

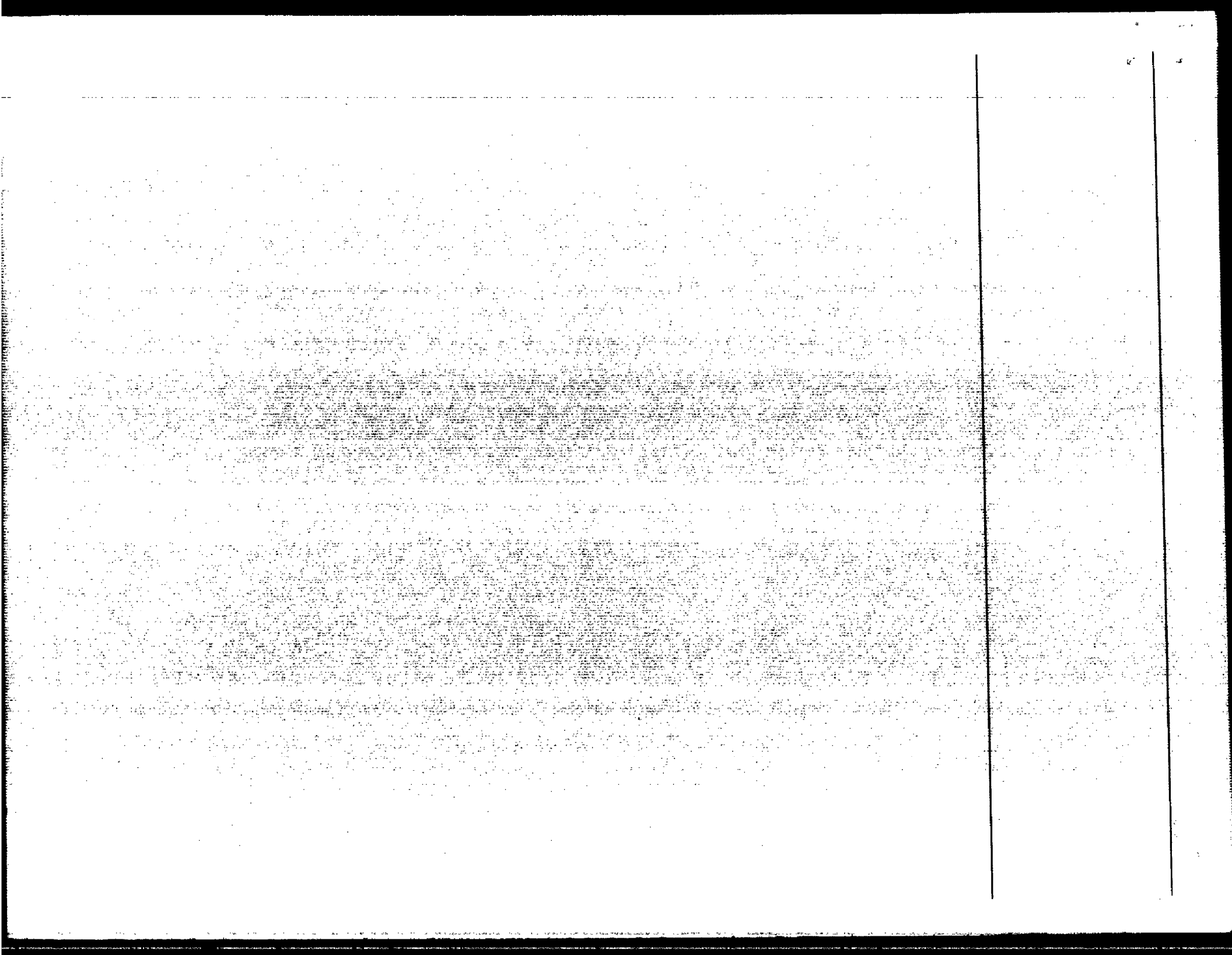
Report to the Chairman, Committee on
Armed Services, House of
Representatives

GAO

May 1966

**NAVY SUPPLY
PROGRAM LEADTIME
FORECASTING NEEDS
IMPROVEMENT**







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

National Security and
International Affairs Division

B-238716

May 18, 1990

The Honorable Les Aspin
Chairman, Committee on
Armed Services
House of Representatives

Dear Mr. Chairman:

In response to discussions with your office, we reviewed the Navy's process for determining procurement leadtime requirements. We found that the Navy can make improvements in forecasting these requirements.

We are sending copies of this report to the Chairmen, Senate Committee on Governmental Affairs, House Committee on Government Operations, Senate Committee on Armed Services, and Senate and House Committees on Appropriations; the Director, Office of Management and Budget; and the Secretaries of Defense and the Navy.

This report was prepared under the direction of Martin Ferber, Director, Navy Issues, who may be reached on (202) 275-6504 if you or your staff have any questions. Other major contributors are listed in appendix II.

Sincerely yours,

A handwritten signature in cursive script that reads 'Frank C. Conahan'.

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

For fiscal years 1986 to 1990, the amount of consumable aviation parts that the Navy estimated was needed while awaiting additional deliveries ranged from \$2.1 to \$2.9 billion a year. At the request of the House Committee on Armed Services, GAO evaluated whether the Navy was using credible procurement leadtimes in determining the need for these parts.

Background

In determining inventory requirements, the Navy considers estimated procurement leadtimes, safety levels, and economic order quantities. The procurement leadtime level is the amount of inventory needed to meet normal demand during the time required to order and receive additional inventory. A safety level is the amount needed to meet fluctuations in demand and leadtime. The procurement leadtime level is further divided into administrative leadtime and production leadtime. The amount of material needed to meet demands from the time a need is determined until a contract is awarded to purchase the material is called administrative leadtime. The amount of material needed to meet demands during the time from the award of a contract until receipt of the material is called production leadtime.

Because the Navy's Aviation Supply Office manages approximately 162,000 aviation items, determining valid requirements is a challenge; moreover, this magnitude also makes inventory management vulnerable to inefficiency and waste.

Results in Brief

The Aviation Supply Office can improve determinations of procurement leadtime requirements for aviation parts. Administrative leadtime requirements were not always based on actual experience. GAO found that at one point, the Supply Office had arbitrarily increased the administrative leadtimes for all items by 9 months. In calculating production leadtime requirements, the Supply Office did not consider some actual experienced leadtimes even when these leadtimes were more realistic. The Supply Office also did not routinely obtain contractor estimates of leadtime or compare them with actual performance.

Inaccurate leadtimes have significant adverse effects. Overstated leadtimes cause added investment for larger stock levels, greater chances of buying excess material, and increased termination costs if requirements change. Understated leadtimes cause material shortages and reduced readiness of the units needing the material.

In a random sample of 21 items, GAO found either overstated or understated requirements on all items. The overstatements totaled \$2.2 million and the understatements totaled \$839,000. With 162,000 items having leadtime requirements of over \$2 billion, the potential for significant efficiencies and dollar savings is great.

Principal Findings

Administrative Leadtime Estimates Are Not Accurate

Although Department of Defense (DOD) policy requires that administrative leadtime forecasts be based on historical information that has been collected for representative procurements, the Aviation Supply Office groups its 162,000 different stock items into only a few groups and uses the same standard leadtime for all individual items within a group. These standards may reflect the average leadtime experienced for an entire group, but they do not reflect the differences in individual leadtimes within a group. The Army and the Air Force estimate administrative leadtimes for individual items, and both DOD and Navy officials say it is feasible for the Navy to also do so.

GAO's analysis of 2,467 items purchased during a recent period showed that actual administrative leadtimes for 863 purchases varied from the standards by at least 6 months. In other words, the Aviation Supply Office either overstated or understated administrative leadtime requirements by 6 months or more in 35 percent of the purchases analyzed.

GAO also randomly sampled 150 stock items but, because of inaccuracies in the Aviation Supply Office's files, was able to obtain requirements data on only 21 items. GAO's review of these 21 items showed that the number of days used in the administrative leadtime requirements computations were overstated for 15 items and understated for 6 items. The value of the overstated requirements was \$645,000 and the value of the understated requirements was \$796,000.

During one period in 1986, the Aviation Supply Office arbitrarily added 9 months to the administrative leadtime standard for all purchases because funds were available. This action resulted in a 25-percent increase in purchases reviewed by GAO.

Production Leadtime Forecasts Are Not Adequate

Unlike administrative leadtimes, production leadtimes are determined on an item-by-item basis. However, the production leadtimes used in requirement computations often did not realistically reflect the time actually required to receive materials from contractors.

In determining production leadtime requirements, the Aviation Supply Office automatically rejects actual leadtimes that are not within 80 to 125 percent of the leadtime on file. These parameters are intended to ensure that atypical data do not influence the requirements forecast. The Aviation Supply Office, however, does not review the leadtimes that are outside of the parameters to determine if they actually are representative.

In addition to historical information on experienced leadtimes, contractor estimates are to be used in forecasting production leadtime requirements according to DOD policy. However, officials at the Aviation Supply Office stated that they receive contractor estimates on only about 5 percent of the items they manage, and those that are obtained are not compared with actual performance.

GAO's review of 21 randomly selected items showed that production leadtime requirements for 17 items were overstated by \$1.6 million and requirements for 4 items were understated by \$43,000. In one case, the three most recently experienced leadtimes were below the 80 percent parameter, which may indicate that the leadtime used in the requirements computation was too long.

Records Are Not Correct

The records used in the requirements determination process contained numerous inaccuracies. For example, GAO's analysis of 150 randomly selected items showed that shipment and receipt records in the contract status file did not agree for 122 (about 80 percent) of the items. GAO projects that about 4,200 items, involving purchases of \$487.5 million, had file discrepancies between shipments and receipts.

Incomplete and inaccurate inventory records further hamper leadtime forecasting. Without reliable data, the Aviation Supply Office does not have reasonable assurances that the procurement system is adequately protected from waste, fraud, and abuse.

Recommendations

GAO recommends that the Navy implement procedures to more accurately determine both administrative and production leadtime requirements. Specifically, GAO recommends that administrative leadtime requirements be based on actual experience for individual items and that additives to requirements be fully justified. Further, GAO recommends that production leadtimes that are outside of established parameters be reviewed, contractor estimates be obtained and compared with actual performance, and complete and accurate records be maintained on administrative and production leadtimes.

Agency Comments

DOD generally agreed with GAO's findings and recommendations (see app. I) and acknowledged that improvements were needed in forecasting leadtimes and maintaining accurate records. DOD noted ongoing or planned corrective actions to more accurately determine leadtime requirements and improve data accuracy. Data accuracy problems will be targeted as an issue for review in fiscal year 1991 under the Federal Manager's Financial Integrity Act.

DOD did not agree with GAO's emphasis on contractor estimates in forecasting production leadtimes. GAO recognizes that these estimates are just one of several sources of data but continues to believe that they should be routinely obtained to help ensure that the most accurate production leadtime forecasts are used in determining requirements.

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Abbreviations

ALT	administrative leadtime
ASO	Aviation Supply Office
DOD	Department of Defense
GAO	General Accounting Office
PLT	production leadtime

Introduction

The Department of Defense (DOD) estimates that parts, such as brakes, pumps, and compressors, costing \$40 million are needed each day to satisfy military customers while awaiting additional deliveries for its inventories. Reducing the time to order and receive such spare parts can reduce the amount of material needed in inventory. This reduction can lessen the risk of unneeded inventories and can promote increased responsiveness to the operating military forces.

The Naval Supply Systems Command administers the Navy supply system and provides supply management policies and procedures to its inventory control points. The Aviation Supply Office (ASO) is the Navy's inventory control point for aviation material. As such, it is responsible for determining how many aviation spare parts are needed. ASO has developed standardized methods for determining how much stock is needed for initial provisioning, replenishment or peacetime operations, and mobilization for war.

When determining requirements for replenishment inventories, the Navy considers economic order quantities and procurement leadtime and safety levels. The procurement leadtime level is the amount of material needed to meet normal demand during the time required to order and receive additional inventory. A safety level is the amount needed to meet fluctuations in demand and leadtime.

The procurement leadtime level is further divided into administrative leadtime (ALT) and production leadtime (PLT). ALT is the amount of material needed to meet demands from the time a need is determined until a contract is awarded to purchase the material. PLT is the amount of material needed to meet demands during the time from the award of a contract until receipt of the material.

The Navy maintains wholesale inventories at various stock points to fill requisitions from customers worldwide. These inventories include two types of material: consumables and repairables. Consumables are individual parts or assemblies that are disposed of when replaced. Repairables are components or assemblies that are returned to the supply system to be repaired when replaced. For fiscal years 1986 to 1990, annual procurement leadtime requirements for aviation consumable items ranged from \$2.1 to \$2.9 billion, as shown in table 1.1.

Table 1.1: Procurement Leadtime Requirements for Consumable Items

Dollars in millions			
Year	ALT	PLT	Total
1986	\$482.2	\$1,640.4	\$2,122.6
1987	570.4	1,736.6	2,307.0
1988	882.3	1,651.3	2,533.6
1989	1,288.8	1,624.3	2,913.1
1990	1,160.0	1,552.8	2,712.8

Inaccurate leadtimes can have significant adverse effects. Overstated leadtimes can cause added investment for larger stock levels, greater chances of buying excess material, and increased termination costs if requirements change. Understated leadtimes can cause material shortages and reduced readiness of the units needing the material.

Objectives, Scope, and Methodology

Our objectives were to evaluate ASO's requirements determination process for procurement leadtimes and to identify aspects that could improve their accuracy.

Between May 1989 and November 1989, we held discussions and collected information at the Office of the Secretary of Defense, the Naval Supply Systems Command, and ASO. We reviewed DOD guidance on defining and developing procurement leadtime requirements and the Navy's implementing policies, procedures, and practices. We selected Navy aviation consumable items for review because of the value of their leadtime requirements.

To evaluate the reasonableness of results of ASO's procurement leadtime process and related policies, we sampled and analyzed requirement computations and available asset records ASO maintained. We compared leadtime estimates used by ASO in requirement computations to leadtimes actually experienced. We then recomputed the requirements using the actual data and compared the results to the requirements computed by using ASO's estimates. We randomly sampled 150 consumable items from a universe of 6,109 consumable items, with purchases valued at \$788 million, where ASO's automated files indicated that supply contracts had been awarded and that some, but not all, of the material had been either received by the Navy or shipped to the Navy by a contractor. We used this factor because ASO considers that leadtime ends when each consignee under a contract receives the first shipment. Primarily

due to inaccuracies in ASO's contract status file, we obtained needed requirement data on only 21 items.

For an additional 5,893 items, we used a computer analysis to compare ALT estimates used by ASO in requirement computations to actual experienced ALTS. The 5,893 items represent virtually all items where sufficient data were available in ASO's active files to compute the actual ALTS.

We used the same computer programs, reports, records, and statistics the Navy used to manage inventories, make decisions, and determine requirements. We did not independently determine the reliability of all of these sources. However, we did assess the accuracy of ASO's contract status file by comparing data contained in the contract status file to data maintained in other ASO files. We estimated the value of discrepancies in the contract status file. We computed these estimates at a 95-percent level of statistical confidence.

We performed our review in accordance with generally accepted government auditing standards.

Administrative Leadtime Estimates Can Be Improved

Although DOD policy requires that ALT be based on historical experience, ASO generally has not used actual experience in determining ALT requirements for individual consumable items. Instead, ASO has grouped items into a few categories and used the same standard ALT for all individual items within a group.

These standards may reflect the average ALT experienced for an entire group, but they do not reflect the differences in individual leadtimes within a group. Our analysis of 2,467 items purchased during a recent period showed that actual ALT for 35 percent of the items deviated from the standards by more than 6 months.

Our review of 21 randomly selected items showed that ALT requirements for 15 items were overstated by \$645,000 and ALT requirements for 6 items were understated by \$796,000. During one period, ASO exacerbated the situation by adding 9 months to the standard because funds were available.

ALT Requirements Have Fluctuated Considerably

DOD policy, as promulgated in DOD Instruction 4140.55, requires that ALT be based on historical information that has been collected for representative procurements. However, ASO has not based ALT requirements on actual experience for individual items. Instead, ASO has grouped the approximately 162,000 individual items into a few broad categories (such as all competitive procurements or noncompetitive procurements valued at between \$25,000 and \$99,999) and used the same standard ALT for all items within a group. These standards have fluctuated considerably over the past several years, as shown in table 2.1.

Table 2.1: Chronology of Administrative Leadtime Standards

Date	ALT standard
12/18/85	Minimum of 273 days for all items.
7/18/86	Minimum of 394 days for all items.
7/25/86	One-time 273 day additive to 394 day minimum, or 667 days for consumable items only.
12/11/87	Minimums of 333, 364, and 394 days, depending upon the type of material and extent of competition.
8/04/88	Maximums of 182, 273, 333, 364, and 394 days, depending upon the type of material and extent of competition.
12/20/88	Maximums of 165 days for all competitive procurements and 128, 143, 228, and 291 days for noncompetitive procurements, depending upon their values.

Documents were not available at the time of our review to give the rationale for the earlier standards. ASO officials told us that they used studies, estimates, and experience in developing the standards. For example, they stated that the increases in ALT standards for 1985 and 1986 were caused by increases in the number of contracts awarded competitively and decreases in the number of unpriced basic ordering agreements. Instead of unpriced orders, contracts were not awarded until they had been priced out—this increased leadtime requirements.

Several reasons for subsequent decreases in ALT standards were cited in various documents and discussions. A memorandum setting the December 1987 standards stated they were based on experience gained in dealing with increased competition and firm-fixed price contracts. The August 1988 standards were based on a study of actual ALTs experienced for groups of items. Other reasons given by ASO officials for the decreases in ALT standards include

- establishing a monitoring system to track the performance of inventory managers and contracting personnel;
- performing some functions concurrently instead of sequentially;
- using more flexible contractual processes, such as including option clauses to purchase larger quantities; and
- adjusting the workloads of contracting personnel so that they are only given the number of purchase requests that can be realistically handled.

The officials stated that the December 1988 changes were based primarily on the ASO commanding officer's prior experience working with the Defense Logistics Agency.

ALTs for Individual Items Deviate Substantially From Standards

Our analysis of 5,893 purchases, valued at \$119.4 million, showed that average ALTs at ASO have declined since 1985. However, further analysis showed that ALTs for individual items have varied substantially from these averages, as well as from the ALT standards used in the requirement computations.

Of the 5,893 purchases, 2,467 purchases were initiated between July 18, 1986, and December 10, 1987. They illustrate the extent of the variance. During this period, the average ALT was 418 days and the standard was a minimum of 394 days for all items. We found that the actual ALT for 863 purchases varied from the standard by at least 180 days. In other words, ASO either overstated or understated ALT requirements by 180 days or more in 35 percent of the purchases we analyzed.

To further quantify the extent of individual deviations from the standards, we reviewed data on 21 randomly selected consumable items. We found that the average ALT exceeded the standards by as much as 601 days for 15 items and that 10 of them exceeded 180 days. The average ALT was less than the standard by as much as 749 days for the other 6 items. We substituted the actual ALTs for the standards used in the requirement computations and determined that requirements for 15 items were overstated by \$645,000 and requirements for 6 items were understated by \$796,000. The following examples illustrate the potential impact of not using representative ALTs in requirement determinations.

ASO used an ALT of 394 days in computing a requirement for 160 canopy glass assemblies (NSN-1560-00-402-8654) for the A-6 aircraft. ASO initiated a purchase action for the 160 assemblies on April 2, 1987, and awarded a contract on October 2, 1987. Therefore, the actual ALT was 183 days. The difference of 211 days in ALT equates to the purchase of 24 additional assemblies with an estimated contract value of \$121,920. On the basis of an ALT of 183 days, the requirement would have been reduced from 160 to 136 assemblies.

In another case, ASO used an ALT of 684 days in computing a requirement for 523 digital microcircuits (NSN-5962-00-225-0472) for the F-14 aircraft. ASO initiated a purchase action for the 523 microcircuits on July 29, 1985, and awarded a contract on April 2, 1986. Therefore, the actual ALT period was 247 days. The difference of 437 days in ALT equates to the purchase of 192 additional microcircuits with an estimated contract value of \$96,960. On the basis of an ALT of 247 days, the requirement would have been 331 microcircuits.

As a final example, ASO used an ALT of 751 days in computing a requirement for 60 breather adapters (NSN-1560-00-970-9693) for the A-6 aircraft. ASO initiated a purchase action for the 60 adapters on September 15, 1986, and awarded a \$3,960 contract on February 12, 1987. Therefore, the actual ALT was 150 days. No purchase of breather adapters would have been necessary at that time because with an ALT of 150 days sufficient assets would have been available to meet the requirements.

Supply officials stated they grouped items because ALT requirement determinations for individual items would have required input from inventory managers on each item and they did not want to do that. However, our discussions with DOD and Navy officials indicate that it is feasible to make ALT forecasts on an individual item basis. According to these

officials, inventory managers in both the Army and the Air Force review historical data and make ALT forecasts for individual items. They also stated that computer equipment was in place for individual ALT determinations in the Navy. We noted that ASO's automated files contained the data entries needed to compute ALTs for individual items.

ALT Additive Increased Purchases

On July 25, 1986, ASO added 273 days to the existing standard of 394 days for consumable items. ASO did this in order to purchase additional stock. Specifically, ASO had fiscal year 1986 funds available that enabled it to satisfy requirements for future periods. By using the additive, ASO raised the reorder levels, thereby generating purchases that otherwise would not have been made or would have been made for lesser quantities. The additive was a one-time occurrence and was eliminated after the purchases it generated were initiated.

Since requirements data on 64 consumable items affected by this additive were available from our prior review of operating levels, we used the data to determine the effect of the additive on ASO's purchases. We compared the actual purchase values for the 64 items with what the values would have been without the additive. The comparison showed that the total purchase value would have been reduced by \$2.1 million (from \$10.6 million to \$8.5 million). By eliminating the additive, 50 purchases would have been for lesser quantities and 14 purchases would not have been made. The following examples illustrate the impact of the additive.

ASO used an ALT of 667 days in computing a requirement for 349 direct current motors (NSN-6105-00-858-6873) for the H-3 helicopter. Since 138 motors already were available, ASO initiated a purchase for 211 additional motors. If 273 days had not been arbitrarily added to the 394-day ALT standard, ASO would have purchased 61 fewer motors and saved \$52,338.

In another case, ASO used an ALT of 667 days in computing a requirement for 240 toggle switches (NSN-5930-01-032-0644) for the H-1 helicopter. Since 161 switches already were available, ASO initiated a purchase for 79 additional switches. If 273 days had not been arbitrarily added to the 394-day ALT standard, ASO would not have had to purchase any switches and it would have saved \$19,355.

Conclusions

ASO generally has not used actual experience in determining ALT requirements for individual consumable items, even though DOD policy requires that ALT be based on historical information for representative procurements. Instead, ASO has grouped items into a few categories and used the same standard ALT for all items within a group. These standards may reflect the average ALT experienced for an entire group, but they do not reflect the divergence in individual leadtimes within the group.

We believe that ALTs used in requirement determinations should be based on actual experience for individual items. The Army and Air Force do this and it is feasible for the Navy to do it. To the extent that representative, past experience is used to develop current requirements, those requirements will provide a more accurate and realistic basis for procurement decisions.

We also believe that the use of additives to artificially increase ALT requirements should be limited, reasonable, and fully justified. The availability of extra funds does not seem to us to be sufficient reason to increase requirements in order to prematurely purchase additional stocks.

Recommendations

We recommend that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures that more accurately determine administrative leadtime requirements. Specifically, we recommend that the Commander

- base administrative leadtime requirements on representative actual experience for individual items rather than on standard leadtimes for groups of items,
- ensure that additives to administrative leadtime requirements are reasonable and fully justified, and
- review historical data on administrative leadtime requirements for completeness and accuracy.

Agency Comments and Our Evaluation

DOD generally agreed with our recommendations and stated that ASO had implemented procedures to more accurately determine ALT requirements. One procedure changes the data base to liberally accept shorter ALTs while limiting the acceptance of longer ALTs. Another procedure improves the timeliness of ALT forecast updates by recording actual ALTs shortly after contract award rather than waiting until contract deliveries occur.

DOD did not agree that the July 1986 additive to ALT requirements was based on available funding. DOD stated that the additive was made to preclude a potential stockout position during the transition from an unpriced purchase order environment to a more time consuming priced order environment.

We continue to believe that the additive was principally driven by available funding as evidenced by the fact that ASO eliminated the additive immediately after the purchases generated were initiated. Also, although ASO's initial budget execution plan for fiscal year 1986 called for obligating 20 percent of the budget in the fourth quarter, ASO actually obligated 40 percent during the fourth quarter. Furthermore, the additional time required to price out orders already had been accommodated in earlier standards. On December 18, 1985, ASO directed an ALT minimum of 273 days for all items to cover the proposed reductions in unpriced orders. On July 18, 1986, ASO increased the minimum to 394 days for essentially the same reason. The latter date was just one week before ASO provided for the additive.

Production Leadtime Estimates Can Be Improved

According to DOD policy, ASO is to use historical information and contractor estimates in establishing realistic PLT requirements. Our review indicated that the PLTs used often did not reflect the time actually required to receive materials from contractors. This was because ASO did not (1) review historical leadtimes that were outside of established parameters, (2) routinely obtain contractor estimates or compare those that had been obtained to actual contractor performance, and (3) maintain complete and accurate historical file data.

As with ALT, inaccurate PLTs can have significant adverse effects. Overstated PLT requirements can generate excess stocks and understated PLT requirements can cause stock shortages. Our review of 21 randomly selected consumable items showed that PLT requirements for 17 items were overstated by \$1.6 million and that PLT requirements for 4 items were understated by \$43,000.

PLT Requirements Are Not Accurate

To make realistic forecasts and ensure that neither too many nor too few spare parts are purchased, DOD policy states that PLTs used in the requirements determination process should be based on estimates from contractors or historical information that has been collected for representative procurements. In line with this policy, ASO collects data on actual experienced PLTs and contractor estimates. However, we found that the PLTs used in the requirements determination process often did not realistically reflect the time actually required to receive materials from contractors.

We reviewed the PLT requirements for 21 randomly selected consumable items and found that the PLTs used in the requirements computation differed from the actual PLTs in every case. The PLTs for 17 items were overstated by up to 472 days and the PLTs for 4 items were understated by up to 631 days. We substituted the actual PLTs for those used in the requirement computations and determined that, on total purchases of \$7.5 million, requirements for the 17 items were overstated by \$1.6 million and requirements for the 4 items were understated by \$43,000. The following examples illustrate the potential impact of inaccurate PLTs.

On November 24, 1986, ASO used a PLT of 573 days in computing a requirement for 10,488 compressor blades (NSN-2840-00-810-9309) for the J-52 engine, even though deliveries under the two most recent contracts were 200 and 349 days. On September 25, 1987, ASO exercised a contract option clause for an additional 2,622 blades and awarded a contract for 13,110 blades. On February 19, 1988, the Jacksonville Naval

Supply Center received the first shipment; therefore, the PLT for the blades was 147 days. The difference of 426 days between the estimated PLT of 573 days used by ASO and the actual PLT of 147 days equates to the purchase of 2,659 more blades (at an estimated contract value of \$446,712) than was required.

Using a PLT of 573 days in the requirements computation contributed to a subsequent excess of blades. In May 1988, ASO determined that 4,628 excess blades were under contract and notified the contractor to cease work because the contract was being terminated. In June 1989, the contract amount was decreased by \$779,448 to reflect the reduced quantities.

In another case, on January 15, 1986, ASO used a PLT of 482 days in computing a requirement for 356 shroud assemblies (NSN-1560-00-064-9374) for the A-6 aircraft. No information on prior contracts was in ASO's contract status file. On January 27, 1987, ASO awarded a contract for 356 assemblies and on February 10, 1988, the Oakland Naval Supply Center, the second of two consignees under the contract, received 12 of these assemblies. Therefore, the PLT for the assemblies was 379 days. The difference of 103 days between the estimated PLT of 482 days used by ASO and the actual PLT of 379 days equates to the purchase of 39 more assemblies (at an estimated contract value of \$14,664) than was required.

The following sections discuss some of the reasons for inaccurate PLT requirements.

Leadtimes That Exceed Parameters Are Not Reviewed

When forecasting future PLT requirements, ASO officials told us that they did not review actual experienced PLTs or contractor estimates that exceeded established parameters. In determining PLT requirements, ASO uses a process that automatically rejects variations from the PLT forecast if the variations are outside of prescribed parameters. The upper parameter is 125 percent of the PLT currently in file and the lower parameter is 80 percent of the PLT currently in file.

This forecasting method is intended to ensure that atypical data from actual experience or contractor estimates do not influence the requirements forecast. Data that are within the parameters are weighted to place major emphasis on more recent data and lesser emphasis on older data.

Although ASO's automatic process has the advantage of isolating apparent atypical PLTs, ASO does not review the PLTs that are outside of the parameters to determine if they are truly nonrepresentative. Experienced PLTs that fall within the 80 and 125 percent parameters are accepted. Data on the other PLTs are collected separately in the ASO computer system but are not reviewed.

Of the 21 consumable items we reviewed, 14 items had experienced PLTs that were outside of the parameters. For example, in the case of the previously discussed compressor blades, ASO's files continue to show a PLT of 573 days because the latest experienced PLT of 147 days and the two prior PLTs of 200 and 349 days were below the 80 percent parameter and therefore were not reviewed. Similarly, ASO's files continue to show a PLT of 482 days for the shroud assemblies because the latest experienced PLT of 379 days was below the 80 percent parameter and, therefore, was not reviewed.

DOD policy states that when experienced PLTs or contractor estimates are determined to be nonrepresentative of future performance, they should be excluded from normal PLT development. The policy also states, however, that the data should be retained in the procurement history files. Unless PLTs that are outside of the parameters are reviewed, ASO will not know if they are representative or nonrepresentative.

Greater Use Can Be Made of Contractor Estimates

ASO generally does not obtain contractor estimates before determining PLT requirements. When estimates are received, they are not compared with actual performance. DOD policy states that such estimates and comparisons shall be used so that the most accurate PLT forecasts can be made. ASO obtains and uses PLT estimates from only five major contractors. ASO does not maintain statistics on the number of individual contract estimates received, but ASO officials estimate that the estimates apply to only about 5 percent of the items in inventory.

If contractor estimates were routinely obtained and used in calculating PLT requirements, more accurate PLT forecasts could result. For example, on May 3, 1989, ASO used a PLT of 473 days in computing a requirement for 29 engine shields (NSN-2840-01-162-1143) for the F-402 engine. We asked a contractor representative for a PLT estimate who stated that, under normal conditions, first delivery would take place within 57 weeks, or 399 days after ASO's order was received. The difference of 74 days between the estimated PLT used and the contractor's estimate equates to the purchase of four extra shields, with an estimated value of

\$7,960. If actual performance was subsequently compared with the contractor estimate and the PLT used in the requirements computation, future PLT requirements would be more accurate. Unfortunately, ASO does not have a procedure for making these comparisons.

One area where positive action has been directed is in the area of contract negotiations. DOD has been concerned about the length of leadtimes, and in May 1989, held a major conference on reducing leadtimes. Nearly 100 top military and civilian officials from the procurement commands of the military services and the Defense Logistics Agency attended. One of the management concepts identified for possible use DOD-wide was to request shorter PLTs in contractor solicitations and press for continued reductions. In the past, Navy procurement policy was not clearly oriented toward negotiating reductions in PLT. In May 1989, the Secretary of the Navy reported to DOD that this policy had changed, and the Navy now is negotiating PLT reductions with contractors.

Historical Records Are Not Complete

We found numerous inaccuracies in the ASO records used in the PLT requirements determination process. Incomplete and inaccurate records make realistic PLT forecasts a very difficult task. Without reliable data, ASO does not have reasonable assurances that the procurement system is adequately protected from waste, fraud, and abuse.

ASO's automated contract status file is a permanent record of shipments by contractors and receipts by Navy activities. ASO uses this file to research contract shipment and receipt data. We examined the April 1989 contract status file to determine the number of consumable items with partial shipments or receipts. The file indicated that 6,109 items, valued at \$788 million, fell into these categories.

We randomly sampled 150 of these items for review and asked ASO to provide requirements determination documents. ASO could provide documents on only 21 items. Requirements documents on the other 129 items were not available, primarily because ASO officials indicated that all material had been delivered and the contracts were completed.

Because the contract status file indicated that none of the contracts for the 150 items were complete, we analyzed the file data in more detail. Our analysis showed that shipment and receipt records did not agree for 122 (about 80 percent) of the 150 items. On the basis of our analysis, we estimate that 4,154 items, involving purchases of \$487.5 million, had file discrepancies between shipments and receipts.

For example, in October 1987, ASO awarded a contract for 85 electromagnetic relays (NSN-5945-00-450-4679), valued at \$10,156, for the H-1 helicopter. The contract status file indicated that the contractor had shipped all 85 relays in February 1988, but the file also indicated that none had been received as of April 1989. The inventory manager for the relays told us that the contract was completed in February 1988 and that requirements documents were no longer available.

Our projection of the types of discrepancies in the contract status file based on our sample of 150 out of a universe of 6,109 items is summarized in table 3.1. Our sample provides a 95-percent level of statistical confidence.

Table 3.1: GAO Projection of Discrepancies in the Contract Status File

Dollars in millions		
Type of discrepancy	Number of items	Value of purchases
Quantities were shipped but none were received	1,507	\$25.1
Quantities were received but none were shipped	1,670	225.2
Quantities were shipped and quantities were received but totals did not agree	977	237.2
Total discrepancies	4,154	\$487.5

In addition to the contract status file, ASO maintains a due in file. The latter file is used to automatically compute the number of days in PLT. Entries in the due in file are temporary, and the file is purged when receipts equal the total quantities ordered under a contract. Permanent receipt data are retained in the contract status file because this file is supposed to be updated with receipt data at the same time the receipts are recorded in the due in file.

To determine if the contract status file and the due in file were in agreement, we compared the content of the files for the 150 sample items. Our comparison identified differences on 74 items. For these items, the contract status file showed outstanding receivables, but the due in file showed no receivables. ASO officials told us that inventory managers probably had deleted the receivables in the due in file but had not updated the contract status file.

ASO officials stated that a major reason why accurate records are not maintained is that ASO's data files are fed information from a variety of sources, and this leads to errors, mismatches, nonpostings, and other

problems. Nevertheless, the discrepancies within and between ASO's files indicate to us that internal controls over file data need to be improved.

Internal controls are essential elements of effective inventory management. When properly implemented, they provide reasonable assurance that (1) reliable data are obtained, maintained, and recorded, (2) assets are protected from waste, fraud, and abuse, and (3) resources are used in accordance with applicable laws, regulations, and policies. The data accuracy problems we found indicated that the Navy did not have adequate internal controls over this important data.

The Federal Manager's Financial Integrity Act of 1982 (31 U.S.C. 3512(b)) requires that agency internal control systems be periodically evaluated and that agency heads provide annual reports to the President and the Congress that state whether these systems comply with the objectives of internal controls set forth in the act and with the standards prescribed by the Comptroller General. When systems do not comply, agency reports must identify the weaknesses involved and describe the plans for corrective action. We reviewed these reports to determine if the Navy had identified significant weaknesses in internal controls over ASO's file data discussed herein and found that the Navy had not done so.

Conclusions

ASO does not review PLT data that the computer system automatically screens out if they are outside of established parameters. ASO needs to review the screened out data to determine if the PLTs are truly nonrepresentative or if conditions have changed so that they now are representative.

ASO receives PLT estimates from only a few contractors and those that are received are not compared with actual performance. Obtaining contractor estimates and comparing them with actual performance would be useful in updating PLT forecasts and would be in accordance with DOD policy.

Our review indicated that completeness and accuracy of PLT data in the permanent files is a serious problem. Shipment and receipt information currently in the contract status file is highly inaccurate and does not provide an adequate data base for research when updating PLT forecasts. Without reliable records and adequate internal controls, ASO does not have reasonable assurances that assets are protected from waste, fraud, and abuse.

Improvements in reviewing PLTs that are not within established parameters, obtaining and comparing contractor estimates, and maintaining complete and accurate historical files would help ensure that better forecasting data are available for use in determining PLT requirements. More accurate requirement determinations would reduce the chances of generating excess stocks because of overstated PLT requirements or incurring stock shortages because of understated PLT requirements.

Recommendations

We recommend that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures to ensure that more accurate production leadtime forecasting data are available and used in making requirement determinations. Specifically, we recommend that the Commander

- review experienced leadtimes and contractor estimates that are outside of established parameters to determine if they are representative of current conditions;
- routinely obtain contractor estimates of production leadtime and compare the estimates with actual contractor performance;
- improve the completeness and accuracy of production leadtime data in the historical files and establish the internal controls needed to ensure the accuracy of these files, including the reconciliation of shipment and receipt data in the contract status file; and
- target data accuracy problems as an issue for review in the Federal Manager's Financial Integrity Act assessments.

Agency Comments and Our Evaluation

DOD stated that as part of an overall DOD initiative to reduce procurement leadtimes, increased emphasis has been placed on determining the best available PLTs and accurately recording realistic PLTs. DOD acknowledged that the degree of variation between actual PLTs and those used in requirement determinations was a valid concern.

With regard to our data accuracy recommendations, DOD stated that data processing modernization efforts under an ongoing major software resystemization project will ensure that assets are properly reflected in all accountable records. As an interim measure, ASO is pursuing short term diagnostic methods to alleviate the effects of current weaknesses. DOD also stated that data accuracy problems will be targeted as an issue for review in fiscal year 1991 under the Financial Integrity Act assessments.

DOD did not agree with our recommendation to routinely obtain contractor estimates of PLT and compare the estimates with actual contractor performance. DOD stated that, although contractor estimates are valuable, they are just one of several sources of data used in validating PLT forecasts and they can be unreliable.

We did not intend to imply that contractor estimates should be the sole source for PLT forecasts. We agree with DOD that these estimates are just one of several sources of data but continue to believe that they should be routinely obtained to assure that the most accurate PLT forecasts are used in determining requirements. We also agree that contractor estimates can be unreliable and that is why we are recommending that they be compared with actual performance.

Comments From the Department of Defense

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



PRODUCTION AND
LOGISTICS

(L/SD)

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

APR 17 1990

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, "NAVY SUPPLY: Procurement Leadtime Forecasting Needs Improvement," dated January 30, 1990 (GAO Code 394277/OSD Case 8233). The DoD generally concurs with both the findings and recommendations of the draft report.

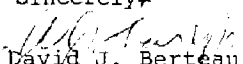
The DoD agrees that improvements are needed in the forecasting of lead times. To that end, the Navy Aviation Supply Office has adjusted its lead time filter parameters both to reflect actual lead times more accurately and to implement the DoD-wide initiative to reduce procurement lead times. The DoD also agrees that improvements in file data accuracy are required. The ongoing Navy Resystemization effort includes improvements in file data accuracy as a major goal.

While the DoD regards information from contractors as valuable in determining realistic production lead time estimates, the Department does not agree with the proposed degree of reliance on contractor estimates. As part of the overall DoD initiative to reduce procurement lead times, including production lead times, increased emphasis has been placed both on determining the best available production lead times and accurately recording realistic production lead times.

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

Sincerely,

Enclosure


For: David J. Berteau
Principal Deputy
Assistant Secretary of Defense
(Production & Logistics)

Appendix I
Comments From the Department of Defense

GAO DRAFT REPORT - DATED JANUARY 30, 1990
(GAO CODE 394277) OSD CASE 8233

"NAVY SUPPLY: PROCUREMENT LEADTIME FORECASTING NEEDS IMPROVEMENT"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

FINDING A: Background: Navy Supply Lead Time Forecasting. The GAO reported that the Naval Supply Systems Command administers the Navy supply system, while the Aviation Supply Office is the Navy inventory control point for aviation material. The GAO observed that, in determining inventory requirements, the Navy considers estimated procurement lead time, safety levels and economic order quantities. The GAO explained that procurement lead time level is the amount of inventory needed to meet normal demand during the time required to order and receive additional inventory. The GAO also noted that the procurement lead time level is further divided into administrative leadtime and production lead time. (The GAO further explained that the amount of material needed to meet demands from the time a need is determined until a contract is awarded is called administrative lead time, while the amount of material needed to meet demands during the time from the award of a contract until receipt of the material is called production lead time.) The GAO found that, for FY 1986 through FY 1990, annual procurement lead time requirements for aviation consumables ranged from \$2.1 billion to \$2.9 billion (as shown in table 1.1 in the draft report). The GAO concluded that, because the Aviation Supply Office manages approximately 162,000 aviation items, determining valid requirements is a significant challenge. The GAO further concluded that the sheer magnitude also makes inventory management vulnerable to inefficiency and waste. (pp. 1-2, pp. 10-12/GAO Draft Report)

DoD Response: Concur. The challenge inherent in determining valid requirements for an inventory of 171,000 aviation consumable items and 96,000 aviation repairable items is, indeed, considerable. In meeting the challenge, the Aviation Supply Office has instituted procedures aimed at minimizing inefficiency and waste and ensuring that requirements determinations reflect the maximum degree of accuracy. As a routine part of business, several recurring actions allow item managers the opportunity to validate the data that is critical to the requirements determination process, including

Now on pp. 2, 8, and 9.

administrative and production lead time forecasts. Supply Demand Review is a computer program, run approximately biweekly, which determines on an item-by-item basis how much and when to buy. The Stratification process is a semiannual program used to categorize stock according to the purposes for which it is held and to develop an estimate of future spares budget requirements. Internal audits of procurements and Requirements Review Boards also provide a safeguard system to ensure accurate calculation of requirements. Implementation of statistical process controls by the Aviation Supply Office (commencing in March 1990) will result in recommendations targeted at the specific processes causing delays in contract awards, thereby enabling future procurements to be based on highly accurate estimates of administrative lead time.

It is important to recognize that the management of any large organization entails risk. The whole point of the Aviation Supply Office review process is to focus attention on the most significant risks. With finite resources, it is impossible to eliminate/prevent all vestiges of "vulnerability to inefficiency and waste" in any operation this large. Improvement is always possible. There are, however, appropriate finite limits on the efforts made, because otherwise the attempts to eliminate all vulnerability risk becoming inefficient and wasteful in and of themselves.

FINDING B: Administrative Lead Time Requirements Have Fluctuated Considerably. The GAO reported that, although DoD policy requires that administrative lead time forecasts be based on historical information (which has been collected for representative procurements), the Aviation Supply office generally has not used actual experience in determining lead time requirements for individual consumable items. The GAO found that, instead, the Aviation Supply Office groups its 162,000 different stock items into only a few groups and uses the same standard lead time for all individual items within a group. The GAO observed that, while these standards may reflect the average lead time experienced for the entire group, they do not reflect the differences in individual lead times within a group. The GAO also observed that these standards have fluctuated considerably over the past several years. (The GAO provided a chronology of the changes in administrative lead time standards in table 2.1, as well as the various explanations for these changes.) The GAO reported that, according to supply officials, they grouped items because, if they computed administrative lead time requirements on the basis of individual items, it would require input from inventory managers. The GAO noted, however, that the Army and

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the Air Force estimate administrative lead time for individual items. In addition, the GAO observed that computer equipment and the necessary data were in place for individual administrative lead time determinations by the Navy. The GAO concluded, therefore, that it is feasible for the Navy to also compute administrative lead time requirements on the basis of individual items. The GAO further concluded that administrative lead times should be based on actual experience for individual items--not collectively by groups. The GAO also concluded that, to the extent that representative, past experience is used to develop current requirements, those requirements will provide a more accurate and realistic basis for decisions. In summary, the GAO concluded that reducing the time to order and receive items can reduce the amount of material needed in inventory--which, in turn, can lessen the risk of unneeded inventories and can promote increased responsiveness to the operating Military Forces. (p. 4, pp. 15-18, p. 23/GAO Draft Report)

Now on pp. 3, 11, 12, and
15.

DoD Response: Concur. The Aviation Supply Office has taken a number of actions in the past three years to stabilize and reduce administrative lead time and, as a direct result of those actions, the overall average administrative lead time has been reduced from 360 days to 172 days. The Aviation Supply Office has established administrative lead time goals, the purpose and intent of which were to focus attention at all levels of the Aviation Supply Office on the internal processing time required to award contracts. The administrative lead time goals represented a significant reduction from the actual experienced administrative lead time. The administrative lead time goals were overlaid in the Master Item File for each item, unless the existing file value was lower than the goal, in which case the lower administrative lead time remained unchanged. Requirements determination calculations were based on the administrative lead time goal or the lower experienced administrative lead time. Consequently, the overall administrative lead time was reduced as a result of overlaying the administrative lead time target in the Master Item File. In addition, the Aviation Supply Office reset the lead time filters to ensure consideration of reduced administrative lead time initiatives in all future computations of administrative lead time.

It is certainly true that administrative lead time requirements have fluctuated considerably, particularly over the period of 1984 to 1987, the interval during which the procurement actions studied by the GAO were initiated. Major changes in contracting policies and

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procedures, e.g., restrictions on unpriced orders (see discussion in Finding D), the Competition in Contracting Act, and the Refund Clause issue had significant impact on the contracting environment and had a tendency to increase administrative lead time.

There are two mechanisms which affect in-file administrative lead time forecasts. First, forecasts are updated on an item-by-item basis, as contract deliveries are made and observations of administrative lead time become known. The routine transactions can be thought of as adjustments to an existing baseline--the update mechanism has been in place for several decades.

The second update mechanism may be thought of as a baseline adjustment. From time to time, the Aviation Supply Office becomes aware of major business changes on the horizon that can be expected to have significant impact on its administrative lead time. To properly anticipate these changes, in-file administrative lead time forecasts are adjusted in a programmatic way. The particular nine month adjustment cited in Finding D, below, is an example of such a non-routine change. The contention that "they (the Aviation Supply Office) grouped items because administrative lead time determinations for individual items would require input from inventory managers on each item and they did not want to do that" no longer applies. Administrative lead time forecasts are routinely updated on an item-by-item basis, using actual administrative lead time observations.

See comment 1.

FINDING C: Administrative Leadtimes For Individual Items Deviate Substantially From Standards. The GAO analysis of 2,467 items purchased during a recent five month period showed that the actual administrative lead time for 863 purchases varied from the standards by at least six months. In other words, the GAO found that--in 35 percent of the purchases analyzed--the Aviation Supply Office either overstated or understated administrative lead time requirements by six months or more.

The GAO also randomly sampled 150 stock items. However, the GAO was able to obtain requirements data on only 21 items because of the inaccuracies in the Aviation Supply Office files. The GAO review of these 21 items showed that the number of days used in the administrative lead time requirements computations were overstated for 15 items (\$645,000) and understated for six items (\$796,000). The GAO cited examples were (1) canopy glass assemblies for A-6 aircraft, (2) digital microcircuits for the F-14 aircraft, and

Now on pp. 3, 9, 12, 13,
and 15.

(3) breather adapters for the A-6. The GAO again concluded that administrative lead times used in requirement determinations should be based on actual experience for individual items. The GAO further concluded that, to the extent that representative, past experience is used to develop current requirements, those requirements will provide a more accurate and realistic basis for procurement decision. (p. 4, p. 13, pp. 18-21, p. 23/GAO Draft Report)

DoD Response: Concur. The Aviation Supply Office has focused command attention on improving the business process of contract award as part of its Total Quality Management efforts. The current approach is to use past experience as a benchmark from which to achieve future improvements. This policy is represented by the current setting for the administrative lead time filter parameters, which are 0.01 percent and 110 percent. That choice of parameters liberally accepts declining observations and is designed to ensure their recognition, while limiting the likelihood of recognizing an aberrant increase.

Another current initiative improves the timeliness of administrative lead time forecast updates. Normal Navy Uniform Inventory Control Point procedures record observations for both administrative and production lead times at the same time, when contract deliveries occur. The Aviation Supply Office has implemented procedures to capture and record administrative lead time observations shortly after contract award, which is approximately one production lead time earlier than would otherwise be the case. As discussed in the DoD response to Finding B, lead time calculations are now done on an item-by-item basis.

The past several years (particularly in 1984 to 1987, the vintage of the data used in this audit) have seen significant changes affecting the ability of Government agencies to award contracts expeditiously. Restrictions on unpriced orders, the Competition in Contracting Act, and the Refund Clause are just three examples of contributors to increased administrative lead time.

FINDING D: Administrative Leadtime Additive Increased Purchases.

The GAO found that, during one period in 1986, the Aviation Supply Office arbitrarily added nine months to the administrative lead time standard for all purchases simply because funds were available. The GAO concluded that, by using the additive, the Aviation Supply Office raised the reorder levels--thereby generating purchases that otherwise would not have been made or would have been made for lesser

Now on pp. 3, 14, and 15.

quantities. Examples of increased purchases cited by the GAO involved (1) direct current motors for the H-3 helicopter and (2) toggle switches for the H-1. (The GAO did note that the additive was a one time occurrence--which was eliminated after the purchases it generated were initiated.) Since requirements data on 64 consumable items affected by this additive were available from a prior review of operating levels, the GAO used the data to determine the effect of the additive on the Aviation Supply Office purchases. The GAO compared the actual purchase values for the 64 items with what the values would have been without the additive--revealing that the total purchase value would have been reduced by \$2.1 million (from \$10.6 million to \$8.5 million). According to the GAO, by eliminating the additive, 50 purchases would have been made for lesser quantities and 14 purchases would not have been made at all. The GAO concluded that the use of additives to increase administrative lead times artificially should be limited, reasonable and fully justified. The GAO further concluded that the availability of extra funds is not sufficient reason to increase requirements in order to prematurely purchase additional stocks. (p. 5, pp. 21-23/GAO Draft Report)

DoD Response: Nonconcur. In FY 1986, the Aviation Supply Office was tasked by the Assistant Secretary of the Navy (Shipbuilding and Logistics) to reduce the number of unpriced Basic Ordering Agreement actions by 20 percent and to reduce the dollar value of unpriced orders by 30 percent. Since 70 percent of the Aviation Supply Office obligations had historically consisted of unpriced orders, compliance with the firm fixed price policy would have resulted in the extension of administrative lead time by as much as 270 days for every sole source buy. As a consequence of this acquisition change, and not, as the audit states, "simply because funds were available," a one-time Supply Demand Review was initiated with an additional administrative lead time. This one-time nine month administrative lead time additive was to preclude a potential stockout position during the transition from an unpriced order environment to a priced order environment. The impact on Stock Fund expenditures resulting from this lead time additive was limited to increased safety level requirements due to increased variability in lead time.

The Aviation Supply Office has ensured and will continue to ensure that arbitrary requirements are not procured.

FINDING E: Production Lead Time Forecasts Are Not Accurate. The GAO reported that, unlike administrative lead times, the Aviation Supply Office does determine production lead times on an item-by-item basis.

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The GAO observed that, in order to make realistic forecasts and ensure that neither too many nor too few spare parts are purchased, DoD policy states that production lead times used in the requirements should be based on estimates from contractors or historical information that has been collected for representative procurements. In line with this policy, the GAO found that the Aviation Supply Office collects data on actual experienced production lead times and contractor estimates. The GAO further found, however, that the production lead times used in requirement computations often do not realistically reflect the time actually required to receive materials from contractors.

The GAO reviewed the production lead time requirements for 21 consumable items and found that the lead times used in the requirements computation differed from the actual production lead time in every case. According to the GAO, production lead times for 17 items were overstated by up to 472 days and the production lead times for four items were understated by up to 631 days. The GAO substituted the actual production lead times for those used in the requirement computations and determined that, on total purchases of \$7.4 million, requirements for the 17 items were overstated by \$1.6 million and requirements for the four times were understated by \$43,000. The GAO concluded that, as with administrative lead time, inaccurate production lead time can have a significant adverse effect--either generating excess stocks or causing shortages. (pp. 4-5, pp. 25-28, pp. 35-36/GAO Draft Report)

DoD Response: Concur. Production lead time forecasts indeed have a degree of inaccuracy, as do any forecasts. However, the key issue is whether a better forecast could have been provided, given the data available at the time of the forecast. The fact that the forecasts differed from the actual observed values is not surprising. The degree of variation is a valid concern. The analysis in the audit should be extended. The GAO concludes that the reason the variations were so large was because the Navy was not using the GAO-recommended forecast system, which is to base the next production lead time on the last one. The Navy uses this approach, but with some modifications to take into account: (a) how long it has been since the last procurement (i.e., if the last contract was five years ago, is it truly representative of today's procurement lead time?) and (b) the degree of variation of the most recent observation from the historic norm. The Aviation Supply Office is cited not for the system, but the degree of difference (called filters) allowed between past history and recent observations. The Aviation Supply Office had

been using 80 percent and 125 percent as filters, meaning that a lead time observation less than 80 percent, or more than 125 percent, or the historic lead time, would not be used to update that lead time forecast. Due in part to the preliminary audit results, the Aviation Supply Office evaluated its forecast filters and changed them to reflect better values for updating the historic forecasts.

The parameters now in use are 70 percent and 110 percent; this change is intended to record the downward trend in production lead time that the Aviation Supply Office is working to achieve. In addition, Navy has a pro-active initiative underway to review data to determine whether a further lowering of the 70 percent parameter is appropriate.

Forecasts will always have a degree of inaccuracy in them; if not, they would not be forecasts as we know them. Technology in the areas of major investment--high technology weapon systems--is changing so rapidly that it affects the ability to accurately predict item demand, procurement lead time, and other factors that must be considered. The operating environment, number of weapon systems in the program, or even the state of world alliances cannot be predicted with unfailing accuracy; all of these will also lead to greater or lesser degrees of accuracy in the forecasting systems. The Navy is actively pursuing a number of initiatives designed to provide better procurement decisions as to quantity and timing of orders and will continue to try to improve the process.

Finding F: Lead Times That Exceed Parameters Are Not Reviewed. The GAO learned that, in determining and forecasting production lead time requirements, the Aviation Supply Office automatically screened out experienced lead times that are not within 80 to 125 percent of the leadtime on file. The GAO observed that these parameters are intended to ensure that atypical data do not influence the requirements forecast.

The GAO found, however, that the Aviation Supply Office does not review the lead times that are outside of the parameters to determine if they are actually representative as opposed to atypical. Of the 21 consumable items it reviewed, the GAO found that 14 items were outside the parameters. The GAO cited, as an example, the case of compressor blades, where the Aviation Supply Office files continued to show a production lead time of 573 days because the latest experienced production lead time of 147 days and the two prior production lead times of 200 and 349 days were below the 80 percent

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Now on pp. 4, 18, 19, 22,
and 23.

See comment 2.

parameter and, therefore, were not reviewed. The GAO concluded that, in the case of the compressor blades, this contributed to a subsequent excess of blades. The GAO pointed out that, while DoD policy states that when experienced production lead times or contractor estimates are determined to be nonrepresentative of future performance they should be excluded from normal production lead time development, the policy also emphasizes that these data should be retained in the procurement history file. The GAO concluded that, unless production lead times outside the parameters are reviewed, the Aviation Supply Office has no way of knowing if they are representative or nonrepresentative. (pp. 6-7, pp. 28-29, pp. 35-36/GAO Draft Report)

DoD Response: Concur. Current Uniform Inventory Control Point computer system design requires the selection of two parameters, upper and lower production lead time filter parameters, which are used to filter out "atypical" production lead time observations. Observations that pass through the filter automatically update the production lead time estimate in file. As a matter of policy, observations that fail to pass through the filter may either be held in suspense pending manual review or may be discarded from the production lead time observation update process. It should be noted that, contrary to the statement in the report, all observations are recorded in the contractor status file as part of the procurement history, regardless of whether or not they are used to update the in-file production lead time estimate. In addition, it should be recognized that the resource expenditure, which would be required to review all rejected observations, would be substantial and, in the DoD view, unjustifiable.

The choice of parameter values is used to balance the risk of automatic file update with inventory manager workload. During the 1986 command inspection of the Aviation Supply Office, it was noted that with the parameter values then in effect, approximately 2,000 observations per week were released for inventory manager manual review and, of these, approximately 90 percent were subsequently deleted from further consideration. On that basis, the decision was made to cease manual review of such observations in order to improve inventory manager productivity.

The current choice of parameters (70 and 110 percent) is intended to maintain the existing level of productivity while recording the downward trend on production lead time that the Aviation Supply Office is working to achieve. A number of programs have been

developed, including: (1) in accordance with DoD initiatives, the Aviation Supply Office procurement specialists are soliciting contractor deliveries 25 percent earlier than file data would otherwise indicate; (2) increased use of indefinite delivery type contracts; and (3) implementation of acquisition planning initiatives, which will lead to a general streamlining of the procurement process. For example, there are procurement automation via the Procurement Early Development System, improved tracking of procurement referrals via an automated system, improved support from the Naval Air Technical Support Facility for procurement drawings, and better support from Navy printing offices for procurement printing, quicker proposal turnaround time using computer communications media, and better document distribution through the development of the Solicitation Process Automation project with Navy printing offices.

The DoD recognizes that the choice of production lead time filter parameter values has important ramifications for many aspects of the Inventory Control Point business, including requirements determination, item management workload, and procurement workload. When properly selected, they provide an economical means of assuring that automatic production lead time file updates are, with a high level of confidence, representative of "typical" conditions, while simultaneously assuring that rejected observations are, with a high level of confidence, representative of "atypical" observations. Current and future initiatives to improve the choice of filter parameter values offer a more practical and cost-effective method of increasing the accuracy of lead time projections than does the labor-intensive manual review of every rejected observation.

FINDING G: Greater Use Can Be Made of Contractor Estimates.

The GAO also reported that, in addition to historical information on experienced lead times, contractor estimates are to be used in forecasting production lead time requirements. The GAO found, however, that the Aviation Supply Office generally does not obtain contractor estimates before determining production lead time requirements. The GAO further found that, in those instances when estimates are received, they are not compared with actual performance. The GAO pointed out that DoD policy states that such estimates and comparisons are necessary so that the most accurate production lead time forecasts can be made. The GAO found, however, that the Aviation Supply Office (1) obtains and uses production lead time estimates from only five major contracts, (2) does not maintain statistics on the number of individual contract estimates received,

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and (3) estimates that contractor information is applied only to about 5 percent of the items in inventory.

The GAO concluded that, if contractor estimates were routinely obtained and used in calculating production lead time requirements, more accurate forecasts would result. The GAO also concluded actual contractor performance should be compared with the contractor estimates and the production lead time used in the requirements computation to assure future production lead time requirements would be more accurate. (The GAO noted, however, that unfortunately the Aviation Supply Offices does not have a procedure for making such comparisons.)

The GAO observed that positive action has been directed in the area of contract negotiations. The GAO reported that the DoD has been concerned about the length of lead times and, in May 1989, held a major conference on reducing lead times. The GAO reported that, while in the past Navy procurement policy was not clearly oriented toward negotiating reduction in procurement lead times, in May 1989, the Secretary of the Navy reported to the DoD that this policy had changed and that the Navy was now negotiating procurement lead time reductions with contractors. (pp. 6-7, pp. 30-31, pp. 35-36/GAO Draft Report)

DoD Response: Partially concur. The DoD agrees that information from contractors is valuable in the procurement process for a number of reasons, including better estimates of production lead times. The DoD does not agree, however, with the GAO interpretation of DoD policy, as set forth in DoD Instruction 4140.55. Specifically, the GAO statement that "DoD policy states that such estimates and comparisons are necessary so that the most accurate Production Lead Time forecasts can be made" conflicts with the statement in the policy that "Production Lead Time may be based on estimates from contractors, historical information that has been collected for representative procurements, or provisioning technical documentation." Inventory managers, as part of the requirements determination process, validate production lead times using a number of data sources, which include historical data and contractor furnished estimates, when available. Recognizing that contractor furnished data can be unreliable (as the GAO noted in the area of cost estimates in GAO/NSIAD-88-7, "Contractor Cost Estimating Systems," OSD Case 7538) and that the contractor suffers no penalties for inaccurate estimates, such data are but one source of data among several used in the validation process. It should be noted that the

Aviation Supply Office obtains contract administrative data (including expected contractor deliveries based on performance monitoring) via access to a realtime Defense Logistics Agency contract administrative data base. The Defense Logistics Agency currently administers 66 percent of the Aviation Supply Office contracts and it is anticipated that, by the end of FY 1990, the Defense Logistics Agency will administer all of the Aviation Supply Office contracts. This will give the Aviation Supply Office an increased capability to validate projections of production lead time. The use of such real time data is a more reliable and appropriate source of information on contractor performance than contract estimates.

FINDING H: Historical Records Are Not Complete: Internal Controls Need To Be Improved. The GAO reported that the records used in the requirements determination process contain numerous inaccuracies. For example, a GAO analysis of 150 randomly selected items showed that shipment and receipt records in the contract status file did not agree for 122 of the items (or about 80 percent). The GAO projected that about 4,200 items, involving purchases of \$487.5 million (report table 3.1) had file discrepancies between shipments and receipts. The GAO reported that, according to Aviation Supply Office officials, a major reason why accurate records are not maintained is that the data files are fed information from a variety of sources and this leads to errors, mismatches, nonpostings, and other problems. The GAO observed that the discrepancies within and between the Aviation Supply Office files indicate that internal controls over file data need to be improved. The GAO also noted that its review of annual assurance reports indicated the Navy has not identified inaccuracies in the file data as a significant weakness. The GAO concluded that incomplete and inaccurate inventory records further hamper lead time forecasting. The GAO also concluded that, without reliable data, the Aviation Supply Office does not have reasonable assurance that the procurement system is adequately protected from waste, fraud, and abuse. Finally, the GAO concluded that more accurate requirement determinations would reduce the chances of generating excess stocks because of overstated procurement lead time requirements. (pp. 7-8, 31-35, p. 36/GAO Draft Report)

DoD Response: Concur. Resystemization is a major project to redesign completely the software system that supports all the functions of the Navy Inventory Control Points. The project is divided into four major phases, with 90 percent of the effort occurring in Phases II, III, and IV. The next scheduled

Now on pp. 4, 20, 21, 22,
and 23.

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Resystemization release is Phase II (the delivery schedule is currently in jeopardy due to technical problems and resource limitations), which includes financial and supply material tracking upgrades. Inherent in the new design is elimination of duplicate supply and financial data bases, and merger of inventory and financial systems into one overall integrated file structure. Implementation of the Uniform Chart of Accounts material accounting system will ensure that assets procured and paid for by the Navy are properly reflected on all accountable records after DD 250 signature acceptance by a Government representative. The current 1960's systems design has long been recognized as an impediment to accurate lead time forecasting. That is part of the basis for the significant Navy resource commitment involved in the Resystemization effort. The Navy has, in the interim, established a flag level Inventory Accuracy effort to establish as many improvements as possible regarding shipments and receipts.

As cited in the DoD response to Recommendation 7, data accuracy problems will be targeted as an issue for review in FY 1991 under the Financial Manager Integrity Act assessments.

* * * * *

RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommended that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures that more accurately determine administrative lead time requirements--by basing administrative lead time requirements on representative actual experience for individual items rather than standard lead times for groups of items. (p. 8, p. 23/GAO Draft Report)

Now on pp. 5 and 15.

DoD Response: Concur. The recommendation is moot, however, inasmuch as administrative lead time requirements are, in fact, based on representative active experience for individual items and not on standard lead times for groups of items. (The response to Finding B contains further discussion of this point.)

See comment 1.

RECOMMENDATION 2: The GAO recommended that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures that more accurately determine administrative lead time requirements--by ensuring that additives to administrative lead time

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Now on p. 15.

requirements are reasonable and fully justified. (p. 23/GAO Draft Report)

DoD Response: Partially concur. The DoD agrees that additives to requirements should be reasonable and fully justified, but contends that appropriate safeguards are already in place.

Now on p. 15.

Recommendation 3: The GAO recommended that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures that more accurately determine administrative lead time requirements--by reviewing historical data on administrative lead time requirements for completeness and accuracy. (pp. 23-24/GAO Draft Report)

DoD Response: Concur. The Aviation Supply Office has implemented procedures to more accurately determine administrative lead time requirements. Historical data are already included in the maintenance of administrative lead time. In November 1989, the Aviation Supply Office reset the procurement lead time filters to ensure inclusion of all internal process improvements affecting contract award. To the extent that one-time aberrant experiences are eliminated by these filters, unnecessary manual review in a limited personnel resource environment has been avoided. The cited practice is consistent with DoD direction to reduce inventories and lead times. In addition, the current data review cited in the DoD response to Finding E is aimed at determining whether a further decrease in the 70 percent parameter is appropriate.

Now on pp. 5 and 23.

Recommendation 4: The GAO recommended that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures to ensure that more accurate production lead time forecasting data are available and used in making requirement determinations--by reviewing experienced lead times and contractor estimates that are outside of established parameters to determine if they are representative of current conditions. (p. 8, pp. 36-37/GAO Draft Report)

DoD Response: Partially concur. The DoD does not agree with the recommended use of contractor estimates. (The issue is addressed in detail in the response to Finding G.)

See comment 2.

The DoD concurs that the assurance that experienced lead times are representative of current conditions is vital to the effectiveness and efficiency of Inventory Control Point operations. The DoD

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contends, however, that this assurance is more economically obtained from the careful selection and periodic analytical review of the lead time filter parameter values rather than through the manual reviews and processing of individual update transactions.

Recommendation 5: The GAO recommended that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures to ensure that more accurate production lead time forecasting data are available and used in making requirement determinations--by routinely obtaining contractor estimates of production lead time and comparing the estimates with actual contractor performance. (pp. 36-37/GAO Draft Report)

Now on p. 23.

DoD Response: Nonconcur. As stated in the DoD response to Finding G, production lead time may be based on several sources of information, of which contractor estimates is but one. Contractor estimates can be unreliable and the contractor suffers no penalty for unreliable estimates provided prior to contract award. The relevant information used by the Aviation Supply Office (real time data from the Defense Logistics Agency contract administration data base) is a more reliable and appropriate source of information on contractor performance.

Recommendation 6: The GAO recommended that the Secretary of the Navy direct the Commander, Naval Supply Systems Command, to implement procedures to ensure that more accurate production lead time forecasting data is available and used in making requirement determinations--by improving the completeness and accuracy of production lead time data in the historical files and establishing the internal controls needed to ensure the accuracy of these files, including the reconciliation of shipment and receipt data in the contract status file. (pp. 36-37/GAO Draft Report)

Now on p. 23.

DoD Response: Partially concur. Improvement in completeness and accuracy of production lead time data in historical files (i.e., contract status file) is a desirable goal. As cited in the DoD response to Recommendation 7, data accuracy problems will be targeted as an issue for review in FY 1991 under the Financial Manager Integrity Act assessments. In terms of its contribution toward improving accuracy of production lead time forecasting data, however, this goal is of secondary importance relative to the several other initiatives discussed elsewhere in the DoD response. The numerous contracting initiatives targeted at reducing production lead times are critical to success in improving forecasting accuracy. Careful

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selection of production lead time forecast filter parameters (i.e., real time contract administration data bases and, to a lesser extent, contractor-provided delivery estimates) are both highly significant forecasting process improvements. It is in these areas that the Navy is currently focusing its efforts.

Resystemization, the Navy's ongoing effort to modernize Inventory Control Point data processing systems, will provide substantial mechanized capabilities needed to better manage lead time forecasting. Phase II of this project (the delivery schedule is currently in jeopardy due to technical problems and resource limitations), will combine currently independent supply, procurement, and financial files into a single integrated data base. A fundamental feature of the new design is that both its item lead time observations and contract record history will be concurrently updated upon processing of material receipt reports from procurement consignees. The result should be considerable reduction, if not elimination, of further disconnects between supply data and contract records.

The current 1960s system design has long been recognized as an impediment to accurate lead time forecasting and that is part of the basis for the significant Navy resource commitment involved in the Resystemization effort. As an interim measure, the Aviation Supply Office has established a Process Action Team to examine possible short term workarounds until the Resystemization effort is complete. Short term efforts to alleviate the effects of these system weaknesses include the design of an Obligation Status File/Contract Status File/Due-In Due-Out File diagnostic (due to be completed by March 1990) and implementation of direct access to the Defense Logistics Agency contract administration file.

Recommendation 7: The GAO recommended the Secretary of the Navy direct the Commander, Naval Supply Command, to implement procedures to ensure that more accurate production lead time forecasting data are available and used in making requirement determinations--by targeting data accuracy problems as an issue for review in the Federal Manager's Financial Integrity Act assessments.
(pp. 36-37/GAO Draft Report)

DoD Response: Concur. Data accuracy problems will be targeted as an issue for review in FY 1991 under the Financial Manager Integrity Act assessments.

Now on p. 23.

The following are GAO's comments on DOD's letter dated April 17, 1990

GAO Comments

1. We agree that ALT experience is collected on an individual item basis. However, when standard ALTs are placed in computer files they automatically override collected experiences and result in minimum or maximum ALTs that inventory managers are required to use in making requirement determinations.
2. Although we agree that the parameters can isolate apparent atypical PLTs, we continue to believe that PLTs outside of the parameters should be reviewed to determine if they are truly nonrepresentative. Our tests showed that a large percentage of PLTs was outside of the parameters. The Navy has about \$1.6 billion in PLT requirements for consumable aviation parts. We believe that reviewing screened out PLTs can improve the accuracy of PLT forecasts and minimize the chances of buying excess material or having stock shortages. Even if only 10 percent of the forecasts were revised, \$160 million in PLT requirements could be potentially affected.

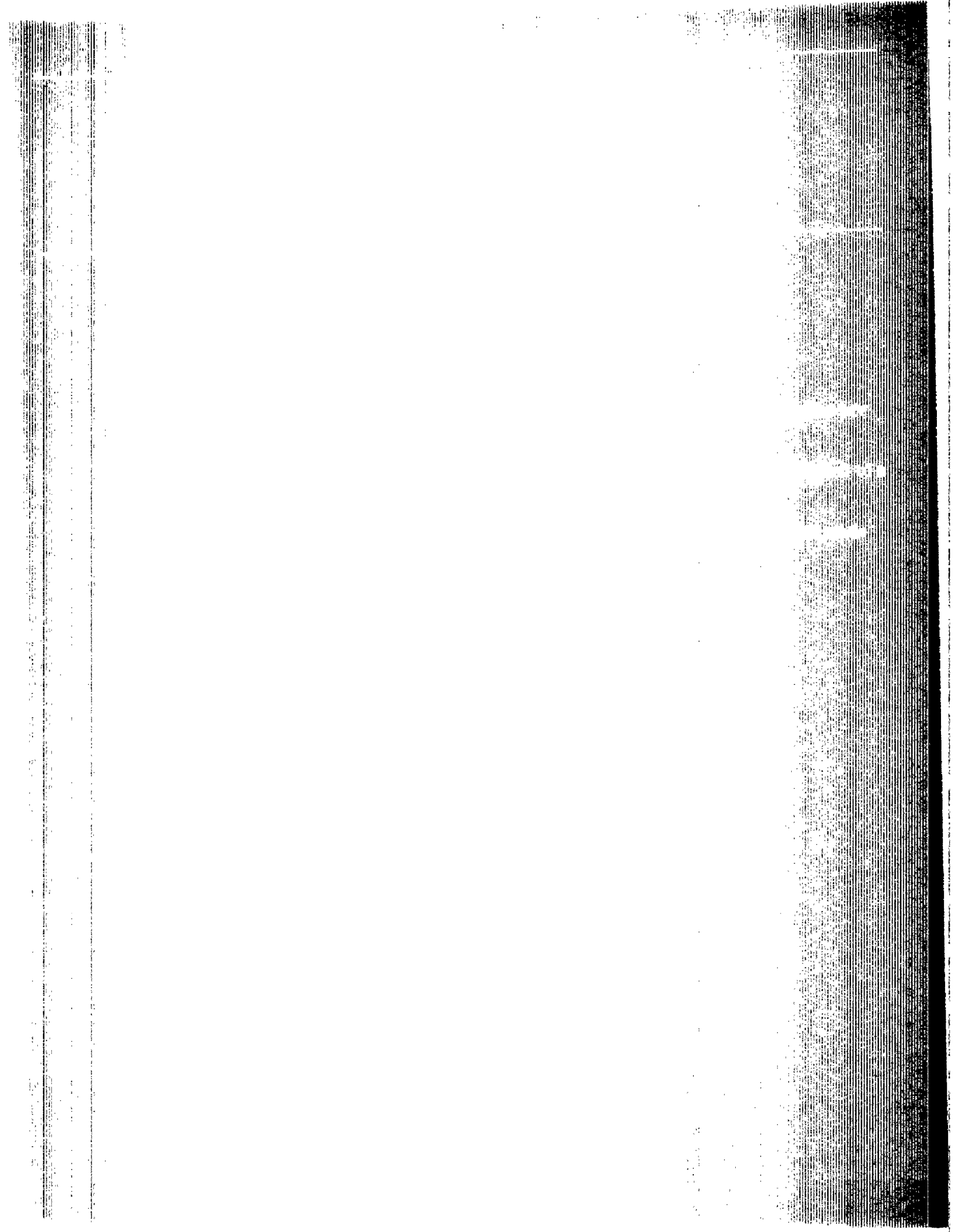
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