

August 1990

# DEFENSE INVENTORY

## DOD Could Better Manage Parts With Limited Manufacturing Sources



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

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**National Security and  
International Affairs Division**

B-239793

August 16, 1990

The Honorable John Glenn  
Chairman, Committee on  
Governmental Affairs  
United States Senate

The Honorable Earl Hutto  
Chairman, Subcommittee on  
Readiness  
Committee on Armed Services  
House of Representatives

As you requested, we reviewed the status of the Defense Logistics Agency's efforts to manage spare and repair parts with limited manufacturing sources.

As arranged with your offices, we plan no further distribution of this report until 30 days from its issue date, unless you release its contents earlier. At that time, we will send copies to other interested committees and Members of Congress; the Secretary of Defense; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others upon request.

Please call me on (202) 275-8412 if you or your staffs have questions concerning this report. Other major contributors are listed in appendix V.

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

Donna M. Heivilin  
Director, Logistics Issues

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Although GAO could not determine the extent to which the Center bought stock that will never be used, according to the Center's inventory report, almost one-third of the items had more than a 25-year supply of stock valued at about \$186 million. Overbuying parts increases the risk that they might never be used.

The Center had not issued adequate guidance for computing life-of-type buys. Moreover, the services generally were not giving the Center accurate estimates of their requirements for diminishing sources parts. In addition, the Center had not issued adequate guidance for storing parts or for ensuring their quality before they enter the inventory.

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## Principal Findings

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### DLA Has Adequately Implemented DOD's Policy, but Services Have Not

DLA has been identifying and managing parts with diminishing manufacturing sources and providing oversight of the program. However, the services have not adequately implemented DOD's policy for the program to ensure that its objectives are being accomplished. Although they have established focal points, the focal points could not provide information on the inventory value, the number of parts with diminishing sources, or the number and value of actual life-of-type buys.

The services said they have taken actions to improve their management of the program. In addition, DOD has set up a study group to identify diminishing sources problems and seek initiatives to resolve them.

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### Diminishing Sources Stock Has Grown Significantly

The Defense Electronics Supply Center's inventory value of diminishing sources stock has nearly doubled in the last 4 years to almost 8,500 parts, valued at about \$279 million. GAO's random sample of 350 parts with diminishing sources showed that the Center made life-of-type buys for 17 percent of the parts. Such buys were not made for 83 percent of the parts because the Center already had stock on hand, the contractor had agreed to continue production, or the Center had found an alternate source. Some parts could not be bought because sources could not be found.

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## Agency Comments

DOD partially agreed with GAO's findings and recommendations. It agreed that improvements are needed in the services' implementation of the diminishing sources program. According to DOD, planned actions should improve overall management of the program. It plans to implement an action plan that will improve its data file on the parts and the process for gathering requirements data.

DOD also plans to issue instructions to ensure that long-term storage requirements are being followed. DOD stated, however, that protected storage is not required for all parts and that there is no indication that electronic parts will deteriorate over the long term. GAO agrees that protected storage is not needed for all parts and recommends that the Center determine which parts need special long-term protection to eliminate inconsistencies in the protection provided. In light of the high failure rates of tested parts, GAO believes that the Center needs to do a better job in this area.

DOD believes that life-of-type buys must be calculated on a case-by-case basis and that guidance on calculating such buys is not needed. GAO agrees that such buys should be calculated separately, but believes better guidance is needed to help ensure that managers make accurate and cost-effective quantity calculations because the policy guidance is too general.

DOD said that the Center already has a testing program to evaluate the quality of stock on hand and has recently increased testing resources to reduce the backlog of new microcircuits awaiting testing. DOD said that the backlog would be worked down to a normal level within 18 months, at which time additional parts in the inventory can be tested.

DOD agreed to request the DOD Inspector General to follow up on the service's actions if it is not readily apparent that the actions in question have been completed in a timely manner.

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**Contents**

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**Abbreviations**

DESC	Defense Electronics Supply Center
DLA	Defense Logistics Agency
DOD	Department of Defense
DMS	Diminishing Manufacturing Sources
GAO	General Accounting Office

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## DOD Policies to Ensure Continued Support in DMS Situations

DOD Directive 4005.16, issued in 1976 and updated in 1984, defines DMS as the loss or impending loss of manufacturers of parts or suppliers of parts or raw materials. It sets up the DMS program to ensure that appropriate and timely actions are taken when essential end item<sup>1</sup> production or support capabilities are endangered by DMS. More specifically, the program is to (1) ensure the availability of end items, parts, and raw materials to support current and planned defense needs, (2) improve operational readiness through timely identification and implementation of the most cost-effective solution to DMS situations, (3) ensure that DMS parts are not designed into new or redesigned systems, and (4) develop an integrated approach among the services to ensure timely resolution of DMS situations. The directive requires the services and the Defense Logistics Agency (DLA) to designate focal points for the DMS program.

This directive also requires DLA and the services to minimize the impact of any potential DMS part shortages. DLA and the services are to develop and implement a way to identify end items on which DMS parts are used so production capability and post-production support can be ensured.

The directive lists several actions that could be taken to avoid shortages caused by manufacturers stopping production. These actions include (1) encouraging the current manufacturer to continue production, (2) finding another source, (3) redesigning the end item to eliminate the DMS part, (4) using a substitute part, and (5) making a life-of-type buy. A life-of-type buy is a one-time procurement, when all cost-effective and prudent alternatives have been exhausted, to meet the future requirement of a part no longer to be produced. DOD said the services and DLA each have programs in place to oversee the DMS program. DOD also said focal points have been established and are now operating effectively.

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## DMS Impact on Readiness and Sustainability

The readiness and sustainability of critical weapon systems can be impaired when needed spare parts are not available. In 1983, a Joint Logistics Commanders study group stated the nonavailability of microelectronic components is analogous to a silent threat—a threat that goes unnoticed until it is too late. The group also said that, if left untreated, the threat will spread to all parts of DOD and reach such a magnitude that there is no possible way that DOD will totally recover and maintain its total system readiness.

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<sup>1</sup>DOD defines an end item as an assembled whole system or equipment, ready for its intended use.

headquarters and command levels. A complete list of the activities contacted is in appendix I.

The Army, Navy, and Air Force did not have centralized management or data available for us to evaluate their DMS program or to determine the extent of their life-of-type buys. Therefore, our review of the services' DMS program was limited to available information. We were unable to determine the extent to which the services bought stock under the program, due to inadequate data. As a result, we could not fully accomplish our objectives within the services.

We concentrated our work at DLA's Defense Electronics Supply Center, which had the most complete DMS database and manages nearly all of DLA's DMS parts. We did not assess the reliability of data from computer-based systems because of the extensive amount of resources it would have required. To determine how DLA administered the program, we reviewed its DMS policies and procedures and interviewed officials at DLA headquarters and DESC. We also visited two DOD depots to determine if the DMS inventory was being properly stored to ensure quality parts would be available when needed.

We took a random sample of 350 of 3,397, or 9 percent, of the DMS parts to determine how frequently DESC bought stock under the program. Our confidence level was 95 percent, with a precision level of plus or minus 5 percent. At DESC we also reviewed contracts, budget data, DMS case files, and other pertinent data.

We also reviewed DESC data on the number of years of inventory it had on hand to determine whether the Center bought DMS stocks that may never be used. We also selected some parts with over a 900-year supply of inventory on hand and reviewed the case files to determine why DESC had that much stock.

We conducted our review between June 1988 and November 1989 in accordance with generally accepted government auditing standards.

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In March 1989, the Air Force Logistics Command and the Air Force Systems Command developed a joint supplement to the Air Force DMS regulation.<sup>1</sup> This supplement,<sup>2</sup> dated May 31, 1989, includes a requirement for field level activities to submit DMS data semiannually. The required data include the number of parts identified and resolved, total dollar amounts, end items affected, and a narrative of situations not resolved at the field level. We did not evaluate the impact this supplement may have on the accumulation of DMS data, because it was too soon to evaluate the effectiveness of the Commands' actions.

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## DOD Established DMS Working Group

In April 1989, subsequent to our inquiry, the Office of the Assistant Secretary of Defense for Production and Logistics set up a DMS ad hoc working group with members from the services and DLA. The purpose of the group is to (1) identify the scope and impact of DMS in DOD, (2) identify existing initiatives that are addressing the DMS problem, (3) recommend priorities for new DMS initiatives, and (4) act as a liaison group with and make recommendations to an ad hoc group composed of industry officials. The group is also to recommend such steps as

- setting up a dedicated information network to share, within industry and defense, suitable part substitutions, existing or potential sources of supply, and spare parts requirements;
- developing a coordinated life-of-type buy methodology among the services and DLA; and
- sharing data on DMS efforts that eliminate the need for weapon system redesign or life-of-type buys.

The group plans to issue a report with its recommendations in June 1990. According to its draft plan, dated July 1989, the group's goals included establishing focal points in the department and in each DOD organization, updating the DMS directive, studying the feasibility of a common information service, improving the accuracy of life-of-type buy calculations, and developing a method to identify potential technological obsolescence during weapon system development.

In March 1989, the Deputy Assistant Secretary of Defense for Logistics said, "Since we cannot fully eliminate the DMS problem, we must learn to manage it." These planned actions show the increased management

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<sup>1</sup>Air Force Regulation 78-7

<sup>2</sup>Air Force Systems Command Air Force Logistics Command Supplement to Air Force Regulation 78-7



equipment manufacturers, consultant firms, and public and private utilities.

Members submit DMS information to the director of the program, who adds the data to the program's database and sends it to the other members. The program is not being used as much as it could be to alert members of relevant information. Since 1981, the program has received only 250 DMS notices from its members. In contrast, the Center had 588 DMS cases during fiscal years 1985 through 1988. The program director said the members need to submit more data to the program.

An indication that program data are not reaching decisionmakers is that Air Force logistics managers for the B-1B, F-111, and KC-135 aircraft said they had never seen a DMS notice from the program, even though the Center is managing numerous DMS parts for those systems. Center officials said these managers need to see this information, and had advised the Air Force of this need for many years.

Another major source for DMS data is the Naval Avionics Center. This activity is the principal source of data submitted to the Exchange Program, according to the program director. The Avionics Center analyzes DMS notices from government and industry sources and sends the data to other government and industry activities.

The Army is developing the Materials and Parts Availability Control Information Data System. This system is designed to focus required information at the local user level to resolve part nonavailability.

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## Forecasting DMS Parts

Increasingly, DOD is conducting studies and assessments to identify which parts will become obsolete. A General Dynamics F-16 aircraft manager said, "A proactive role is extremely cost-effective, not only in removing problems due to obsolete components, but also in recognizing obsolete manufacturing methods which are causing reduced product productivity." Another industry official said potential problem parts could be identified by using general purpose simulation systems, artificial intelligence systems, and Navy databases to provide information on ongoing programs

The Navy has a microcircuit obsolescence management program which includes a database for microcircuits. According to officials from the Naval Avionics Center, the most cost-effective solutions to DMS problems

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## Creating Manufacturing Processes

Emulation is also being used to resolve DMS situations. In emulation, the functions of discontinued parts can be duplicated using current technology. The emulation process results in a product that can be used in place of the DMS part, although the new part will not be like the old one. It uses state-of-the-art technology, such as computer-aided design and simulation, to emulate obsolete technologies. The result is inserting current technology into existing systems, which can improve reliability and maintainability.

According to Center officials, they are pursuing emulation because they can avoid running out of stock sooner than predicted and obtain otherwise nonprocurable parts. The Air Force set up a \$15-million facility in Sacramento, California, to perform emulation projects, primarily on microcircuits. DLA, with Navy participation, is sponsoring a microcircuit emulation program to demonstrate the possibility of replacing obsolete technology microcircuits with current devices. The estimated cost of this project is over \$9 million. In fiscal year 1990, the Army also plans to participate in this program.

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## Conclusions

At the time of our review, little DMS data were available from the services or their focal points to assess the success of the DMS program. Since we began our review, the services have taken, or plan to take, actions to improve their oversight and management of the program. We believe these actions, if properly implemented and monitored, should improve overall management of the program, particularly if data are consolidated. These actions include developing options to address DMS, such as forecasting obsolete parts and cultivating new manufacturing sources. In addition, a working group formed by DOD plans to coordinate these actions and study the viability of having one source for DMS information.

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## Recommendation

We recommend that the Secretary of Defense request the DOD Inspector General to follow up on each of the services' actions and proposals to determine whether the services are providing adequate management of the program.

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## Agency Comments and Our Evaluation

DOD partially agreed with the findings and recommendation in this chapter. DOD agreed that improvements are needed in the services' implementation of the diminishing sources program. According to DOD, planned actions should improve overall management of the program. It

# Defense Electronics Supply Center's Management of DMS Needs Improvement

The Defense Electronics Supply Center, which manages 90 percent of DLA's DMS part, has detailed procedures for managing the parts and has set up management oversight groups to give this area appropriate attention. The results of our random sample indicate the Center resolved most of its DMS situations by making other than life-of-type buys. Although its inventory value of DMS parts has nearly doubled in the last 4 years, some of this growth appears to be from reclassifying existing inventory to the DMS classification.

Certain aspects of the Center's program could be improved. For example, it has not issued adequate guidance for computing life-of-type buy quantities. As a result, the Center is potentially overstocked on some parts and understocked on others. Other guidance is needed for storing DMS parts for long periods and ensuring the quality of on-hand and purchased DMS parts. The Center has parts that may not meet quality requirements now or in the future. Many of these parts are used on weapon systems; therefore, a shortage in quality parts could impair readiness and sustainability. Overstocking or having poor quality parts increases the risk that parts might never be used.

## The Center Has Set Up Detailed DMS Management Procedures

The Center uses an integrated approach to manage its program. It has oversight groups to review DMS actions, focal points who coordinate the handling process, and a computer system to track its parts. According to DLA, the Center uses about 27 staff years<sup>1</sup> in DMS projects each year.

When a manufacturer notifies the Center that it plans to stop making a part, the Center assigns a number to the notification. It uses this case number to track the parts throughout the resolution process. The Center's first step is to contact the manufacturer and try to convince it to continue production. If not successful, the Center contacts other manufacturers of similar parts to determine if they would produce the parts. The Center also contacts users of the parts to determine if substitute parts are acceptable or whether the end items could be redesigned to eliminate the parts.

If this process is unsuccessful, the Center computes future requirements based on sales history and service input. It then determines whether it needs to buy additional inventory. The Center reclassifies the inventory as DMS and manages it as such from that time forward. If a buy is needed, the Center searches more diligently for other manufacturers

<sup>1</sup>A staff year is the equivalent of one person's time for an entire work year.

- The services are maintaining weapon systems for longer periods.
- Because manufacturers are more aware of DMS procedures, they sell more of their inventories of slow-moving parts to the government when it is the only user.

DMS contracts awarded by the Center in fiscal years 1987, 1988, and 1989 exceeded sales by \$28.2 million. These contracts totaled \$84.8 million, while sales were \$56.6 million. Reclassifying existing inventory to DMS status also contributed to its inventory growth.

To determine how the Center resolved DMS situations, we reviewed cases for fiscal years 1985 through 1988. During this time, manufacturers reported they were going to stop producing 8,552 parts managed by DESC. During initial screening, the Center found alternate sources or substitute parts, or the original manufacturer continued production, for 4,615 (54 percent) of the items. For the remaining 3,937 (46 percent) parts, item managers had to decide whether to make a life-of-type buy.

We took a random sample of 350 of these 3,937 parts. For 50 percent of these cases, the Center determined it had sufficient inventory on hand, made a life-of-type buy for 35 percent, had the current manufacturer continue production or found an alternate source for 8 percent,<sup>2</sup> or bought parts as it phased out the end item for 1 percent. Five percent were nonprocurable. The Center had not resolved the situation for one part at the time of our review. Based on our sample, the Center made a life-of-type buy on about one of every six DMS parts.

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## Inaccurate Life-of-Type Buy Quantities

Although we could not directly relate the lack of guidance or definitive requirements to the excessive or deficient inventory levels, these factors could both be contributing factors. Generally, without specific requirements data from the services, the Center's policy is to buy a 10-year supply for life-of-type buys.

According to DESC's October 25, 1989, DMS stock status report, the Center estimated it had more than a 25-year supply for about one-third of the parts (2,916 of 9,149) valued at over \$186 million. Overstocking parts increases the risk that they might never be used and would need to be disposed of in the future. In contrast, the report also showed that the Center had a potential shortage of more than 5 years for over 20 percent

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<sup>2</sup>These parts should not have been listed as parts needing item manager decisions on resolution. They should have been dropped when the Center found a continuing or alternate source.

The data sources item managers used included (1) a study showing the demands for the current quarter and the prior year, (2) a 2-year demand history showing the demand by user, and (3) a demand forecast from the services and other users. For parts with a predictable demand, the item managers would multiply the period a report covered times a number to determine a 10-year supply. For example, they multiplied the 2-year demand history by five.

In addition to the various computations above, item managers did not consistently consider other input. For example:

- Some included foreign military sales as a requirement, while others did not.
- Some added the service and other user forecasted needs to the quantities computed above, while others excluded the forecasted needs if the amount forecasted was lower than the computed quantity.
- Some included past demands from the services and other users, even if DESC did not receive forecasted needs, while others excluded the demands if the Center did not receive forecasted needs.

Even though each of these methods is in accordance with DESC's policy, they could still result in different quantities being bought. Since one of the objectives of the DMS program is to implement the most cost-effective solution, item managers should be provided more specific guidance to achieve this goal. Not all of these methods are proving to be cost-effective.

DOD disagreed that the Center's guidance is inadequate. It said that additional specific guidance cannot be issued to ensure correct and cost-effective calculation of buy quantities. According to DOD, each item must be viewed individually and consideration given to many variables. In addition, DOD stated that its general guidance is augmented by annual training classes where specific emphasis is placed on requirements computations. We agree that one formula cannot be used to calculate the life-of-type quantity for all DMS items. It appears, however, that item managers are not being given sufficient guidance on how to calculate the quarterly forecasted demand because there is apparent confusion among the item managers. Therefore, we continue to believe additional guidance would be beneficial.

application system which will provide application information to the users. Since this is a newly implemented system, we were not able to evaluate whether it will provide the information necessary to calculate requirements.

In addition to inadequate service data, DESC item managers also accepted projected needs, even though demand history did not support them. For example, when the services submitted projected needs for parts they had not requisitioned in over a year, the Center never questioned the amounts.

In June 1988, the Center issued guidance which requires its item managers to get written justification when the value of a proposed buy exceeds \$5,000 and the projected life-of-type need exceeds past demands by 50 percent or more. The procedure still allows the Center to make buys without confirming a service's stated needs. For example, in one case, the Coast Guard submitted a requirement for 40 of a part it had not used in over 10 years. The Center did not verify the need and awarded a contract for \$1,143 for 50 of this part in December 1988.<sup>3</sup> As of September 1989, the Center had received no requests for this part.

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## Quality of DMS Parts Is Unknown

Although the Center buys millions of dollars worth of DMS stock, it has not issued adequate guidance on storing these parts and has not determined the effect of long-term storage on these parts. The Center has also not tested many DMS parts on hand and has not required acceptance testing on many DMS parts. As a result, the Center may have stock that will not meet quality requirements now or in the future. The resulting lack of quality parts could impair the readiness and sustainability of weapon systems.

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## Policy and Procedures for Long-Term Storage Need Improvement

The Center has issued long-term storage guidance, but it applies only to some of its DMS microcircuits. According to the Center officials, they store microcircuits in canisters pressurized with nitrogen because these parts are subject to corrosion and deterioration over time. Furthermore, the procedures set up in this guidance are not being followed.

In 1979, DESC instructed its item managers to store microcircuits in canisters when they make life-of-type buys. It has since supplemented these

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<sup>3</sup>The contractor gave DESC a lower unit price for buying 50 of this part. As a result, the Center paid less for 50 than it would have for 40.

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## DMS Testing Program Needs to Be Formalized

The Center does not require acceptance testing on some DMS parts and has not tested many of its DMS parts. In October 1988, at the direction of the Center Commander, the Center began requesting parts from the depots for testing. In July 1989, the Center officials said 11 of 78 parts tested had failed. Test officials said they need to do additional tests on some of these parts as well as additional parts in certain federal supply classes before they consider the results final. The Center subjected the 78 parts to a total of 2,906 tests. The 78 parts failed 69 of the tests (2.37 percent). This failure rate is higher than the overall rate of 1.77 percent for the parts the Center tested in fiscal year 1988. Manufacturers often delete testing and documentation requirements when the Center makes a life-of-type buy. As a result, it is often difficult to determine why a part failed. According to Center officials, the government is not in a strong negotiating position when making life-of-type buys and cannot always require testing.

To determine the extent to which the Center requires tests on DMS parts, we reviewed the life-of-type buy awards for fiscal years 1988 and 1989 in our sample of 350 parts. Of these 49 awards, the Center required testing on 17 (35 percent). Because these parts were not tested at the time of receipt, and the test results on parts from storage are inconclusive, the Center does not know that many of these items are of poor quality. In addition, it cannot determine whether the parts were inadequate at the time of receipt or after a period of time.

DOD said the Center will increase sample testing to further identify any problems that may exist. According to DOD, the Center has added testing resources that will allow it to decrease the backlog of material receipts within 18 months.

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## DMS Impact on Weapon Systems

We did not focus on the impact of DMS parts on weapon system readiness and sustainability, but we did obtain some data on how many critical parts could have a potential shortage. We also identified some DMS parts to show their potential impact on weapon systems.

The July 25, 1989, DMS master list had 78 parts that are critical to the operation of a weapon system that needed more stock more than the Center had. According to DESC records, as of September 27, 1989, these parts affected 115 weapon systems and support equipment programs. Thus, the Center ran out of, or estimated that it will run out of, these parts long before the applicable equipment is expected to be phased out. For example:

stocks to DMS status and some is from life-of-type buys, it cannot be determined how much each of these factors contributed to this growth. However, the program needs to be improved because item managers have inadequate guidance for calculating DMS buy quantities, and the services are not providing sufficient or accurate information to the Center for it to determine accurate life-of-type buy requirements. The Center has also not issued adequate guidance on long-term storage requirements for DMS parts, or for ensuring the quality of DMS parts when it makes life-of-type buys.

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## Recommendations

We recommend the Secretary of Defense direct the services to (1) properly implement DOD policy to provide oversight of the program and (2) develop parts requirements for those with diminishing sources based on past usage and valid projections of future needs.

We further recommend that the Director, DLA, direct the Center to

- issue adequate guidance for its item managers to ensure correct calculations of the quantity when making life-of-type buys;
- determine which parts need special long-term storage protection, ascertain what protection is required, and provide it as necessary;
- establish a program to periodically test samples of on-hand diminishing sources parts to evaluate the quantities of stock in inventory; and
- ensure that the quality of parts is satisfactory through quality assurance tests or other means before the Center accepts them.

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## Agency Comments and Our Evaluation

DOD agreed that the services must provide accurate requirements data to DESC. It said that the Air Force was implementing a system to provide information regarding the systems on which DMS items are used. DOD also generally agreed that more oversight is needed to ensure that long-term storage requirements are being followed and, as a result, long-term storage instructions will be issued to depot personnel. It did not agree, however, that protected storage is required for all DMS parts. It added that there is no indication that electronic parts will deteriorate to an unstable state over the long term. Furthermore, it said that DESC has developed the only long-term storage standards for electronics parts such as microcircuits because industry does not store electronics parts for long periods.

We did not recommend protected storage for all parts. We recommended that DESC determine which parts need special long-term protection. Our



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# Years of Diminishing Manufacturing Sources Stock Managed by the Defense Electronics Supply Center as of June 25, 1988

Years of stock on hand	Number of parts	Percent of total	Total assets	Percent of total
0	662	9.51	\$107,692.94	0.04
1 to 1.0	373	5.36	2,061,399.18	0.68
1.1 to 2.0	310	4.45	2,047,695.48	0.68
2.1 to 3.0	330	4.74	2,728,920.37	0.90
3.1 to 4.0	243	3.49	2,336,119.60	0.77
4.1 to 5.0	244	3.50	4,590,229.03	1.52
5.1 to 7.5	512	7.35	24,369,325.25	8.05
7.6 to 10.0	468	6.72	31,558,508.57	10.42
10.1 to 25.0	1,525	21.90	102,229,876.30	33.76
25.1 to 50.0	913	13.11	55,753,763.84	18.41
50.1 to 100.0	625	8.97	34,826,032.09	11.50
100.1 to 200.0	374	5.37	15,275,239.34	5.04
200.1 to 300.0	139	2.00	5,386,252.34	1.78
300.1 to 700.0	157	2.25	8,662,441.22	2.86
700.1 to 900.0	27	0.39	2,979,450.14	0.98
900.1 to 1,000	10	0.14	411,475.43	0.14
1,000.1 to 1,500	24	0.34	1,674,819.25	0.55
1,500.1 to 2,000	11	0.16	1,499,132.54	0.50
2,000.1 to 3,000	12	0.17	1,479,411.26	0.49
3,000.1 to 4,000	2	0.03	136,386.05	0.05
4,000.1 to 5,000	0	0.00	0	0.00
5,000.1 to 7,500	2	0.03	338,635.87	0.11
Over 7,500	1 <sup>a</sup>	0.01	2,381,943.28	0.79
<b>Total</b>	<b>6,964</b>	<b>100.00</b>	<b>\$302,834,749.37</b>	<b>100.00</b>

<sup>a</sup>This part had about a 22-year supply on hand. The Center's report was erroneous because the computer data file did not reflect actual demand data for the part.

Source: DMS stock status report dated June 25, 1988.

# Comments From the Department of Defense



PRODUCTION AND  
LOGISTICS

ASSISTANT SECRETARY OF DEFENSE  
WASHINGTON, D. C. 20301-8000

May 24, 1990

(L/SD)

Mr. Frank C. Conahan  
Assistant Comptroller General  
National Security and International  
Affairs Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report "DEFENSE INVENTORY: Improvement Needed in DoD's Diminishing Manufacturing Sources Program," dated April 5, 1990, (GAO Code 391612), OSD Case 8295. The DoD partially concurs with both the findings and recommendations of the draft report.

The DoD agrees that improvements are needed in the Service's implementation of the Diminishing Manufacturing Sources program. To that end, the DoD is in the process of finalizing an Action Plan to be published in June 1990. The Action Plan is intended to transition the DoD from a reactive mode to a proactive mode in addressing issues of diminishing manufacturing sources. However, the DoD takes exception to the GAO assertion that more specific guidance is needed to ensure that correct calculations are made when making life-of-type buys. There are many variables involved when considering electronic parts purchases, and each purchase must be viewed individually. The current procedures were developed to accommodate these differences.

The findings and recommendations are addressed in greater detail in the enclosure. The DoD appreciates the opportunity to comment on the draft report.

Sincerely,

A handwritten signature in cursive script that reads "David M. Berteau".

David M. Berteau  
Principal Deputy

Enclosure

The GAO noted that the policy also requires the Services and the Defense Logistics Agency to develop and implement a way to identify end items that use diminishing sources parts and to designate focal points for monitoring program implementation. (p. 3, pp. 15-17/GAO Draft Report)

DoD Response: Concur. Each of the Services and the Defense Logistics Agency have programs in place to oversee the Diminishing Manufacturing Sources program. Focal points have been established and are now operating effectively.

- FINDING B: Increased Service Attention to the Diminishing Manufacturing Sources and Material Shortages Program Management. The GAO observed that, at the time of its review, the Services had not adequately implemented the DoD policy for the Diminishing Manufacturing Sources and Material Shortages program. The GAO reported that, as a result, the Services could not readily provide the data needed by the GAO to assess program implementation. The GAO found that, although the Services had established focal points for the program (as required by DoD policy), the focal points could not provide Diminishing Manufacturing Sources program information on (1) the number of parts the Services were managing, (2) the amount of their inventory, or (3) the amount they had spent on parts. The GAO noted that, in response to its inquiries, the Services have recently taken action to improve their management of the Diminishing Manufacturing Sources program. The GAO reported that, in April 1989, the Army indicated it was in the process of improving its oversight and control of the Diminishing Manufacturing Sources program and had taken steps to reduce and control life-of-type buys. The GAO also reported that, in June 1989, the Navy indicated it had reviewed its procedures and was updating its policy and procedures to consolidate information to facilitate more effective and efficient management reviews. In addition, the GAO reported that, in March 1989, the Air Force Logistics Command and the Air Force Systems Command developed a joint supplement to the Diminishing Manufacturing Sources program regulation, which includes a requirement for field activities to submit data semiannually and to include more detailed Diminishing Manufacturing Sources program-related data. The GAO noted that it is still too soon to evaluate the impact of the Service corrective actions. The GAO concluded, however, that if the described actions are properly implemented and monitored, they should improve overall management of the

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likely fall under the Diminishing Manufacturing Sources program, (3) cultivating other sources to produce discontinued parts, and (4) creating manufacturing processes to replace or emulate discontinued designs. The GAO discussed plans and actions for each of the strategies. The GAO concluded that the planned actions, if properly implemented and monitored, should help improve the overall management of the Diminishing Manufacturing Sources program. (pp. 26-32/GAO Draft Report)

DoD Response: Concur. The DoD is taking proactive measures to address diminishing manufacturing sources. (See Findings B and C, and the DoD responses to Finding I and Recommendations 1 through 7.)

- FINDING E: Defense Electronics Supply Center Management of Diminishing Manufacturing Sources Program Parts. The GAO reported that the Defense Logistics Agency gave the Defense Electronics Supply Center responsibility for handling the Diminishing Manufacturing Sources program. The GAO found that the Center has developed detailed procedures for managing program parts and has set up management oversight groups to give the area appropriate attention. The GAO reported that the Center uses focal points to coordinate the handling process and a computer system to track its diminishing source parts. The GAO explained that, when a manufacturer notifies the Center it plans to stop making a part, the Center assigns a number to the notification and uses that case number to track the parts throughout the resolution process. The GAO discussed the various steps the Center takes to contact manufacturers and users to work out alternate sources or methods to deal with the situation. The GAO explained that, if the initial process is unsuccessful, the Center computes future requirements based on sales history and Service input--and then determines whether additional inventory is needed. According to the GAO, the Center then reclassifies the inventory as falling under the Diminishing Manufacturing Sources program and manages it accordingly. The GAO noted that, if a buy is needed, the Center searches more diligently for other manufacturers and substitute parts--and if these are not available, makes a life-of-type buy. The GAO reported that the Center computer system has a master list of all the diminishing source parts it manages, which indicates those that have no alternate source. In addition, the GAO noted that the system produces the stock status report, which includes (1) the total asset value of the quantity on hand, (2) the estimated annual

- **FINDING G: Impact Of Life-Of-Type Buys On Inventory Growth.** The GAO reported that, when a life-of-type buy is the only alternative, the Center requests the Services to provide projected requirements for the part. The GAO further reported that, in those cases where the Services do not provide that information, the Center buys parts based on past demands, which the GAO concluded is not always an accurate prediction of projected needs. The GAO noted that, generally, without specific requirements data from the Services, the Center policy is to buy a 10-year supply for life-of-type buys.

According to the GAO, the October 1989 Diminishing Manufacturing Sources program stock status report indicated that the Center had more than a 25 year supply (the expected life of a weapon system) for about one-third of the parts--valued at over \$186 million. The GAO observed that overstocking parts increases the risk that they might never be used and would need to be disposed of in the future. The GAO also reported that, in contrast, the report also showed the Center had a potential shortage of more than 5 years for over 20 percent of the diminishing source parts. The GAO noted that those shortages could seriously impair readiness and sustainability of weapon systems. The GAO also reported the Diminishing Manufacturing Sources program report indicated that the life-of-type buy items in its sample had an average of about 58 years of stock in inventory--and that the Center had over a 25 year supply for 47 of the 122 life-of-type buy items. The GAO noted that the report also showed the Center had over 900 years of inventory for about one percent of its diminished sources parts. The GAO observed that, in some cases, the Center had stock on hand when it classified parts as falling under the Diminished Manufacturing Sources program, while in other cases it made a life-of-type buy based on past demand or the Service estimate--and then the demand dropped sharply.

The GAO reported that, according to Center officials, the stock status report was not intended to identify parts with excess stock. The GAO further reported the officials indicated that on-hand inventories are generally bought based on past demands--when demands decrease, stocks appear excessive; if stocks are reduced and a shortage may even exist. While agreeing with the Center assessment, the GAO nevertheless concluded that the data in the Diminished Manufacturing Sources program report reasonably state the years of stock in inventory, based on demands as of the computation date. The GAO further concluded

cited differences in how item managers considered (1) foreign military sales, (2) user forecasted needs, and (3) past user demands. The GAO observed that even though each of the methods are in accordance with Center policy, they could still result in different quantities being bought. The GAO concluded that, since one of the objectives of the Diminishing Manufacturing Sources program is to implement the most cost effective solution, item managers should be provided with more specific guidance to achieve that goal. The GAO concluded that not all the methods being used are proving to be cost effective. The GAO further concluded that, overall, the Center has provided inadequate guidance to its item managers for computing life-of-type buys for diminishing stock—asserting it is an area that needs improvement. (p. 6, pp. 40-42, p. 51/GAO Draft Report).

**DoD Response:** Non-concur. The DoD does not agree that additional specific guidance can be issued to ensure correct and cost-effective calculation of buy quantities. Each item must be viewed individually and consideration given to the many variables involved. As an example, the two most important factors in computing a buy quantity for a receiving tube are the 10-year demand history and the expected life of the system(s) being supported. On the other hand, the 10-year history may not be meaningful for microcircuit buys, since it would not contain requirements for new production. Written guidance has been issued in a Defense Electronics Supply Center standard operating procedure and associated memoranda. The guidance is augmented by annual training classes where specific emphasis is placed on requirements computations. The differences in the variety of data sources used, reported by the GAO, may be entirely appropriate for many different types of electronic parts and the variety of end items that a particular part(s) supports.

- **FINDING I: Need for Adequate Service Input And Verification.** The GAO observed that inadequate Service data can also contribute to an inaccurate inventory of diminishing sources stock. The GAO reported that DoD Directive 4005.16 requires the Services to implement a method to identify end item application for critical items affected by the Diminishing Manufacturing Sources program. According to the GAO, however, the Air Force focal point advised that the Service cannot determine on what system a part is used and, therefore, cannot give the Center requirements data. The GAO reported that, as a result, the Center must use past sales

reduced substantially, more time and effort would be spent on an already labor-intensive program, with minimal payback.

- **FINDING J: Need For Guidance On Long-Term Storage Of Diminishing Sources Parts.** The GAO found that, although the Center buys millions of dollars worth of Diminishing Manufacturing Sources program stock, it has not issued adequate guidance on storing the parts, nor has it determined the effect of long-term storage on those parts. According to the GAO, the Center has issued long-term storage guidance, but it applies only to some diminishing stock microcircuits. The GAO explained that, although the Center often buys parts to be used 10 years in the future, it has not determined whether special long-term storage protection is needed. The GAO found, for example, that in accordance with a 1979 instruction, the Center stores some microcircuits in nitrogen pressurized canisters. The GAO further found, however, that the instructions do not require stock already on hand to be put in canisters until it becomes stock under the Diminishing Manufacturing Sources Program. The GAO reported that, as of June 1989, only about one-half of the total value of the Center's diminishing stock microcircuits was being stored in canisters.

The GAO found that another long-term storage problem involves maintaining pressure in the canisters. The GAO visited depots in Richmond, Virginia, and Ogden, Utah, and found instances where required pressures were not being maintained in the storage canisters. The GAO concluded that more oversight and management attention is needed to ensure that depots follow the requirements for long-term storage. The GAO observed that, according to Center officials, no studies have been done to show whether nitrogen storage will protect microcircuits from corrosion and deterioration or whether other diminishing stock parts need special long-term protection. The GAO observed that, as a result, the Center has not issued any storage instructions for parts other than the microcircuits. The GAO concluded that, overall, the Center policy and procedures on long-term parts storage need improvement. (p. 6, p. 9, pp. 44-47, p. 51/GAO Draft Report).

**DoD Response:** Partially concur. There is no standard available to determine how long microcircuits can remain in storage without deterioration. Industry does not store microcircuits for long periods. The Defense Electronics Supply Center experience



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Center does not know how many of the diminishing sources stock items are of poor quality, nor can it determine whether the parts were inadequate at the time of receipt or after a period of time. The GAO reported that Center officials said they have not received many complaints from the Services on the quality of parts. The GAO further reported that the Center has limited testing resources and, therefore, does not plan to change the diminishing stock testing program. The GAO nevertheless concluded that the diminishing stock testing program needs to be formalized and guidance issued to ensure that all such parts pass acceptance tests when life-of-type buys are made. (p. 6, p. 10, pp. 47-48, p. 51/GAO Draft Report).

DoD Response. Partially concur. The Defense Electronics Supply Center experience indicates that the quality of diminishing manufacturing sources parts is no worse than the other parts the Center buys. However, the Defense Electronics Supply Center Quality Directorate will increase sample testing of diminishing manufacturing sources parts to further define any problems that may exist. The Center now has increased resources for testing. Presently there is a substantial backlog of new receipts of microcircuits awaiting testing. The additional resources will allow this backlog to be worked down to a normal level within 18 months.

- FINDING L: The Impact of Diminishing Sources Parts On Weapon Systems. The GAO reported that it did not focus on the impact of diminishing sources parts on weapon system readiness and sustainability, but did obtain some data on how many critical parts could have a potential shortage. The GAO also identified some diminishing source parts to show their potential impact on weapon systems. According to the GAO, the July 1989 Diminishing Manufacturing Sources program master list had 78 parts that are critical to the operation of weapon systems and that require more stock than was available at the Center. The GAO reported that Center records indicated that, as of September 1989, those 78 parts affected 115 weapon systems and support equipment programs. The GAO observed, therefore, that the Center has run out of, or estimates it will run out of, those parts long before the applicable equipment is expected to be phased out. The GAO discussed several examples of diminishing stock parts that have, or could in the future, affect various systems and pointed out DoD actions to address the problems. In addition, the GAO reported Center officials indicated that they were also working

the number of parts with diminishing sources; and the number and value of life-of-type buys.

- **RECOMMENDATION 3:** The GAO recommended that the Secretary of Defense direct the Services to develop parts requirements for those with diminishing sources, based on past usage and valid projections of future needs. (p. 10, p. 51/GAO Draft Report)

**DoD Response:** Partially concur. The DoD requirements for parts with diminishing sources are already based on past usage and valid projections of future needs. In the case of the Air Force Logistics Command, life-of-type buys are determined by multiplying an average annual repair requirement times the projected years of service times the replacement factor times the quantity per application. Although the formula is simple, it provides a realistic requirement for system support. In addition, in order to help in the process of gathering requirements data, the DoD plans to establish a Diminishing Manufacturing Sources Oversight Group. The Group will meet when the Defense Electronics Support Center is unable to obtain needed requirements data from the Services in a timely manner. This is one of the actions included in the DoD Diminishing Manufacturing Sources Ad Hoc Working Group Action Plan scheduled to be completed in June 1990.

- **RECOMMENDATION 4:** The GAO recommended that the Director, Defense Logistics Agency, direct the Defense Electronics Supply Center to issue specific guidance for its item managers to ensure correct calculations of the quantity when making life-of-type buys. (p. 11, p. 51/GAO Draft Report)

**DoD Response:** Nonconcur. Specific guidance cannot be written that would cover all the variables involved in making a life-of-type buy for the 70-plus Federal Supply Classes managed by the Defense Electronic Supply Center. Written guidance has been issued which allows for Inventory Managers to consider all of the variables involved in the wide range of items and to select the most appropriate criteria when determining requirements. This written guidance is augmented by annual training classes where specific emphasis is placed on requirements computation.

- **RECOMMENDATION 5:** The GAO recommended that the Director, Defense Logistics Agency, direct the Defense Electronics Supply

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- **RECOMMENDATION 7:** The GAO recommended that the Director, Defense Logistics Agency, direct the Defense Electronics Supply Center to ensure that parts pass quality assurance tests before the Center accepts them. (p. 11, p. 52/GAO Draft Report).

**DoD Response:** Concur. The Defense Electronics Supply Center has developed an in-house capability to test parts on receipt. This program will allow the Center to reject unacceptable parts. The Center's Quality Directorate will expand the testing of parts to the program's fullest capability within the limitations of testing equipment and personnel availability.

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Center (1) to determine which parts need special long-term storage protection, (2) to ascertain what protection is required, and (3) to provide it, as necessary. (p. 11, p. 51/ GAO Draft Report)

DoD Response: Partially concur. The DoD agrees that more oversight and management attention is needed to ensure the requirements for long-term storage. The Defense Logistics Agency will issue instructions to depot personnel to emphasize that additional attention is needed to insure proper storage of life-of-type buy stocks. In regard to standards, there are no standards available on which to base long-term storage of electronic parts such as microcircuits, except those developed by the Defense Electronics Supply Center. Industry does not store these types of parts for long periods. There is no indication that parts will deteriorate to an unusable state over the long term. The Defense Electronics Supply Center Quality Directorate has determined that pressurized nitrogen containers will prevent some types of deterioration of microcircuits stored for several years, and they have been using this method for some time. There is no indication that it does not perform satisfactorily.

- RECOMMENDATION 6: The GAO recommended that the Director, Defense Logistics Agency, direct the Defense Electronics Supply Center to establish a program to test samples of on-hand diminishing sources parts periodically to evaluate the quantities of stock in inventory. (p. 11, p. 52/GAO Draft Report).

Now on pp. 4, 29.

DoD Response: Partially concur. The Defense Electronics Supply Center already has a program to test inventories periodically. If the test shows the stock is bad, there are usually no alternatives available to replace it (other than emulation for some types of microcircuits).

The Center has recently increased its resources for testing. Presently there is a substantial backlog of new receipts of microcircuits awaiting testing. The additional resources will allow this backlog to be worked down to a normal level within 18 months, at which time additional parts in the inventory can be tested.

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with the North American Aerospace Defense Command to monitor 600 diminishing stock electronic parts used in its control center for tactical warning and attack assessment. (pp. 48-50/GAO Draft Report).

**DoD Response:** Concur. On the parts for which stocks will run out prior to phase-out of the supported systems, the DoD will have to modify/redesign/replace the systems.

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#### RECOMMENDATIONS

- **RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense request the DoD Inspector General to follow-up on each of the Service's actions and proposals to determine whether the Services are providing adequate management of the Diminishing Manufacturing Sources program. (pp. 10-11, p. 33/GAO Draft Report)

Now on pp. 4, 17.

**DoD Response:** Concur. The DoD is developing an Action Plan to address the management of the Diminishing Manufacturing Sources program. The Action Plan is scheduled to be completed in June 1990. After the Services have agreed to the actions in the Action Plan and to the related completion dates for those actions, and if it is not readily apparent that the actions in question have been completed in a timely manner, the DoD will request follow-up action by the DoD Inspector General.

- **RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense direct the Services to implement properly DoD policy to provide oversight of the Diminishing Manufacturing Sources program. (p. 10, p. 51/GAO Draft Report)

Now on pp. 4, 29.

**DoD Response:** Concur. The DoD Diminishing Manufacturing Sources Ad Hoc Working Group Action Plan, scheduled to be completed in June 1990, will contain action items that will result in providing appropriate oversight of the program. This will include developing Service plans to be able to determine: the value of the diminishing manufacturing sources inventory;



indicates that nitrogen pressurized containers will prevent certain types of deterioration. Microcircuits other than those in the Diminishing Manufacturing Sources program do not require long term storage, since they are issued continuously and replaced with new stock from procurements. Further, the Defense Electronics Supply Center Quality Directorate has determined that other types of items generally do not require specialized long-term storage. The DoD agrees that more oversight and management attention is needed to ensure that long-term storage requirements are being met. Accordingly, by July 1990, the Defense Logistics Agency will issue instructions to depot personnel to emphasize the additional attention needed to ensure proper storage of life-of-type buy stocks.

- **FINDING K: Need For A Formalized Diminishing Sources Testing Program.** The GAO found that the Defense Electronics Supply Center does not require acceptance testing on some diminishing stock parts and has not tested many of them. The GAO learned that, in October 1988, the Center began requesting parts from the depots for testing. The GAO found that the Center's testing of diminishing sources stock, performed in July 1989, showed that 11 of 78 different parts failed. The GAO was advised by test officials that they need to do additional tests on some of the same parts, as well as more parts in certain Federal supply classes, before they can consider the results final. According to the GAO the Center subjected the 78 parts to a total of 2,906 tests and the 78 parts failed 69 of the tests (2.37 percent)--a higher failure rate than the overall failure rate of 1.77 percent for the parts the Center tested in FY 1988. The GAO found that manufacturers often delete testing and documentation requirements when the Center makes a life-of-type buy--as a result, it is often difficult to determine why a part failed. The GAO noted that, according to Center officials, the Government is not in a strong negotiating position when making life-of-type buys and, therefore, cannot always require testing.

The GAO reviewed the life-of-type buy awards from the diminishing stock parts it sampled for FY 1988 and 1989. The GAO found that, of the 49 life-of-type awards in its sample, the Center required testing on 17 items--or 35 percent. The GAO pointed out, however, that this means the Center did not require acceptance testing on almost two-thirds of the parts. According to the GAO, because the parts were not tested at the time of receipt and because test results from storage items are inconclusive, the

data to predict future use, instead of actual projected needs from the Air Force. The GAO cited several examples which indicated that prior usage data are not always a good indicator of projected future use.

The GAO found that, in addition to inadequate Service data, the Center item managers also simply accepted projected needs, even though demand history did not support them. The GAO reported, for example, that when the Services submitted projected needs for parts they had not requisitioned in over a year, the Center never questioned the amounts. The GAO learned that, in June 1988, the Center issued guidance requiring item managers to get written justification when the value of a proposed buy exceeds \$5,000 and the projected life-of-type need exceeds past demands by 50 percent or more. The GAO pointed out, however, that procedure still allows the Center to make buys without confirming the Services' stated needs. The GAO concluded that the Services are not providing sufficient or accurate information for the Center to determine accurate life-of-type buy requirements-- asserting that it is another area where the Diminishing Manufacturing Sources program needs to be improved. (p. 6, pp. 42-44, p. 51/GAO Draft Report).

DoD Response: Partially concur. It is agreed that the DoD must emphasize and enforce the requirement that the Services identify end item application for use in providing accurate requirements data to the Defense Electronics Supply Center. The DoD Action Plan, scheduled to be completed in June, 1990, calls for the Services to improve/expand their application data files.

However, the DoD does not agree that the Air Force cannot determine on what system a part is used. In the past, the Air Force Logistics Command was, at times, unable to determine on what system a part was used. The application information was routinely available through interrogation of the Master Material Support Record System, DO49. As of May 1990, the Requirements Data Bank Applications/Programs/Indentures is providing necessary application information to the users.

In regard to written justification of proposed life-of-type buys, it is not considered cost effective to require written justification for buys of less than \$5000.00. The example cited by the GAO had a buy of \$1143.00. If the \$5000.00 floor were

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28-29

that life-of-type buys contribute to overall inventory growth. (pp. 8-9, pp. 39-40, p. 50/GAO Draft Report).

**DoD Response:** Partially concur. Life-of-type buys do contribute to overall inventory growth. The implication is that if the Defense Electronic Supply Center has more than 25 years worth of stock, some of it will not be used and will be disposed of. This may in fact occur on some items. However, the Diminishing Manufacturing Sources program stock status report is not by itself an appropriate tool to determine whether items have overages or shortages. Some of the assets procured are intended to be used not only as spare parts, but also for production of end items in the out-years. Thus, a snapshot which compares current stocks with current usage will indicate that excess stocks exist when, in fact, they may not. Further, some end items are expected to be in the DoD inventory and will require support beyond 25 years.

The GAO reported that over 20 percent of the diminishing manufacturing sources parts have shortages of more than five years. These may not be true shortages, since many of the buys were made several years ago and were for the expected life of the end item. As an example, the electron tubes procured in FY 1984 to support the KW-37 communication system should have about three to four years of stock remaining, since the KW-37 is scheduled for phase-out in the early 1990s.

**FINDING H: Inadequate Center Guidance On Diminishing Manufacturing Sources Program Buys.** The GAO reported that the general policy of the Defense Electronics Supply Center is to buy what is needed to reach a 10-year supply, based on past demand or input from the Services. The GAO found, however, that item managers actually used a variety of data sources and methods to determine the amount for a 10-year supply. The GAO reported that the data sources used included (1) a study showing the demands for the current quarter and the prior year, (2) a two year demand history showing the demand by user, and (3) a demand forecast from the Services and other users. The GAO explained that, for parts with predictable demand, item managers would simply multiply the period a report covered times a number to determine a 10-year supply.

In addition to the various computations, the GAO also found that item managers did not consistently consider other input. The GAO

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usage, and (3) the estimated number of years of stock in the inventory. The GAO concluded that the Defense Electronics Supply Center has implemented the DoD policy with regard to the Diminishing Manufacturing Sources program. (pp. 3-6, pp. 34-36, p. 50/GAO Draft Report)

**DoD Response:** Partially concur. The Defense Electronics Supply Center is involved in over 90 percent of the Defense Logistics Agency diminishing manufacturing source items, but the Center has not been given responsibility for the entire program. This responsibility rests in the headquarters of the Defense Logistics Agency.

- **FINDING F: The Diminishing Sources Inventory Has Grown Substantially.** The GAO found that the Defense Electronics Supply Center inventory of diminishing sources stock has nearly doubled in the last 4 years--rising to almost 8,500 parts, valued at about \$279 million. The GAO noted that, while life-of-type buys and reclassifying inventory have contributed to that increase, data are not available to determine how much each category of action contributed overall to diminishing sources stock inventory growth.

To determine how the Center resolved diminishing Sources situations, the GAO reviewed cases for FY 1985 through FY 1988. According to the GAO, manufacturers reported they were going to stop producing 8,552 Center managed parts during that period. The GAO found that the Center resolved the parts problems during initial screening for 4,615 of the items (or 54 percent), while item managers had to decide whether to make a life-of-type buy for the remaining 3,937 parts. The GAO sampled 350 of the 3,937 parts and found that, for 50 percent, the Center (1) made a life-of-type buy, (2) had the current manufacturer continue production or found an alternate source for 8 percent, or (3) bought parts as it phased out the end item for one percent. The GAO observed that, based on its sample, the Center made a life-of-type buy on about 1 of every 6 parts managed under the Diminishing Manufacturing Sources program. (pp. 4-5, pp. 7-8, pp. 36-38/GAO Draft Report).

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**DoD Response:** Concur. The Center procured only one out of every six diminishing manufacturing source items, or 17 percent.

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Diminishing Manufacturing Sources and Material Shortages program. (p. 4, pp. 6-7, pp. 22-24, p. 32/GAO Draft Report)

DoD Response: Concur. Planned actions of the Services and the Defense Logistics Agency should improve overall management of the Diminishing Manufacturing Sources and Material Shortages program.

- **FINDING C: Establishment of a DMS Working Group.** The GAO reported that, in April 1989, subsequent to its [the GAO] inquiry, the Office of the Secretary of Defense set up a Diminishing Manufacturing Sources program ad hoc working group with members from the Services and the Defense Logistics Agency to, among other things, assess the current effort in the DoD and recommend new initiatives. According to the GAO, the group's goals include (1) establishing focal points in each DoD organization, (2) updating the Diminishing Manufacturing Sources program directive, (3) studying the feasibility of a common information service, (4) improving the accuracy of life-of-type buy calculations, and (5) developing a method to identify potential technical obsolescence during weapon system development. The GAO noted that, in June 1990, the ad hoc group plans to issue a report with its recommendations. The GAO also cited a March 1989 statement made by the Deputy Assistant Secretary of Defense for Logistics, in which he said, "since we cannot fully eliminate the DMS problem, we must learn to manage it." The GAO observed that the planned actions show the increased management attention that the Diminishing Manufacturing Sources and Material Shortages program is expected to receive in the future from the Office of the Secretary of Defense, the Defense Logistics Agency, and the Services. (p. 7, p. 22, pp. 24-25/GAO Draft Report)

Now on pp. 3, 13-14

DoD Response: Concur.

- **FINDING D: Strategies To Address Situations Related to the Diminishing Manufacturing Sources and Material Shortages Program.** The GAO found that, in addition to the identified planned actions (see Findings B and C), the DoD has recognized other ways to address the situations related to the Diminishing Manufacturing Sources program. The GAO reported that those strategies include (1) developing information systems for manufacturers to notify users of discontinued parts, (2) forecasting which parts will

GAO DRAFT REPORT - DATED APRIL 5, 1990  
(GAO CODE 391612) OSD CASE 8295

"DEFENSE INVENTORY: IMPROVEMENT NEEDED IN DOD'S  
DIMINISHING MANUFACTURING SOURCES PROGRAM"

DEPARTMENT OF DEFENSE COMMENTS

\* \* \* \* \*

FINDINGS

- FINDING A: Background: DoD Diminishing Manufacturing Sources Program. The GAO explained that managers of defense weapon systems face the problem of maintaining the systems when manufacturers stop making needed spare parts. According to the GAO, the Deputy Assistant Secretary of Defense for Logistics has said that all new weapons systems entering production in FY 1989 have parts that will not be available when they become operational, particularly in the rapidly changing electronics technology area. The GAO observed that the demand for high-technology parts, coupled with a shorter life cycle of the technology and the long life of weapon systems, is rapidly increasing the nonavailability of parts.

The GAO reported that, in 1976, in order to address the problem, the DoD established the Diminishing Manufacturing Sources program to ensure that appropriate and timely actions are taken when essential end item production or support capabilities are endangered. The GAO observed that the DoD policy is, as follows:

- minimize the impact of diminishing sources parts;
- improve operational readiness by identifying and implementing the most effective solutions to diminishing sources problems;
- ensure such parts are not designed into new systems; and
- develop procedures to ensure an integrated approach to improve responsiveness to diminishing sources situations.

# Years of Diminishing Manufacturing Sources Stock Managed by the Defense Electronics Supply Center as of October 25, 1989

Years of stock on hand	Number of parts	Percent of total	Total assets	Percent of total
0	1,110	12.13	\$500,667.77	0.16
1 to 1.0	546	5.97	1,364,232.06	0.44
1.1 to 2.0	489	5.34	1,521,158.87	0.49
2.1 to 3.0	435	4.75	1,899,459.01	0.61
3.1 to 4.0	335	3.66	2,857,795.58	0.91
4.1 to 5.0	301	3.29	4,292,634.61	1.37
5.1 to 7.5	669	7.31	14,390,418.80	4.60
7.6 to 10.0	546	5.97	12,561,004.96	4.01
10.1 to 25.0	1,802	19.70	87,306,451.90	27.89
25.1 to 50.0	1,130	12.35	68,587,835.39	21.91
50.1 to 100.0	736	8.04	54,008,726.16	17.25
100.1 to 200.0	502	5.49	24,020,129.49	7.67
200.1 to 300.0	203	2.22	11,428,494.62	3.65
300.1 to 700.0	199	2.18	10,958,272.24	3.50
700.1 to 900.0	44	0.48	2,502,346.11	0.80
900.1 to 1,000	9	0.10	429,935.62	0.14
1,000.1 to 1,500	41	0.45	5,261,369.60	1.68
1,500.1 to 2,000	19	0.21	1,891,906.64	0.60
2,000.1 to 3,000	20	0.22	2,504,062.80	0.80
3,000.1 to 4,000	5	0.05	500,657.90	0.16
4,000.1 to 5,000	1	0.01	248,630.32	0.08
5,000.1 to 7,500	6	0.07	1,676,467.58	0.54
Over 7,500	1	0.01	2,330,266.75	0.74
<b>Total</b>	<b>9,149</b>	<b>100.00</b>	<b>\$313,042,924.78</b>	<b>100.00</b>

<sup>1</sup>This part actually had about a 22-year supply on hand. The Center's report was erroneous because the computer data file did not reflect actual demand data for the part.

Source: DMS stock status report dated October 25, 1989.

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# Activities Contacted During the DMS Review

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- Office of the Assistant Secretary of Defense (Acquisitions and Logistics), Washington, D.C.
- Headquarters, U.S. Army, Washington, D.C.
- Army Materiel Command, Alexandria, Virginia
- Army Laboratory Command, Adelphi, Maryland
- Army Communications - Electronics Command, Fort Monmouth, New Jersey
- Army Tank - Automotive Command, Warren, Michigan
- Army Missile Command, Redstone Arsenal, Alabama
- Army Armament, Munitions and Chemical Command, Rock Island, Illinois
- Headquarters, U.S. Navy, Washington, D.C.
- Naval Supply Systems Command, Washington, D.C.
- Naval Air System Command, Washington, D.C.
- Naval Sea Systems Command, Washington, D.C.
- Space and Naval Warfare Systems Command, Washington, D.C.
- Naval Avionics Center, Indianapolis, Indiana
- Aviation Supply Office, Philadelphia, Pennsylvania
- F-14 System Program Office, Philadelphia, Pennsylvania
- Navy Ships Parts Control Center, Mechanicsburg, Pennsylvania
- Headquarters, U.S. Air Force, Washington, D.C.
- Air Force Logistics Command, Wright-Patterson Air Force Base, Ohio
- Oklahoma City Air Logistics Center, Tinker Air Force Base, Oklahoma
- Sacramento Air Logistics Center, McClellan Air Force Base, California
- San Antonio Air Logistics Center, Kelly Air Force Base, Texas
- Ogden Air Logistics Center, Hill Air Force Base, Utah
- Warner Robins Air Logistics Center, Warner Robins Air Force Base, Georgia
- Air Force Cataloging and Standardization Center, Battle Creek, Michigan
- Air Force Systems Command, Wright-Patterson Air Force Base, Ohio
- B-1B System Program Office, Wright-Patterson Air Force Base, Ohio
- Joint Aeronautical Materiel Activity, Wright-Patterson Air Force Base, Ohio
- Headquarters, Defense Logistics Agency, Cameron Station, Alexandria, Virginia
- Defense Electronics Supply Center, Dayton, Ohio
- Defense Depot, Ogden, Utah
- Defense Depot, Richmond, Virginia
- Government/Industry Data Exchange Program Center, Corona, California



report points out protected storage inconsistencies for microcircuits and that other parts are not protected. In light of the high failure rates of tested parts, we believe that the Center needs to do a better job of determining the impact of long-term storage on electronic parts. Therefore, we believe that our recommendation is valid.

DOD said the Center's stock status report should not be solely used to determine stock shortages and overages because it only provides the status at a specific point in time and may not accurately reflect the true status of an item. Although we agree that the report shows the status of DMS items at a point in time, we used the report to show the years of DMS stock on hand. Since the status report is based on quarterly forecasted demand and the Center makes its life-of-type buys based on quarterly forecasted demand, we believe the status report serves as a reasonable indicator of the status of DMS items. DOD did not agree with our recommendation that DESC should issue specific guidance for its item managers to ensure correct and cost-effective calculations of the quantity when making life-of-type buys.

DOD said the Center's guidance on life-of-type buys was developed to allow for many variables, and more detailed guidance cannot be issued to ensure cost-effective calculations of buy quantities. We recognize that there are many variables to consider and that specific guidance cannot be issued for each item. We believe, however, that additional guidance is needed to alleviate the apparent confusion the item managers have regarding how to calculate the quarterly forecasted demand.

- According to a Center official, as of January 1989, the Air Force had grounded 57 T-37 trainers because a DMS part, a tube for navigation equipment, was out of stock. Based on an Air Force estimate, the Center made a 10-year life-of-type buy in 1981, but ran out in 1985—at least 6 years before the trainer was to be phased out. DESC had tried to find a qualified source to make this tube since 1985 and, as of January 1989, had awarded contracts to two manufacturers. A Center official said that as of July 1989, one manufacturer had delivered 54 of this part, while the other was still trying to produce an acceptable product.
- According to a Center official, the lack of an integrated circuit could ground Navy F-14A aircraft. In 1985, the manufacturer told DESC it was going to stop producing the circuit. The Center could not make a life-of-type buy because the manufacturer said it could no longer make the part. In August 1989, a Navy official said the Navy had been able to “work around the problem,” and no F-14As had been grounded. He also said the Sacramento Air Logistics Center would try to reproduce the part, although no completion date had been set.
- Another system, the Air Force’s B-1B aircraft, has 42 DMS parts. Of these, 11 have less than 4 years of stock on hand. DMS parts had not affected fleet readiness as of January 1989, according to B-1B officials. In some cases, officials said prime contractors would make life-of-type buys with vendors who plan to stop producing needed parts. B-1B program officials at the Oklahoma City Air Logistics Center said they were unaware that any of the parts being used on the B-1B were DMS.

According to Center officials, they are also working with the North American Aerospace Defense Command to monitor 600 DMS electronic parts used in its control center for tactical warning and attack assessment.

DOD agreed that it will have to modify, redesign, or replace those systems for which it will run out of parts prior to phasing out those systems.

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## Conclusions

The Defense Electronics Supply Center implemented DOD’s policy regarding the DMS program. It also established an integrated management approach and set up oversight groups to ensure DMS parts are given appropriate attention. It resolved most DMS situations without making life-of-type buys.

The Center’s DMS inventory has grown significantly in recent years. Although some of this growth is the result of reclassifying existing

instructions and is revising a DLA manual to incorporate long-term storage requirements. These instructions, however, do not require stock already on hand to be put in canisters until it becomes DMS. According to a Center official, the lack of required long-term storage for stock on hand was an oversight. As of June 30, 1989, the Center was storing in pressurized canisters 873 different microcircuits valued at \$23.2 million. This amount represented about one-half the total value of the Center's DMS microcircuits.

The Center determined that it had sufficient stock on hand for about half of the 350 parts in our sample, so it did not buy any additional items. In our sample, 78 were microcircuits with stock on hand in June 1989. Of these 78, 30 had a 10-year or more supply not in canisters, according to DESC's data. The Center's stock status report showed one part had a 388-year supply, although nothing was in a canister.

Another long-term storage problem involves maintaining pressure in the canisters. The Center requires depots to maintain 2 to 5 pounds of pressure in the canisters. In May 1989, DESC officials visited the Richmond, Virginia, depot and found about one-third of the canisters had no pressure. In June 1989, we visited the Richmond and Ogden, Utah, depots. At Richmond, 2 of 20 canisters had no pressure. Richmond officials said that these two canisters leaked and that they would move the stock to other canisters. At Ogden, 30 of 200 canisters had no pressure, and 1 had only 1 pound of pressure. An Ogden official said he had recently opened the canisters to insert stock and had not repressurized them at the time of our visit. Officials at both depots said they routinely check the canisters to ensure proper pressure. We believe, however, more oversight and management attention is needed to ensure that the depots follow DESC's requirements for long-term storage.

According to DESC officials, they have not done any studies to show (1) that nitrogen storage will protect microcircuits from corrosion and deterioration or (2) whether DMS parts other than microcircuits need special long-term protection. As a result, the Center has not issued any storage instructions for parts other than microcircuits.

DOD agreed that more oversight and management attention is needed to ensure that long-term storage requirements are followed. According to DOD, DLA will issue, by July 1990, instructions to depot personnel to emphasize the additional attention needed to ensure proper storage of life-of-type buy stock.

## Service Input Inadequate and Needs to Be Verified

Inadequate service data can also contribute to inaccurate inventory. Although DOD Directive 4005.16 requires the services to implement a method to identify end-item application for critical items affected by DMS, the Air Force focal point who is responsible for responding to DESC's inquiries said the Air Force could not determine on what system it used what part about two-thirds of the time. As a result, the Air Force cannot give the Center requirements data. Consequently, DESC must use past sales data to predict future use instead of actual projected needs from the Air Force to project life-of-type buy quantities. However, prior usage data are not always a good indicator of projected future use. For example:

- In October 1989, the Center data showed it had a 2,000-year supply (8,000 units valued at \$5,040) of an electrical contact. The Air Force had requisitioned 780 units in 1986. After the Center asked for life-of-type requirements, the Air Force told the Center it could not determine its need because it could not determine on what system it used the part. The Air Force recommended, however, that the Center buy 10 years of stock based on its past demands. The Center computed a 10-year need of 8,000 based on requisitions received during the previous 4 quarters. Since the Center had 2,632 on hand, it bought 5,368 in October 1987, for \$2,966.73. Since that time, the Air Force has not requested any of these parts.
- In October 1989, the Center had a 1,096-year supply (236,710 units valued at \$82,848) of an electrical contact. As of March 1987, the Air Force, the only user, had requisitioned 21,537 the previous 4 quarters. Although the Air Force could not determine its need, it recommended buying a 10-year supply based on its demand history. The Center bought 70,565 in November 1987 for \$21,169.50. The Air Force requisitioned an average of 176 per quarter in fiscal year 1988. This is substantially less than the average quarterly demand of about 5,400 in calendar year 1986. Although it had 66 days to respond to the Center, the Air Force DMS focal point said it did not have enough time to query its using activities to determine its projected demand.

DOD agreed that it must emphasize and enforce the requirement that the services identify system application for use in providing accurate requirements to the Center. The DOD action plan, to be completed in June 1990, calls for the services to improve their application data files.

DOD also agreed that the Air Force Logistics Command was sometimes unable to identify on what system a part was used. DOD said that as of May 1990, the Air Force was implementing a requirements data bank

of its DMS parts (2,040 of 9,149). These shortages could seriously impair readiness and sustainability of weapon systems.

According to the report, the life-of-type buy items in our random sample had an average of about 58 years of stock in inventory. DESC had over a 25-year supply for 47 of the 122 life-of-type buy items. Also, the report showed the Center had over 900 years of inventory for about 1 percent of its DMS parts (see apps. II and III). The number of parts with over a 900-year supply increased by over 60 percent, and their value nearly doubled during a 16-month period ending October 25, 1989. In some cases, the Center had stock on hand when it classified the parts as DMS. In other cases, it made a life-of-type buy based on past demand or the service estimate; then the demand dropped sharply.

According to DOD, the report implies that if DESC has more than 25 years worth of stock, some of it will not be used and will be disposed of. DOD agrees that this may in fact occur on some items. However, it said that the DMS program stock status report is not by itself an appropriate tool to determine whether items have overages or shortages. Some of the assets procured are intended to be used not only as spare parts, but also for production of end items in the out-years. Thus, a snapshot that compares current stocks with current usage will indicate that excess stocks exist when, in fact, they may not. Further, some end items are expected to be in the DOD inventory and will require support beyond 25 years.

We used the stock status report to show the years of DMS stock on hand. Since the Center's policy is to buy a 10-year supply for life-of-type buys, we pointed out that the stock status report shows that almost one-third of the items has more than a 25-year supply of stock on hand valued at about \$186 million. Included in these amounts are about 100 items valued at over \$148 million that had more than a 900-year supply on hand. In addition, we have acknowledged that we could not determine the extent to which the Center bought stock that will never be used, but that overbuying parts increases the risk that they might never be used and would have to be disposed of.

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### Inadequate Center Guidance on DMS Buys

DESC has provided inadequate guidance to its item managers for computing life-of-type buys. Its general policy guidance is to buy what is needed to reach a 10-year supply based on quarterly forecasted demand or input from the services. Item managers, however, used a variety of data sources and methods to determine quarterly forecasted demand and, thus, a 10-year supply.

and substitute parts. If these are not available, it makes a life-of-type buy.

In its computer system, the Center has a master list that has all the DMS parts it manages and indicates those that have no alternate sources. A second product of this system is the stock status report, which includes total asset value, the quantity on hand, estimated annual usage, and estimated number of years of stock in inventory.

## The DMS Inventory Has Grown Substantially

The amount and value of DMS parts the Center manages has nearly doubled in the last 4 years. Life-of-type buys and reclassifying inventory have contributed to this increase. However, the data are not available to determine how much each of these contributed to inventory growth.

As of September 30, 1989, the Center managed over 8,000 DMS parts valued at almost \$279 million, about double the 1985 value. Table 3.1 shows this growth from fiscal years 1985 to 1989.

**Table 3.1: Comparison of the Defense Electronics Supply Center's Total and DMS Inventories**

Fiscal year	Number of parts		
	Total	DMS	Percent
1985	201,853	4,277	2.12
1986	185,898	4,863	2.62
1987	178,356	5,935	3.33
1988	173,519	7,439	4.29
1989	166,008	8,469	5.10

Dollars in millions

Fiscal year	Inventory value		
	Total	DMS	Percent
1985	\$932,726	\$147,074	15.77
1986	1,013,106	177,210	17.49
1987	1,084,455	226,389	20.88
1988	1,122,869	257,329	22.92
1989	1,206,520	278,887	23.11

Note: These figures include only replenishment parts for the inventory.

According to Center officials, DMS parts have increased for several reasons. For example:

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**Chapter 2**  
**Office of the Secretary of Defense and the**  
**Services Are Increasing Their DMS Efforts**

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conditionally agreed to our proposal requesting the DOD inspector general to follow up on the services' actions. DOD stated that it would request follow-up if it is not readily apparent that the actions in question have been completed in a timely manner. Moreover, DOD said focal points have been established and are operating effectively.

We agree that the actions taken and planned should improve overall management of the DMS program. We believe, however, that the DOD Inspector General needs to conduct periodic follow-up reviews to ensure continued progress.

are available in the early stages of system development, before obsolescence occurs. These officials said technology assessments are valuable tools to (1) screen systems for impending obsolescence, (2) encourage designers to use devices considered to have long-term availability, and (3) provide service managers the opportunity to shift from reactive to proactive planning.

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### Cultivating Other After-Market Sources

About 70 small companies buy manufacturing data from large semiconductor suppliers when the suppliers stop production. Some of these companies, called after-market suppliers, have contacted the government to discuss ways it could use them more effectively to alleviate the DMS problem.

In 1986, the semiconductor industry submitted a proposal to DLA to prevent DMS situations of obsolete semiconductors. According to the proposal, the industry felt that DMS situations involving obsolete semiconductors could not be resolved by forecasting the end of production, making life-of-type buys, and stocking inventory until the end item was phased out. The proposal said that the only realistic and cost-effective method was to transfer the technology to an after-market supplier who could provide the parts until the end item was phased out. DLA officials reviewed the proposal but did not adopt the concept.

According to Center officials, it would have been difficult for the government to compare the cost of a life-of-type buy and contracting with the after-market supplier because DOD could not accurately forecast requirements for parts over the life of the system. In addition, the government would have been required to buy a 2- or 3-year supply of an item while waiting for the after-market supplier to start producing the part. If the supplier had been unable to produce the part, then the government could not have bought what it needed and would not have had enough inventory to meet its needs for several years.

According to a vice president of an after-market supplier, the government has committees to investigate emulation, redesign, and information databases, but it does not have any programs to evaluate the after-market concept. Center officials agreed, and said such a program was not being studied because of the amount of risk assigned to the government. They said many of the after-market suppliers want advanced funding, while the government waits up to 3 years for the supplier to get royalty and licensing agreements from the manufacturer.



attention that DMS is expected to receive in the future from the Office of the Assistant Secretary of Defense, DLA, and the services.

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## Strategies to Address DMS Situations

In addition to the planned actions, DOD has recognized other ways to address DMS situations. These strategies include developing information systems for manufacturers to notify users of discontinued parts, forecasting which parts will likely become DMS, cultivating other sources to produce discontinued parts, and creating manufacturing processes to replace or emulate discontinued designs.

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## Developing Information Systems

Timely, consolidated information is essential to effectively manage the DMS program. Customers, such as DESC, need timely notification from manufacturers to make intelligent supply support decisions. Knowing which parts are going to become DMS helps users to develop alternative support decisions and manufacturers and weapon system managers to avoid using them in new designs.

The government uses information from several data sources to reduce the impact of DMS. One of these sources is the Military Parts Control Advisory Group, which is a DLA organization within the DOD parts control program. This program encourages the use of standard parts with the latest technology in system design and equipment acquisition. The DOD instruction requires the service program managers to provide the Advisory Group with parts lists from their contractors to review. The Advisory Group reviews the lists and recommends not using parts that are DMS or otherwise obsolete. The program manager then directs the contractor not to use the parts in the item being bought. The program manager is not, however, required to follow the Advisory Group's recommendations.

Another information source is the Government/Industry Data Exchange Program. Chartered on behalf of the Joint Logistics Commanders and managed by the Navy, this program is a cooperative effort between government and industry which seeks to reduce or eliminate expenditures of time and money by making maximum use of existing information. The program provides a means to exchange technical data essential in the research, design, development, production, and operational phases of weapon systems and equipment. Membership includes 392 government and 735 industry activities. Members include prime contractors, major subcontractors, government acquisition and support activities, original

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# Office of the Secretary of Defense and the Services Are Increasing Their DMS Efforts

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At the time of our review, the services had not adequately implemented DOD's policy for the DMS program, therefore, they could not readily provide the data we needed to determine the impact DMS has had on their inventory levels or whether they were administering the program properly. In response to our inquiries, the Office of the Assistant Secretary of Defense for Production and Logistics and the services have recently taken action to improve their management of the program. In addition, several alternative strategies to address situations are being used or developed.

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## The Services Have Increased Attention to DMS Management

The services did not have the data we needed to determine whether the program was being administered properly. Although these services had established focal points as required by DOD, the focal points could not provide DMS information on the number of parts their services were managing, the amount of inventory, or the amount spent on parts.

In April 1989, the Army said it was in the process of improving its oversight and control of DMS and had taken steps to reduce and control life-of-type buys. We did not review the actions the Army said it had started or planned to start, because it was too early to determine whether their stated actions were actually implemented and whether the planned actions would be effective.

In June 1989, the Navy said it had reviewed its DMS and life-of-type buy procedures. According to its review, the Navy spent less than \$151 million on life-of-type buys between fiscal years 1983 and 1988. Since fiscal year 1986, its life-of-type buys have totaled \$35.8 million. Each of the Navy's hardware systems commands and their respective field activities are responsible for identifying DMS parts for their equipment and weapon systems. Because of this decentralized approach, the Navy's databases are widely scattered and do not include the same information. The Navy is updating its policy and procedures to consolidate information to facilitate more effective and efficient management reviews. We did not evaluate the Navy's planned policy or procedural updates or verify the life-of-type buy data it provided, because it was also too early to determine the effectiveness of its actions.

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At a parts nonavailability symposium<sup>2</sup> in March 1989, the Deputy Assistant Secretary of Defense for Logistics said that over 37 percent of the microcircuits used in key defense programs currently in production will be out of production and experiencing significant problems in finding manufacturers in the next 2 to 3 years. Also at this symposium, the commander of DLA's Defense Electronics Supply Center (DESC) stated, "For users in the field and the DOD units supporting them, items taken out of production translates into higher prices, extended delivery schedules and, in a number of situations, no support whatsoever . . ."

When faced with a DMS situation, the services can sometimes convince the prime contractors of the end items to produce the parts or to help find alternate manufacturing sources. When no source can be found, the services can either redesign the end item to ensure continued support, accept substitute parts to replace the DMS parts, or use parts from other end items to resolve the parts shortage.

There are occasions, however, when an essential part is no longer produced and a solution is not readily available. For example, the Air Force grounded 57 of its T-37 training aircraft because an electronic tube was not available. Eventually, an alternate source was located. In another instance, a Navy official told us a significant number of its F-14 aircraft will not be able to perform their mission if no manufacturing source is found for an integrated circuit. The Navy is trying to resolve the problem by having the Air Force make the part.

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## Objectives, Scope, and Methodology

The Chairman, Senate Committee on Governmental Affairs, and the Chairman, Subcommittee on Readiness, House Committee on Armed Services, asked us to review the DMS program. To address their concerns about inventory growth and management, our objectives were to determine (1) whether DOD administered the DMS program properly, (2) the extent to which DOD bought stock under the DMS program, and (3) whether DOD bought DMS stock that would never be used.

To determine how the services implemented DOD's policy and how they managed its DMS programs, we obtained documentation and interviewed officials at the Army's Materiel Command, Laboratory Command, and Communications-Electronics Command; the Navy's Aviation Supply Office and Ships Parts Control Center; and the Air Force Logistics Command. In addition, we contacted other DOD organizations at both the

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<sup>2</sup>Government/Industry Electronic Parts Nonavailability Symposium.

# Introduction

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Managers of defense weapon systems, such as the M-1 tank and F-14 and B-1 aircraft, face the problem of maintaining their systems when manufacturers stop making some needed spare parts. The Deputy Assistant Secretary of Defense for Logistics said all new weapon systems entering production in fiscal year 1989 have parts that will not be available when they become operational. The Department of Defense (DOD) has been aware of the need to ensure the continued availability of parts and has set up a program called Diminishing Manufacturing Sources and Materiel Shortages (DMS) to address this need. Although rapidly changing electronics technology will continue to be a problem, a well-managed DMS program can reduce the impact of parts shortages on weapon system readiness and sustainability. In addition, DOD has identified a special objective in its DMS Master Plan to improve the requirements determination process for DMS items that will hold down inventory growth.

According to DOD officials, most DMS parts are electronic. DOD systems are becoming more dependent upon sophisticated electronics. Because of technological improvements, the market life for electronics technology has recently experienced a steady decrease from 10-12 years to 4-5 years. The reduced market life results in a reduced manufacturing period. Reasons manufacturers stop producing defense parts include rapid changes in technology, uneconomical production requirements, and foreign source competition. The demand for sophisticated parts, coupled with a shorter life cycle of the technology and the long life—20 years or more—of DOD weapon systems, has resulted in rapidly increasing nonavailability of parts.

Mergers have reduced the number of U.S. integrated circuit manufacturers. As the acquiring companies try to reduce their financial burden, they look more favorably on supplying product lines that will generate more profit and less favorably on supplying DOD with outmoded parts. DOD's use of microcircuits is projected to be as low as 2 percent of the market within the next decade. Thus, the continued production of electronic military parts is pitted against a volatile and increasingly commercial marketplace.

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**Life-Of-Type Buys  
Contribute to Inventory  
Growth**

When a life-of-type buy is the only alternative, the Center requests the services to provide projected requirements for the part. In cases where the services do not provide this information, the Center buys parts based on past demands, which is not always an accurate prediction of projected needs.

Some of the methods used by the Center to calculate life-of-type buys resulted in too much stock being bought. From a random sample, GAO determined that for 122 buys, the Center had an average of about a 58-year supply on hand. Some of this stock may never be used.

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**Long-Term Storage  
Requirements Not  
Determined**

Even though the Center often buys parts to be used 10 years in the future, it does not determine whether special long-term storage protection is needed. For example, it stores some microcircuits in nitrogen-pressurized canisters, but many other parts are not similarly stored due to an inconsistent policy. In addition, it has not determined whether the nitrogen protection will ensure quality parts in the future or whether parts other than microcircuits need long-term protection.

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**Quality of Parts Is  
Unknown**

Parts managed by the Center may not be operable now or when needed in the future. GAO's analysis of 49 contracts for diminishing sources parts awarded in 1988 and 1989 indicated that almost two-thirds did not require acceptance testing. As a result, the Center does not know the quality of the parts being received. Its initial testing of diminishing sources parts from stock showed that 11 of 78 different parts failed.

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**Recommendations**

GAO recommends that the Secretary of Defense direct the services to (1) properly implement DOD policy to provide oversight of the program and (2) develop parts requirements for those with diminishing sources based on past usage and valid projections of future needs. He should also direct the DOD Inspector General to follow up on these actions. GAO also recommends that the Secretary of Defense instruct the Director, Defense Logistics Agency, to require the Center to (1) issue specific guidance for its item managers to ensure correct and cost-effective calculations when making life-of-type buys, (2) determine which parts need special long-term storage protection, (3) establish a quality assurance program to periodically test samples of on-hand diminishing sources parts, and (4) ensure that the quality of parts is satisfactory before the Center accepts them

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# Executive Summary

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## Purpose

The Department of Defense (DOD) established the Diminishing Manufacturing Sources and Material Shortages Program to ensure the availability of parts even when manufacturers stop making spare parts. Concerned that this program may be unnecessarily contributing to inventory growth, the Chairmen, Senate Committee on Governmental Affairs, and the Subcommittee on Readiness, House Committee on Armed Services, asked GAO to review the program. GAO's objectives were to determine (1) whether DOD was administering the program properly, (2) the extent to which DOD had bought stock under the program, and (3) whether DOD bought diminishing sources stock that would never be used. GAO also obtained information about the extent to which this stock had been adequately stored and routinely tested.

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## Background

The demand for high technology parts, coupled with a shorter life cycle of technology and the long life of DOD weapon systems, is rapidly increasing the nonavailability of parts. DOD's policy is to (1) minimize the impact of diminishing sources parts, (2) improve operational readiness by implementing the most cost-effective solutions to diminishing sources problems, (3) ensure such parts are not designed into new systems, and (4) develop procedures to respond to diminishing sources situations. Among other things, the policy requires that the services and the Defense Logistics Agency designate focal points to monitor program implementation.

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## Results in Brief

GAO found that DLA had been identifying parts with diminishing sources and was providing management oversight of the program. However, the services had not. They were still developing program policies and plans, and did not have the data either to monitor the program or to enable GAO to assess the program's impact on inventory levels.

The Defense Electronics Supply Center, which manages nearly all of DLA's diminishing sources parts, reported that diminishing sources parts valued at about \$279 million in 1989 represented about a 100-percent growth since 1985. Some of this growth was caused by reclassifying existing stocks to diminishing sources status.

In cases where the Center had exhausted all cost-effective alternatives, it made a one-time procurement known as a life-of-type buy. Based on a random sample, GAO found that the Center made life-of-type buys to resolve about 17 percent of its diminishing sources situations.

