former Under Secretary of Defense for Acquisition established an inventory reduction plan, which

emphasized pursuing alternatives to current DoD logistics systems. The GAO noted that, in the plan, the DoD states that inventories can be reduced and costs avoided through the use of commercial practices. The GAO further noted that, in January 1993, the DoD issued guidance for all DoD components on alternatives for managing inventory at the Defense Logistics Agency wholesale and Service retail levels. The GAO explained that the guidance specifically states that:

- the use of existing commercial distribution systems shall be maximized when cost-effective and responsive to the requirements of the end-user.
- all DoD components are to employ direct delivery from vendors to end users wherever cost-effective and responsive to end-user requirements; and
- specific consideration should be given to items with high potential benefits from using commercial logistics practices. (pp. 6-7, pp. 34-35/ GAO Draft Report)

DOD RESPONSE: Concur. The Defense Logistics Agency initiated an aggressive program to adopt and implement the best commercial practices.

FINDING I: The Defense Logistics Agency Use of Commercial Practices Has Been Limited For Electronics Supplies. The GAO reported that, in the past, the Defense Logistics Agency had used three primary commercial practices for managing electronics inventories, although efforts were limited in scope and represented only a small part of logistics operations. The GAO noted the Defense Logistics Agency had acknowledged that the use of the practices provide several benefits--including (1) shorter procurement lead times, (2) less paperwork, (3) better accuracy in forecasting future item demands, and (4) reduced inventory levels. The GAO identified the following Defense Logistics Agency primary initiatives for improving its management of electronics items:

- **Long-Term Contracting.** The GAO reported that the Defense Logistics Agency agreed to purchase items from a supplier for 1 to 5 years. The GAO explained that the agreements can be for one item or for groups of items with common characteristics. The GAO concluded that, through such long-term contracts, the Defense Logistics Agency reduces the amount of (1) time it takes to com-

plete the procurement process and (2) inventory ordered each time, thereby reducing administrative and holding costs. The GAO also concluded that long-term contracts provided for cost savings because suppliers benefit from an increase in volume and business stability and can pass the savings on to the Defense Logistics Agency in the form of lower prices.

- Standard Automated Materiel Management System Procurement by Electronic Data Exchange. The GAO reported that, with the system, the Defense Logistics Agency can purchase supplies using electronic data communications for orders under \$2,500. The GAO explained that the Defense Logistics Agency electronically receives price quotes from suppliers and transmits orders and award notifications. The GAO noted that the automated system reduces (1) paperwork, (2) lead times, and (3) mailing costs. The GAO indicated that the Defense Logistics Agency planned to expand the system to make it accessible to more suppliers--which could result in lower item prices and could reduce the need to evaluate item pricing.
- Paperless Order Placement System. The GAO noted that the use of such a direct vendor delivery program allows the Defense Logistics Agency to reduce inventory levels and administrative paperwork. The GAO observed that, by using long-term contracts, the Defense Logistics Agency uses the system to order items electronically from suppliers that are common to both commercial and military end-users. The GAO noted that suppliers agree to obtain the appropriate electronic computer equipment to communicate with the Defense Logistics Agency and to use existing commercial distribution networks. The GAO also noted that the supplier directly delivers the items to the using facility. The GAO pointed out that the Defense Logistics Agency began using the system for electronics supplies in 1987.

The GAO concluded that, although the Defense Logistics Agency had increased the use of the described initiatives over the past few years, they still covered only a small part of the Defense Logistics Agency total operations. The GAO noted that, in FY 1993, the Defense Logistics Agency-- (1) purchased only 3 percent of electronics items under long-term contracts, (2) awarded only 4 percent of its contracts (6 percent of its total obligations) through

the Paperless Order Placement System, and (3) used the electronic data exchange system to place 11 percent of its orders with suppliers (2 percent of its total obligations in FY 1993). (pp. 6-7, pp. 35-38/GAO Draft Report)

DOD RESPONSE: Concur. The Defense Logistics Agency is working with customers to develop tailored logistic support techniques including contractual vehicles allowing direct vendor delivery in lieu of depot inventory. In that way the Agency, as the integrated materiel manager, provides a value-added service facilitating direct vendor delivery arrangements allowing economies of scale while maintaining a high degree of product integrity. The involvement of the Defense Logistics Agency also ensures a common interface with the industrial base, thereby providing greater leverage and flexibility in planning and meeting surge requirements during emergency situations. The Agency has initiated an aggressive commercial practice program which is increasing the use of direct vendor delivery, long term contracting, and electronic ordering. The number of long term contracts for electronic parts increased from 401 in FY 1992, to 641 in FY 1993. The percent of sales using direct vendor delivery increased from 8.5 percent in FY 1992, to 11.2 percent in FY 1993. The Defense Logistics Agency established the following corporate goals: (1) 50 percent of sales will use direct vendor delivery by FY 1997; (2) 80 percent of dollars obligated will be under long term contracts by FY 1997; and (3) 70 percent of requisition will be electronically transmitted by FY 1995.

FINDING J: Commercial Practices Can Be Implemented While Meeting Procurement Requirements. The GAO explained that Government procurement requirements, some of which are based on Federal laws, serve a variety of objectives--such as providing equal opportunity to all potential contractors and promoting small and minority business opportunities. The GAO further noted that the private sector places few, if any, restrictions on the sources a firm may use. The GAO pointed out that a commercial firm, for example, is not required to conduct competitions for its contracts and, if it chooses to do so, it may limit such competitions to a few selected sources.

The GAO reported that the DoD Advisory Panel on Streamlining and Codifying Acquisition Laws, known as the Section 800 Panel, identified more than 600 such laws affecting Defense procurements. Although some of those laws, regulations, and policies were developed to ensure fairness in the procurement system or to protect the interest of the Government in

Appendix I
Comments From the Department of Defense

response to past abuses, the GAO pointed out that they may be inconsistent with private sector practices--and, therefore, may be barriers to commercial firms that want to do business with the Government.

The GAO observed that, despite the additional burdens such requirements sometimes create, the DoD has begun to incorporate commercial practices in its operations. The GAO noted, for example, the DoD had established a prime vendor program for medical supplies at over 65 military hospitals--one that closely emulated practices pioneered by the private sector. The GAO further noted that the Defense Logistics Agency Defense Personnel Support Center developed an implementation plan, including a study of existing Government procurement requirements, to determine how a prime vendor program could be successfully developed for medical supplies. The GAO concluded that effort suggested that the DoD could satisfy Government procurement requirements as it establishes new and more efficient inventory management practices. The GAO emphasized that there are currently a number of legislative proposals pending to reform the Government procurement system. The GAO emphasized that a major objective of the proposals is to enhance the acquisition of commercial items and make the Government more accessible to the commercial marketplace by alleviating some of the inconsistencies between Government and commercial contracting. The GAO concluded that enactment of legislation addressing those objectives could make it easier for the Defense Logistics Agency to implement commercial practices. (pp. 6-7, pp. 38-40/GAO Draft Report)

Now on pp. 5, 32-34.

- **DOD RESPONSE:** Concur. The Department supports enactment of the acquisition reform legislation.

* * * * *

RECOMMENDATIONS

- None.

Appendix I
Comments From the Department of Defense

The following is a GAO comment on the Department of Defense's (DOD) letter dated May 9, 1994.

GAO Comment

1. We modified this section of the report, as appropriate, to address some of DOD's concerns.

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Related GAO Products

Commercial Practices: Opportunities Exist to Reduce Aircraft Engine Support Costs (GAO/NSIAD-91-240, June 28, 1991).

DOD Medical Inventory: Reductions Can Be Made Through the Use of Commercial Practices (GAO/NSIAD-92-58, Dec. 5, 1991).

DOD Food Inventory: Using Private Sector Practices Can Reduce Costs and Eliminate Problems (GAO/NSIAD-93-110, June 4, 1993).

Commercial Practices: Leading-Edge Practices Can Help DOD Better Manage Clothing and Textile Stocks (GAO/NSIAD-94-64, Apr. 13, 1994).

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