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Report to the Chairman, Subcommittee on Investigations, Committee on Armed Services, House of Representatives

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DEFENSE PROCUREMENT

Improvement Needed in Technical Data Management

GAO/NSIAD-92-23

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National Security and
International Affairs Division

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The Honorable Nicholas Mavroules
Chairman, Subcommittee on
Investigations
Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

This is our response to your request that we examine the Department of Defense's (DOD) management of its technical data repositories. You asked us to review the timeliness of DOD's response to requests for technical data particularly from small business contractors, the adequacy of such data, and the actions being taken to improve access to technical data.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 15 days from the date of this letter. At that time, we will send copies to interested parties and make copies available to others upon request.

Please contact me at (202) 275-4587 if you or your staff have any questions concerning this report. Other major contributors are listed in appendix II.

Sincerely yours,

Paul F. Math
Director, Research, Development,
Acquisition, and Procurement Issues

Executive Summary

Purpose

Small businesses are concerned about their continuing inability to compete for Department of Defense (DOD) contracts because they cannot get timely access to current, accurate, and complete technical data. The 1984 Defense Procurement Reform Act legislated some solutions to this problem. However, DOD is still working on automating its systems to provide data in digitized form.

The Chairman, Subcommittee on Investigations, House Committee on Armed Services, asked GAO to determine whether Congress needs to enact further legislation to improve competition for such contracts. Specifically, the Chairman asked GAO to review (1) the timeliness of DOD's response to requests for technical data from contractors, (2) the adequacy of DOD's data, and (3) the actions DOD is taking to improve access to its technical data.

Background

The military services operate 24 repositories to manage the receipt, storage, and distribution of technical data for DOD procurements: the Navy has eight; the Army, seven; the Air Force, five; and the Defense Logistics Agency, four. The repositories respond to requests for technical data from contractors, the general public, and DOD and other government procuring agencies. Since the early 1960s, when they converted from paper copy storage, the repositories have relied on aperture cards as their primary medium for storing data. These cards have 80 columns and a 35-millimeter filmstrip containing images of engineering drawings. Since 1983, however, the military services have tried to improve their processes by automating their repositories and replacing the cards with digitized data stored on optical disks. Automation of the technical data in repositories has become part of a larger program known as "Computer-aided Acquisition and Logistics Support." This program is attempting to automate virtually all DOD technical data, including technical manuals, repair standards, and engineering drawings.

Results in Brief

The repositories generally lacked the necessary records to monitor their own timeliness, although they are required to maintain such records. However, GAO's review at nine repositories and interviews of 23 private contractors indicate that the repositories responded in a timely manner to most requests for technical data.

Data quality problems continue to inhibit contractors from competing for government work or completing the work after a contract is awarded.

Repository managers state that quality-of-data difficulties often originate during the acquisition process; they say that they cannot fix these problems. Repositories mainly receive, store, and distribute data.

DOD is relying on automation as a major part of the solution to improving the operation of its technical data repositories. Although the automation effort began slowly because direction and coordination were inadequate, DOD is now making progress toward achieving that goal.

Principal Findings

Responses Were Timely, but No Monitoring System Exists

Because the repositories do not have historical logs or other records to measure how quickly they respond to requests for technical data, the repositories could neither evaluate timeliness nor determine the status of requests they had received. Nevertheless, repositories have government internal control standards that require such documentation.

The repositories maintain a priority sequence for responding to requests for technical data. They have four levels of priority responses, ranging from those that require an answer within a specific amount of time to those that are not time sensitive. On the basis of the data that was available at the repositories visited, GAO found that the repositories generally responded to time sensitive requests in a timely manner. For example, technical data packages related to an acquisition action were included with the solicitation documents or provided within 10 days after receipt of the request for data.

In addition, the majority of the 23 contractors said that the repositories responded in a timely manner to most requests for data. There were exceptions. For example, 5 of the 23 contractors said that there were instances in which they believed it had taken a lengthy amount of time to receive the data. The only contractor that qualified its statement said that when it had taken longer than 30 days to receive the data, it did not relate to a time sensitive request and the requested data was voluminous.

Contractors Experienced Data and Communication Difficulties

Nineteen of the 23 contractors GAO interviewed, or about 83 percent, reported having problems with the quality of the data they received. These problems involved illegible drawings, obsolete data, and inaccurate or incomplete information. The repositories, however, are only storage, retrieval, and distribution centers; data quality depends on the performance of the initial prime contractor and the diligence that the DOD acquisition managers exercise when they first receive the technical data. The repositories alone do not control the quality of the data they maintain.

Moreover, when contractors sought help from the repositories to resolve problems with the data they received, the contractors were dissatisfied. Telephone calls were answered by prerecorded messages, and written requests took as long as 2 months to receive a satisfactory reply.

DOD Automation Efforts Are Underway

To solve many of the problems described, DOD is attempting to automate the repositories' technical data systems. DOD's major ongoing effort is to electronically convert, or "digitize," the technical data by changing from aperture card use to optical disk storage and retrieval formats. The Army and the Air Force jointly implemented an automation plan. The Navy and the Defense Logistics Agency are also implementing a joint plan, however, at a somewhat slower pace. The seven Army and five Air Force repositories are well into converting the data; the Navy's and the Defense Logistics Agency's efforts have been slower because of difficulties with funding and technology.

Recommendations

GAO recommends that the Secretary of Defense take the following actions to ensure that the best possible technical data is quickly provided to contractors, the general public, and DOD procuring agencies:

- Direct the service Secretaries and the Director of the Defense Logistics Agency to require that each of the military services and the Agency technical data repository managers ensure compliance with the appropriate internal control documentation necessary (1) to measure how quickly technical data requests are filled and (2) permit repository managers to determine the status of in-process requests.
- Direct the service Secretaries and the Director of the Defense Logistics Agency to reinforce their guidance to those organizations and entities charged with the responsibility of analyzing and accepting technical data for DOD to ensure that technical data accepted during the acquisition process is as current, accurate, and complete as possible.

- Direct the service Secretaries and the Director of the Defense Logistics Agency to reinforce the need for procurement offices and repository sites to include in each solicitation the area code and telephone number of the person(s) designated to handle inquiries or to make proper referrals to persons with requisite engineering expertise who can solve technical data problems.

Agency Comments

GAO provided a draft of this report to DOD for its review and comment. The Department did not provide an official response. However, GAO obtained the views of responsible DOD officials during an exit conference and incorporated their comments in chapter 4.

Contents

Abbreviations

CALS	Computer-aided Acquisition and Logistics Support
DLA	Defense Logistics Agency
DOD	Department of Defense
FOIA	Freedom of Information Act
GAO	General Accounting Office

Introduction

Each year the Department of Defense (DOD) spends billions of dollars on spare parts for military weapon systems and supporting equipment. The law encourages DOD to obtain the spare parts at the lowest overall costs by advocating the use of full and open competition whenever possible. To compete successfully, prospective contractors must have adequate technical data, i.e., specifications, detailed engineering drawings, and—in some cases—manufacturing processes and testing procedures for the items they wish to manufacture.

The military departments and the Defense Logistics Agency (DLA) operate 24 repositories, whose primary purpose is to manage the receipt, indexing, storage, retrieval, and appropriate release of stored technical data. The Navy is responsible for eight repositories, the Army for seven, the Air Force for five, and the DLA for four.[1] DOD repositories generally provide technical data in response to requests from (1) the general public under the Freedom of Information Act (FOIA), (2) the general public in connection with solicitations for bids on government contracts or for other reasons, (3) government procuring agencies for inclusion in solicitation packages sent to prospective contractors for competitive procurements or other government agencies requesting engineering support data, and (4) foreign governments in connection with military equipment sales.

DOD repositories have relied on aperture cards as their primary data storage medium since the early 1960s, when they converted from keeping paper copies. A standard aperture card contains 80 columns of information and a 35-millimeter filmstrip mounted on it with pictures or images of the relevant engineering drawings. Most of DOD's technical data repositories have relied on manual operations or older, computer-controlled aperture card devices for data storage and retrieval.

Since 1983 the military services and DLA have worked to automate their repositories by replacing the aperture cards with digitized data stored on magnetic or optical disks. This automation effort has become part of a larger program called "Computer-aided Acquisition and Logistics Support" (CALS). CALS is defined by DOD as a DOD and industry business strategy to (1) transition from paper to automated processes, (2) support weapon system life cycles (cradle to grave), (3) use standard data interchange requirements, (4) eliminate redundancy by using standard information sys-

[1]See appendix I for a listing of the repositories.

tems, and (5) employ these systems in consonance with corporate information management principles.[2]

Objectives, Scope, and Methodology

During hearings on March 15, 1990, Congress heard testimony about the continuing inability of small and mid-sized private businesses to compete for government contracts for providing spare and repair parts because technical data was not available.[3] Subsequently, the Chairman, Subcommittee on Investigations, House Committee on Armed Services, asked us to determine whether additional congressional action is needed to improve competition for such contracts. Specifically, the Chairman asked us to review DOD's management of technical data repositories to determine the following:

- How quickly has DOD responded to technical data requests from contractors needing to prepare bids or proposals in response to agency invitations and from potential suppliers wanting to determine whether they can compete for future business?
- How well has DOD managed its technical data to ensure its currency, accuracy, and completeness?
- How much effort has DOD made to improve access to its technical data, and what specific impediments exist to achieving future progress?
- What has been the effect of Defense Management Review initiatives on DOD's ability to make continued progress in implementing technical data improvement initiatives?

To determine how quickly DOD responded to contractors needing technical data, either for bidding or potential supplying purposes, and to assess whether DOD provides current, accurate, and complete technical data to requesters, we obtained information from both private industry and the DOD repositories. We found that responsibility within DOD for the currency, accuracy, and completeness of technical data resides with the DOD agencies designated to establish data requirements and inspect the data prior to acceptance for repository storage and use. That process is part of the other

[2]GAO reviewed the CALS initiative progress and issued a separate report, Defense ADP: A Coordinated Strategy Is Needed to Implement the CALS Initiative (GAO/IMTEC-91-54, Sept. 13, 1991).

[3]The hearings concerned a bill (H.R. 1111) to revise certain government procurement procedures regarding contracts for buying spare parts. The bill's goal was to reduce federal procurement costs and to improve the ability of small businesses to compete for such contracts.

work the Chairman requested on the procurement of technical data early in the acquisition process for major systems.[4]

For this review, we visited 9 of the 24 DOD repositories listed in appendix I. At these repositories, we examined the processes used and the documentation created to ensure that businesses desiring to bid on proposals to supply spare parts receive timely access to technical data. We focused on the time taken by the repositories to respond to requests for technical data from private industry and the public.

We visited 23 private contractors to gather information on how quickly the repositories responded to their requests for technical data. We asked contractor officials and their staffs for examples and documentation concerning the quality of technical data recently provided to them by repositories of the three military services and the DLA. We also questioned both contractor and repository officials about how data quality problems are resolved. We accepted the contractors' complaints about and examples of poor quality and slow responses at face value, making no attempt to validate their claims.

The contractors we visited represent small to medium-sized businesses whose sales in 1990 ranged from $200,000 to $38,750,000. They are located in nine states throughout the United States, and collectively, they used 18 of the 24 DOD technical data repositories in 1989 and 1990. Because these contractors were not scientifically selected, we cannot project their opinions or experiences to any other contractors.

We also gathered and analyzed documentation concerning ongoing efforts to automate technical data storage and interviewed and obtained documents from responsible agency and repository officials.

Additionally, we gathered and analyzed documents from, and interviewed responsible officials of, the Office of the Secretary of Defense, the military departments, and DLA.

To avoid duplication of effort, we coordinated our work with the Army Audit Agency, which was also performing a review of the Army's technical data management.

[4]Defense Procurement: Acquiring Technical Data for Spare Parts Reprocurement (GAO/NSIAD-91-313, Sept. 13, 1991).

We performed our review from July 1990 through November 1991 in accordance with generally accepted government auditing standards. We requested written comments on this report from DOD and, at DOD's request, extended the 30-day comment period an additional 15 days. However, DOD did not provide written comments. We obtained the views of responsible DOD officials during an exit conference and have incorporated their comments in chapter 4.

Most Requesters Received Data Quickly, but Repositories Lack Records to Monitor Timeliness

Although the repositories do not have the necessary records and data to monitor timeliness, we found that timeliness does not appear to be a major problem. Technical data packages related to an acquisition action were included with the solicitation documents or were provided within 10 days after the receipt of the request for data. Requests not related to an acquisition action were usually met within 10 to 30 days, except for requests involving large volumes of data, which were not time sensitive and took much longer. Discussion with the contractors also indicated that, for the most part, repository responses were timely.

DOD Repositories Use a Priority System to Respond to Requests

The repositories usually respond to requests for data in the following order of priority:

- Repositories first answer requests with legislated or regulated response times, e.g., FOIA requests and requests for data resulting from a bid solicitation. Under FOIA, for example, requests for data must receive prompt attention and a reply within 10 days, unless a delay is authorized. Responsible personnel at the repositories told us that the initial response to a FOIA inquiry only acknowledges receipt of the request and does not indicate that the requested data is being provided. Usually, the initial response under FOIA informs the requester (a) whether the data is available; (b) what the fee, if any, will be; and (c) what procedures to follow if the data is still desired.
- Repositories then answer routine requests involving what they call their "mission requirements" or normal work load, i.e., the preparation of technical data sets that buyers need to solicit bids or quotations for the contracts to be awarded for authorized purchase requirements.
- Repositories next respond to requests involving critical items for which funds were not budgeted and for which the need was unforeseen when annual buying plans were approved.
- Repositories then answer engineering support requests from other governmental agencies.
- Lastly, repositories answer requests from potential future bidders and other requests from the general public that are not made under the FOIA.

Timeliness Was Difficult to Measure but Does Not Appear to Be a Major Problem

The repositories generally did not have data bases to measure whether technical data requests from contractors and the general public are filled in a timely manner. The lack of specific response time criteria for public requests, along with the general absence of historical data, makes it very difficult to measure timeliness. However, on the basis of our work at nine repositories and 23 contractors, we found that repositories responded to requests for technical data in a timely manner in most instances.

Standards for internal controls in the federal government include the need to document and record transactions. Transactions must be promptly recorded if pertinent information is to maintain its relevance and value to management in controlling operations and making decisions. The repositories generally do not document and record transactions and therefore could not monitor timeliness. For example, the repositories generally did not have (a) data bases to measure whether technical data requests from contractors and the general public are filled "on time," (b) specific response time criteria for public requests, and (c) general historical data.

The data that we were able to find was not summarized in an organized fashion and was often incomplete. Proper classification of repository transactions with summary records from which management reports could be prepared would permit repository managers to know how long it takes to meet requests or to know when requests spend too much time in process.

Nevertheless, on the basis of the data available, we generally found that the repositories responded to time sensitive requests in a timely manner. For example, we found that technical data packages related to an acquisition action were included with the solicitation documents or provided within 10 days after receipt of the request for data.

In addition, requests not related to an acquisition action were usually fulfilled within 10 to 30 days, except for requests involving large volumes of data, which often take much longer to fulfill. For example, at one Navy repository, a request came in for all the technical data on an aircraft wing. Such a request might involve thousands of aperture cards, requiring considerable time to fulfill. An official at one Army repository said that complying with a request of this magnitude could take months. Therefore, they give requests of this kind a low priority, opting to fulfill requests for data related to an open solicitation first and fulfilling other requests as time permits. Further, none of the nine repositories we visited had received complaints from contractors concerning the receipt of data too late to permit timely preparation of bids or proposals.

The majority of the 23 contractors we interviewed said that DOD's repositories responded in a timely manner to most requests for technical data. There were some exceptions. For example, 5 of the 23 contractors we visited reported instances in which they believed that a lengthy amount of time had transpired before data was provided by the repositories. One contractor qualified his statement by saying that when the repositories took longer than 30 days to respond to requests for data not related to an acquisition, the requests were for technical data packages containing 100 or more aperture cards. The other four contractors did not qualify their statements.

Conclusions

Our work at nine repositories and 23 contractors did not reveal a lack of timeliness to be a significant problem. However, the repositories do not maintain data that would permit them to know how long it takes to meet requests or to know when requests spend too much time in process.

Recommendation

We recommend that the Secretary of Defense direct the service Secretaries and the Director of DLA to require that each of the military services and DLA technical data repository managers ensure compliance with the appropriate internal control requirements designed (1) to measure the timely fulfillment of technical data requests and (2) to determine the status of in-process requests.

Contractors Are Having Difficulty Resolving Certain Problems

Contractors we visited said they had problems with both the quality of the data they received from the repositories and with communicating their difficulties to government personnel. The repositories provide the data to contractors and the general public, but repositories are not responsible for the actual quality of the data they maintain. Repositories function only as libraries, storing and retrieving information. Because repositories are not responsible for ensuring the quality of this information, contractors who requested data believe they received data of such poor quality that it inhibited their ability to bid on a contract or to complete the contract work.

Additionally, 10 of the contractors, or about 43 percent, had difficulties in communicating with government personnel about problems with technical data. The contractors believe that these difficulties also inhibited their ability to bid on a contract or complete work after contract award.

Data Quality Is Not a Repository Function

DOD's repositories are basically libraries responsible for the storage and retrieval of data obtained through the acquisition process. According to repository managers, the quality (i.e., currency, accuracy, completeness, and legibility) of data stored in their facilities depends on the integrity of the initial prime contractor. Data quality also depends on the diligence DOD exercises when it first receives the technical data. DOD program managers are responsible for choosing organizations to inspect and analyze data before DOD accepts it. DOD relies on these inspections and reviews during the acquisition process to assure itself that data sent to its repositories is current, accurate, complete, and legible.

Contractors Had Problems With Data Quality

Because repositories could not ensure the quality of the data they provided, contractors experienced problems. Of the 23 contractors we visited, 19,or 83 percent, provided us with 34 recent examples of deficient data. This data included 10 examples of illegible drawings, 8 examples of out-of-date information, and 16 examples of inaccurate or incomplete material. Some of these problems involved a wide range of conditions that were not the responsibility of the repositories. Among the problems that the contractors encountered were the following:

- One contractor received an Army drawing that was difficult to read because the data had been shrunk to fit onto one aperture card.
- Another contractor received, along with a solicitation, technical drawings that were partially illegible. The contractor requested assistance from

repository officials but was told that nothing could be done to correct the illegible drawings. The contractor did not bid on the contract.

- Another contractor was awarded a contract to manufacture lubricating nozzles. Later, the contractor identified three critical dimensions that were missing from the detailed drawings. The contractor requested the missing data from the applicable DLA repository. DLA officials told the contractor that no drawings were available to identify the missing dimensions. The contractor then had to contact the original equipment manufacturer to obtain the missing dimensions. The contractor claims that work on this contract was delayed for almost 2 years while the contractor attempted to obtain the missing data.
- The same contractor was awarded a contract for replacement doors for several airplanes. The specifications required a cast aluminum door with holes drilled around the perimeter for mounting. According to the contractor, the specifications were not current in that they did not specify that the holes should not be pre-drilled. The contractor predrilled the holes, and the doors would not fit.

Contractors Also Had Communication Problems

A major concern expressed by 10 of the contractors we visited was their inability to communicate effectively with government personnel at either the repositories or the DOD procurement offices to address technical questions or resolve technical data problems. Contractors often telephoned for help and received a prerecorded message. They also were referred from one office to another without ever reaching the right person.

One contractor said that he had twice requested technical data clarification from the Air Force; both times he had had to wait about 2 months for a response. As a consequence he had to delay completing the contract. Because of continuing technical data problems, four contractors we visited said it was easier to work for a prime contractor, sell to a distributor, or not sell to the government at all. Three other contractors indicated they will stop, or have completely stopped, competing for government sales.

Conclusions

Although DOD requires final inspections and reviews to ensure the quality of data it acquires, problems with the quality of data hinder the ability of contractors to compete for and perform government contracts. Many of the quality problems originate in the acquisition process and cannot be corrected by the repositories. Furthermore, contractors want better customer service and communication to solve their problems with technical data.

Recommendations

We recommend that the Secretary of Defense direct the service Secretaries and the Director of the DLA to

- reinforce their guidance to those organizations and entities charged with the responsibility of analyzing and accepting technical data for DOD to ensure that technical data accepted during the acquisition process is as current, accurate, and complete as possible and
- require procurement offices and repository sites to include in each solicitation the area code and telephone number of the person(s) designated to handle inquiries or to make proper referrals to persons with requisite engineering expertise who can solve technical data problems.

Repositories Plan to Improve Operations Through Technical Data Automation

For several years, repository managers relied on labor-intensive manual operations and inefficient, old, computer-controlled aperture card storage and retrieval equipment for day-to-day operations. The services and DLA have initiated programs to streamline repository operations by using digital storage systems that convert technical data stored on aperture cards into electronic pulses stored on optical or magnetic disks, a process known as "digitization."

The automation process has been slow, has encountered setbacks, and has been criticized for lack of coordination and direction. Despite these past difficulties, the repositories are making progress toward digitization. Digitization of technical data repositories is now part of a larger DOD automation-related initiative known as "CALS," but progress on CALS has been slow because of DOD's decentralized implementation approach.[1]

Automation Has Occurred Slowly

The conversion of technical data from aperture card format to optical disk format through digitization has been slow. Responding to direction from the Secretary of Defense in 1983, the services and DLA initiated projects to automate their repositories. Each service developed its own implementation strategy. Originally, the Army and the Air Force jointly moved toward full digitization. The Navy planned a mixed system of aperture card storage, along with phasing in both magnetic and optical disk storage devices, and the DLA opted for a nondigitized automated system using only improved aperture card storage devices.

Later, in compliance with the 1985 DOD Data Management Plan, each component planned the following actions:

- The Army and the Air Force were to digitize technical data using the Army's Digital Storage and Retrieval Engineering Data System and the Air Force's Engineering Drawing Computer Assisted Retrieval System programs.[2]
- The Navy was to automate its indexing system and its storage of technical data using the Engineering Data Management Information and Control System program.
- The DLA took an intermediate step toward automation with its Engineering Drawing Automated Storage and Retrieval Equipment program.

[1]See GAO report Defense ADP: A Coordinated Strategy Is Needed to Implement the CALS Initiative (GAO/IMTEC-91-54, Sept. 13, 1991).

[2]These systems were developed by the Army and the Air Force in a joint effort and are identical in their core requirements and capabilities.

The services and DLA took these actions in response to both the Secretary of Defense's 1983 direction and a 1984 congressional act: the Defense Procurement Reform Act.[3]

GAO Reviewed the Plan's Progress

In March 1986, we reported that DOD's efforts to automate the technical data repositories would not ensure the most efficient and effective solution to repository problems.[4] In that report we stated that, among other things, (1) agency efforts to automate technical data repositories were duplicative and nonstandard, (2) interoperability among repositories and private industry had been jeopardized, (3) management strategy was needed for future standardization, and (4) management strategy for achieving interoperability among the repositories did not include the necessary oversight control.

In July 1986, after reviewing DOD's 1985 Data Management Improvement Plan, we advised Congress that, although the plan met the three minimum requirements of the act, it did not adequately describe the scope and direction of the technical data improvement initiatives.[5] We further advised that without this information, it would be difficult to measure improvements as the plan is implemented.

DOD Gives Its Rationale for Delay

Automation has not occurred exactly as defined in DOD's 1985 plan, according to the Chief, Technical Data Division, Directorate of Standardization and Data Management, Office of the Secretary of Defense. He stated that the plan was only a formulation of a program of action; rarely does the execution of a plan coincide with projected milestones. DOD also reported problems with both prime contractors and subcontractors in developing hardware and software. These problems had to be solved and solutions tested.

The rationale for the delay in automating the Navy's repositories indicates that at the time the Army and the Air Force were implementing their programs, the Navy had specific requirements that existing technology could not satisfy. In addition, no funds had been allocated for Navy requirements. DLA eventually joined with the Navy to acquire its system and replace DLA's

[3]Public Law 98-525.

[4]Data Management: DOD Should Redirect Its Efforts to Automate Technical Data Repositories (GAO/IMTEC-86-7, Mar. 13, 1986).

[5]Comptroller General's letter, B-220908 (GAO/IMTEC-86-14, July 28, 1986).

old aperture card-handling devices with the more modern storage and retrieval equipment for digitized data. Overall, according to DOD, as a result of contract and testing delays, deployment of the Navy's and DLA's system has been delayed approximately 2 years beyond estimates proposed by the Navy. As of May 1991, digitization had not yet begun at the DLA repositories.

DOD's difficulties in converting from aperture card to optical disk storage and retrieval of technical data have, in our opinion, inhibited the repositories' ability to efficiently store and retrieve technical data. Repository operations have become even more cumbersome as greater quantities of cards are stored. An increased use of competitive procurements is also driving the number of data requests upward. Furthermore, aperture card-handling equipment is old and frequently out of service for maintenance or repairs. One Army repository manager told us he experienced significant mechanical breakdowns due to equipment age.

DOD Is Making Some Progress

Nevertheless, DOD is currently making progress in its efforts to resolve its repository problems. Conversion of technical data from aperture cards to optical disks using state-of-the-art technology for digitally storing, updating, retrieving, and duplicating technical data is underway and nearing completion at Army and Air Force repositories using their planned programs.

The Air Force took the first steps toward loading the data first and experienced the usual initial difficulties. According to DOD, the data could not just be scanned and loaded; it had many anomalies, including legibility issues, physical layout locations, inaccurate or mislocated data, and many other specific problems. As a result, the loading process took longer than expected and required revised planning and budgeting for the task. DOD stated that, due to lack of funding and required personnel, the loading process has been slower than desirable. However, the Air Force and the Army have made and continue to make a great effort to accelerate the process. Table 4.1 shows the installation status of the Air Force system as of February 1991.

Table 4.1: Status of U.S. Air Force Repository Conversion From Aperture Card to Optical Disk Format

Location	Active data[a]	Percent loaded
Sacramento Air Logistics Center, California	1,230,000	91
San Antonio Air Logistics Center, Texas	1,270,000	89
Warner Robins Air Logistics Center, Georgia	1,270,000	80
Oklahoma City Air Logistics Center, Oklahoma	820,000[b]	71
Ogden Air Logistics Center, Utah	2,460,000[c]	28

[a]DOD divided the data into two categories: active and inactive. Active data had experienced some activity within the last 3 years. This data would be loaded, with the most active data loaded first. Inactive data, i.e., data with no activity within the last 3, would not be loaded until it experienced some activity, at which time it would become active data.

[b]Based on reassessment of active file status, an additional 300,000 images will be loaded. Total to be loaded: 1.12 million.

[c]Based on reassessment of active file status, an additional 2.2 million images will be loaded. Total to be loaded: 4.66 million.

Source: Technical Data Division, Directorate of Standardization and Data Management, Office of the Secretary of Defense.

Table 4.2 shows the status of the Army's automated system as of March 1991. Some repositories are complete or nearing completion, while others have had to postpone conversion due to funding shortfalls.

Table 4.2: Status of U.S. Army Repository Conversion From Aperture Card to Optical Disk Format

Location	Active data	Percent loaded
Belvoir Research, Development, and Engineering Center, Fort Belvoir, Va.	182,531	100
Missile Command, Redstone Arsenal, Ala.	1,100,000	100
Aviation Systems Command, St Louis, Mo.	600,000	90
Tank and Automotive Command, Warren, Mich.	850,000	82
Armament Research, Development, and Engineering Center, Picatinny Arsenal, N.J.	462,492	64
Armament, Munitions, and Chemical Command, Rock Island, Ill.[a]	600,000	62
Communications-Electronics Command, Fort Monmouth, N.J.[b]	750,000	33

[a]Armament, Munitions, and Chemical Command was shut down from September 1989 to September 1990 because of funding shortfalls for hardware maintenance, according to DOD. A hardware maintenance contract was awarded in September 1990.

[b]DOD reported that the Communications-Electronics Command also had funding shortfalls and the system had been inactive since February 1989. However, the system was reactivated in October 1991 and is now loading data.

Source: Technical Data Division, Directorate of Standardization and Data Management, Office of the Secretary of Defense.

Navy and DLA Program Has Funding Problems

The Navy and DLA have a well structured approach to accomplishing their initial loading requirements, but funding has been and continues to be an issue, according to DOD. The Navy and DLA have completed evaluating and testing their proposed system. The program offices for both the Navy and DLA are preparing plans to load approximately 40 million images—Navy and DLA combined—over the next 2 to 3 years. As of April 1991, however, conversion to digitized data at the Navy was negligible, and as of May 1991, digitization had not yet begun at the DLA.

One of the difficulties is that the Navy has funding in fiscal year 1991 for loading, but funds for fiscal year 1992 and beyond have not been programmed. Furthermore, DLA only has a small amount of funding programmed for fiscal years 1991, 1992, and 1993. DOD said that unless additional funding is provided beginning in fiscal year 1992, the Navy and DLA will have difficulty loading their data bases soon.

Defense Management Review Initiatives Affect Repository Improvements

Several Defense Management Review initiatives affect the automation of technical data. These initiatives include (1) the use of stock fund money to purchase technical data, (2) DOD's inventory reduction plan, and (3) the transfer of responsibility for the procurement of consumable items of supply[6] from the military services to DLA.

Purchase of Technical Data Using Stock Fund Moneys

Beginning October 1, 1990, DOD allowed the use of stock fund money to purchase technical data. The money is now available for developing or purchasing technical data needed to competitively procure spare and repair parts.

Previously, materiel developers bought technical data using procurement appropriations, but DOD was concerned because data was not being bought to the extent required. DOD and an Army audit of the Army stock fund indicated that not buying the data resulted in significantly higher stock fund costs because prices are generally higher when there is no competition. To make competitive purchases, technical data is required. The change in stock fund operating policy allows supply managers—those most concerned with decreasing supply costs—to obtain the technical data needed for competitive spare parts purchases.

[6]A consumable item of supply is a national stock numbered supply item (except explosive ordnance, major end items of equipment, and repairables) that is normally expended or used up beyond recovery when it is used in the way it was designed or intended.

The Inventory Reduction Plan

The DOD Inventory Reduction Plan, created in 1990, envisions, among other things, a comprehensive review of on-hand inventories of DOD materiel to significantly reduce inventories and future funding requirements for the purchase and repair of materiel. While this initiative will lower the DOD inventories, such reductions will not significantly affect repository computer hardware and software requirements, repository personnel told us.

Transfer of Technical Data on Consumable Items

The decision to transfer procurement responsibility for about one million consumable items from the military services to the DLA will mean that their associated technical data will go to DLA repositories. Transfer of this responsibility is to occur over a 3-year period beginning in August 1991. DOD estimates that the transferred drawings equate to about 5 million aperture cards. DLA has not yet begun to convert its technical data from aperture cards to the optical disk format. However, the Army and the Air Force intended to transfer part of their data in digitized format, further straining the DLA repositories' ability to access technical data.

Originally, three of the four DLA repositories had not planned to receive complete hardware for the automated system until 1992. The DLA would then have required a year or more to digitize the data currently in its inventory. Some DLA repository managers we spoke with believed that DOD should delay transferring the procurement responsibility of the affected items to DLA until DLA has digitization capability and that if any data is transferred before then, it should be on aperture cards.

On March 19, 1991, we advised DOD that some DLA repository managers believed that only a small amount of the transferred data would be digitized and that plans to acquire interim equipment might be premature. Repository managers preferred the transfer of data to be in aperture card format for operational efficiency and economic reasons.

On August 9, 1991, DOD responded to our advice by saying that (1) most aperture cards for data to be transferred have been destroyed and (2) interim equipment for the digitization process for DLA would be provided and would later form part of the DLA's automated system. However, managers at several of the larger service repositories told us that their aperture cards have not been destroyed, but have been placed in storage and could be provided to DLA. Furthermore, managers at two DLA repositories told us they prefer to use aperture cards until their digitized systems have been fully automated and are on line.

On November 19, 1991, at our exit conference, DOD officials advised us that their plans have been modified and that DLA intends to implement full systems at all four DLA repositories in 1992 and will not accept interim equipment in 1991. DLA also modified its plans and will now accept aperture cards from the military services until both DLA and the services are able to exchange digitized data. The Army and the Air Force, who were planning to transfer some data in digitized form, will now transfer aperture cards to the DLA centers until the DLA repositories are capable of accepting digitized data.

Officials in the Office of the Secretary of Defense told us that two other factors may eventually affect the progress of automating technical data:

- Personnel and operating budget reductions could lengthen the process of providing data to contractors and slow the process of loading data for automation.
- Base closures and consolidations could cause site adjustment for the Navy's system and have an impact on the Army's and Air Force's automated repository sites.

Conclusions

DOD plans to automate its repository operations to improve the system for managing its technical data. Automation has been recognized as important by DOD since 1983 and was congressionally mandated in 1984. Automation efforts have fallen behind schedule primarily due to a lack of funding and required personnel. DOD is implementing an automation system that if continued, should improve its ability to retrieve and disseminate more rapidly the technical data stored in the repositories. Any downgrading of the automation efforts because of funding and personnel shortfalls could impede the progress underway to improve accessibility to the technical data stored in the DOD repositories.

Department of Defense Technical Data Repositories

U.S. Navy

1. Marine Corps Logistics Base, Albany, Ga.
2. Naval Air Technical Services Facility, Philadelphia, Pa.[1]
3. Naval Electronics Systems Engineering Center, Portsmouth, Va.
4. Naval Ordnance Station, Louisville, Ky.[1]
5. Naval Sea Engineering Data Support Activity, Portsmouth, N.H.
6. Naval Ship Weapons System Engineering Station, Port Hueneme, Calif.
7. Navy Ships Parts Control Center, Mechanicsburg, Pa.[1]
8. Naval Training Systems Center, Orlando, Fla.

U.S. Army

9. Armament, Munitions, and Chemical Command, Rock Island, Ill.
10. Armament Research, Development, and Engineering Center, Picatinny Arsenal, N.J.[1]
11. Aviation Systems Command, St. Louis, Mo.[1]
12. Belvoir Research, Development, and Engineering Center, Ft. Belvoir, Va.
13. Communications-Electronics Command, Ft. Monmouth, N.J.
14. Missile Command, Redstone Arsenal, Ala.
15. Tank-Automotive Command, Warren, Mich.

U.S. Air Force

16. Ogden Air Logistics Center, Hill Air Force Base, Utah
17. Oklahoma City Air Logistics Center, Tinker Air Force Base, Okla.[1]
18. Sacramento Air Logistics Center, McClellan Air Force Base, Calif.
19. San Antonio Air Logistics Center, Kelly Air Force Base, Tex.[1]
20. Warner Robins Air Logistics Center, Robbins, Ga.

Defense Logistics Agency

21. Defense Construction Supply Center, Columbus, Ohio
22. Defense Electronic Supply Center, Dayton, Ohio[1]
23. Defense General Supply Center, Richmond, Va.
24. Defense Industrial Supply Center, Philadelphia, Pa.[1]

[1]Repository selected for review.

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