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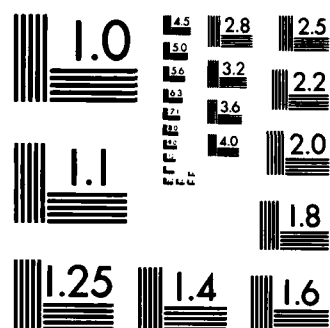
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AD-A157 891

Report To The Honorable Sam Nunn
United States Senate

Actions Taken By DOD On GAO Recommendations To Improve Spare Parts Requirements Determination

GAO found that actions taken by the military services and DOD to improve the spare parts requirements determination process, in response to prior GAO report recommendations, have resulted in estimated cost savings of over \$800 million during the past 5 years. Additional actions in process should result in further estimated savings of over \$500 million.

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GAO/NSIAD-85-61
APRIL 30, 1985

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-217879

The Honorable Sam Nunn
United States Senate

Dear Senator Nunn:

As requested by letter dated August 2, 1983, from the late Senator Henry Jackson, as amended and concurred in by your office, we have examined selected aspects of the military services' requirements for peacetime and war reserve stocks of spare parts.

As agreed with your staff, this report provides information on (1) the status of actions taken by the military services and DOD to improve the spare parts requirements determination process in response to prior GAO recommendations, and (2) the results of our inquiry as to whether the Army and Navy have problems, similar to those we have previously reported in the Air Force, in insuring that appropriate production lead times are used in computing spare parts requirements. We plan to provide you with a separate report containing an overview of the defense industrial base and DOD's industrial preparedness planning. Additionally, we previously provided your office with fact sheets and questions for use in the fiscal years 1985 and 1986 Defense authorization hearings which addressed other issues covered by Senator Jackson's letter.

We found that actions taken or planned by the military services and DOD to improve the spare parts requirements determination process are responsive to our prior report recommendations and should alleviate the identified problems. Actions already taken have resulted in estimated savings of over \$800 million during the past 5 years. Additional actions planned or in process should result in further estimated savings of over \$500 million. We also found that the Army and Navy do not have problems, similar to those previously reported on in the Air Force, in insuring that appropriate production leadtimes are used in computing spare parts requirements. The detailed results of our examination are shown in appendixes I and II.

Our review was performed during the period October 1983 through July 1984 at the Department of Defense; the U.S. Army Materiel Development and Readiness Command; the Naval Material

and Naval Air Systems Command; and the Air Force Logistics Command. Also, field work was performed at the Air Force's Warner Robins and San Antonio Air Logistics Centers; the Navy's Aviation Supply Office; and the Army's Troop Support and Aviation Readiness Command which was subsequently reorganized into two separate commands--Troop Support Command; Aviation Systems Command.

We monitored and updated the results of GAO and agency report follow up tracking systems showing the status of actions taken or planned to improve the spare parts requirements determination system. We obtained and evaluated documentation supporting actions taken or planned. We performed the work necessary to measure and verify the reasonableness of cost savings associated with the actions taken or planned. We also compared Army, Navy, and Air Force procedures and implementing systems for insuring that current and accurate production lead time data is used in computing requirements. Our work was conducted in accordance with generally accepted government auditing standards.

As requested by your office, we did not obtain official agency comments on this report. However, we discussed our findings with agency officials and their comments were considered in preparing the report. Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time we will send copies to the Secretaries of Defense, Army, Navy and Air Force and other interested parties.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Frank C. Conahan". The signature is fluid and cursive, with the first name "Frank" and last name "Conahan" clearly distinguishable.

Frank C. Conahan
Director

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STATUS OF ACTIONS TAKEN ON PRIOR GAO REPORT
RECOMMENDATIONS TO IMPROVE THE SPARE PARTS
REQUIREMENTS DETERMINATION PROCESS

MILLIONS OF DOLLARS CAN BE SAVED BY IMPROVED MANAGEMENT OF
AIRCRAFT CARRIER INVENTORIES (LCD-78-221, 12/22/78)

We reported that the continuous buildup of large amounts of excess inventory aboard aircraft carriers was due to a lack of supply discipline and management controls to prevent ordering excessive amounts of appropriation-funded reparable aviation spare parts. We pointed out that for a 2-year period ending December 31, 1977, the aircraft carriers reported monthly to their fleet commands on-hand and on-order excesses averaging \$108 million and \$46 million, respectively. Our analysis revealed that 87 percent of the excesses were items for which the carriers were authorized fixed allowances, and were, therefore, due to overordering, rather than to normal fluctuations in demand.

We pointed out that the fleet commands had not expressed any concern to the carriers about their frequent and substantial overordering of appropriation-funded aviation reparables. We concluded that this attitude was fostered by the fact that the overordering of these items had no effect on fleet supply funds since they were purchased by the wholesale inventory manager with appropriated funds and issued free to the carriers.

GAO RECOMMENDATION

We recommended that the Secretary of the Navy establish funding controls and limitations at the fleet command level over issues of appropriation-funded reparables.

STATUS OF ACTION TAKEN

In response to our report, the Navy, with DOD and Congressional approval, directed in October 1980 a 3-year test of the stock fund financing of the procurement, repair, and transportation of non-aviation depot level reparables with future plans to expand the testing to aviation depot level reparables. Under stock fund financing, depot level reparables are not issued free to fleet customers. Instead, the customers must pay standard cost for a replacement spare if they do not turn in for depot repair the part being replaced. If an inoperable spare is turned in as exchange for the replacement spare, the customer pays repair cost for the replacement. Repair cost is currently about 28 percent of procurement cost.

The Navy's evaluation report, published in August 1983, showed that since converting to stock fund financing of non-aviation depot level reparables the Navy saved \$306 million in connection with fiscal years 1981 through 1983 procurement appropriation funding requests, and projects annual recurring

savings of \$78.1 million. These savings resulted because of a 66 to 77 percent increase in returning reparable spares to depots for repair and a 50 day decrease in the time it took fleet customers to return an inoperable spare to a depot for repair. Also, the Navy's supply materiel availability rate for non-aviation depot level reparables increased from 55 to 76 percent.

As a result of its success with non-aviation depot level reparables, the Navy has received approval to extend its stock fund financing testing to aviation depot level reparables beginning in April 1985 for a 3-year period. Upon completion of this testing, DOD will decide whether the stock fund concept for depot level reparables should be made permanent for the Navy and whether it should be expanded to the other military services.

In connection with fiscal year 1985 Defense authorization hearings, the Chief of Naval Operations advised the House Committee on Armed Services that the conversion of aviation depot level reparables to stock fund financing would improve aviation readiness and save an estimated \$422.5 million during fiscal years 1985 through 1989.

NAVY'S BUDGET REQUESTS FOR REVISED SHIPBOARD
ALLOWANCES ARE OVERSTATED (PLRD-82-31, 1/11/82)

We reported that the Navy in budgeting for \$212.6 million in operation and maintenance funds over a 5-year period (fiscal years 1983 through 1987) to finance a revised shipboard spare parts allowance for surface ships, did not consider assets already on board the ships. Before fiscal year 1983, the Navy's criteria for stocking equipment spare parts on board surface ships was that the part must either (1) have an expected failure of one or more in a 90 day period based on past fleet wide usage or (2) be vital to the ship's mission or personnel safety and have a mathematical probability of at least one failure in a 4-year period. The latter category of spare parts are known as insurance stocks and account for 95 percent of items in a ship's inventory allowance.

On the basis of a study made by the Center for Naval Analyses, the Navy revised its stockage criteria for surface ships to permit stockage of minimum replacement units of spare parts deemed essential to the ship's mission if the parts had a mathematical probability of at least one failure in 10 years. To determine the amount of additional funding required by the revised stockage criteria, the Navy had it's Fleet Material Support Office (FMSO) study the financial impact of the revised criteria on four ships. This activity developed simulated allowance lists for the four ships under the old and revised stockage criteria based on shipboard equipment configuration and applicable parts usage. The study showed that the value of shipboard allowances would increase an average of 38.6 percent.

Our analysis showed that the study measured the difference in simulated allowances only and did not consider applicable assets already carried by the ships. For example, for one of the four ships studied the revised criteria resulted in increases in allowances valued at \$592,000 for 4,105 items. We found that 1,840 of these items valued at \$173,000, or 29 percent of the increased value, were already on board the ship in sufficient quantities to satisfy the increased allowance.

GAO RECOMMENDATION

We recommended that the Navy be directed to consider the assets already on board surface ships and make appropriate reductions to the \$212.6 million of operation appropriation funds budgeted for fiscal years 1983 through 1987 to finance the revised stockage criteria.

STATUS OF ACTION TAKEN

By letter dated March 24, 1982, the Navy concurred and advised that actions would be taken to reduce funding programmed for this initiative.

Our follow up review showed that as of February 1984 the Navy had reduced its budgeted 5-year operations appropriation funding requirement of \$212.6 million to finance the revised shipboard stockage criteria by \$94.3 million, or 44 percent. The reduction by fiscal year is shown below.

<u>Fiscal year</u>	<u>Amount (in millions)</u>
1983	\$ 20.6
1984	25.4
1985	12.8
1986	16.0
<u>1987</u>	<u>19.5</u>
Total	<u>\$ 94.3</u>

THE SERVICES SHOULD IMPROVE THEIR PROCESSES FOR
DETERMINING REQUIREMENTS FOR SUPPLIES AND SPARE PARTS
(PLRD-82-12, 11/30/81)

We reported that there were major differences in the methods used by the services to compute and forecast their production lead time requirements and that the impact of these differences were significant because each day of production lead time at the three service activities reviewed ranged from hundreds of thousands to over a million dollars in requirements. Generally, production lead time begins on the contract award date and ends with receipt of a significant delivery. However, each service defined significant delivery differently.

The Army considers significant delivery to have occurred when one-third of the ordered items are shipped; the Air Force when 10 percent of the items are received; and the Navy uses on the average initial receipt of ordered items by all consignees. We pointed out that the Army also arbitrarily added 30 days to an item's production lead time to compensate for delivery from a contractor's plant to the storage location. Our test indicated that this 30-day additive was excessive by about 15 days when compared to actual delivery experience.

We reported that the Army and Air Force used the last representative buy to forecast lead time requirements; whereas, the Navy used a filtering and smoothing process which considered variations in previous lead times and assigns weighting factors to the most recent and older lead time data.

GAO RECOMMENDATIONS

We recommended that DOD develop and issue uniform policy guidance on the computation and forecasting of production lead time. Also, we recommended that the Army be directed to reduce its arbitrary 30-day lead time additive to something more representative based on actual experience.

STATUS OF ACTIONS TAKEN

DOD concurred in the need for a more uniform policy on production lead time and advised that specific changes to current lead time policy would be made as required in the course of a long range review of materiel stockage policy. DOD also stated that the Army's Inventory Research Office had been tasked to perform a delivery lead time study to determine a more representative value than the standard 30 days.

Our follow up review showed that on April 12, 1982, the Army made a change to its standard wholesale logistics system

which reduced the delivery lead time additive from 30 to 15 days. Our analysis of budgeted requirements, computed on March 31, 1983, by the Army's five wholesale inventory managers showed that each day's production lead time represented about \$7.5 million in requirements. Accordingly, we estimate that the 15-day overall reduction in production lead time reduced the Army's inventory requirements by about \$112.5 million.

Also, in March 1984, DOD's Logistics Systems Analysis Office completed a 7-month study of the procurement lead time procedures and practices of the military services and selected Defense contractors. The objectives of this study were to (1) review the practices currently used by DOD components and selected Defense contractors for determining procurement lead times for secondary items and (2) develop proposals for a uniform DOD policy, to include

- defining conditions when historical information or contractor quotes will provide the basis for determination of procurement lead time.
- defining the time frames to be used in the computation of lead time, including a logical segmentation of lead time.

The study was conducted at the headquarters and selected wholesale inventory control points of each of the military services and the Defense Logistics Agency. Also, the study team visited 13 Defense contractors. The study pointed out that in fiscal year 1983, the value of procurement lead time for all secondary items within DOD exceeded \$15 billion and that one day of lead time equates to \$30 million. On this basis the study concluded that inaccurate lead time estimates can be quite costly. Overstatement of lead time ties up funding and increases the likelihood of long supply conditions. Conversely, understated lead times can result in stockouts and degraded materiel readiness. The study identified numerous procedures and practices throughout DOD which may contribute to the use of inaccurate procurement lead times in requirements determinations.

The study found variation among DOD components in the definition of production lead time and when to use historical data or more current contractor quotes in determining production lead time requirements. Each DOD component defines the end of production lead time differently. Because no DOD component could offer a satisfactory rationale for their particular way, several alternative approaches were considered. It was concluded that when production lead time is based on historical data, the best method for computation is a quantity weighted

average of receipt confirmation dates, and, if necessary, contract estimated delivery dates. The following example illustrates how this works.

<u>Shipment quantity</u>	X	<u>Number of Days</u>	=	<u>Unit Days</u>
25	X	100	=	2,500
50	X	115	=	5,750
25	X	140	=	3,500
				<u>11,750</u>

11,750 unit days
100 units = 117.5 days

The study found that some DOD components use contractor quotes only if they increase production lead time requirements. Also, it was found that DOD components do not have systems that track contractor delivery performance against their production lead time quotes. Several examples were found where one Defense contractor consistently delivered much earlier than the production lead times quoted which were used in determining requirements. In one case this contractor's production lead time quote of 14 months was being used by a DOD component to compute requirements even though each of the last three procurements from this contractor were delivered in less than 5 months.

The study pointed out that the contractors visited believe that valid production lead time quotes are far superior to historical data because quotes reflect current market conditions, whereas historically based projections of production lead times tend to dilute the fluctuations in the economy. Also, most contractors visited said they were willing to furnish quotes on a semiannual basis for a limited number of items to be procured in the next budget year if DOD components provided them with their projected procurement plan for the items.

The study recommended that DOD establish uniform policy on production lead time for secondary items which would include the following

- Production lead time quotes should be requested from contractors on a semiannual basis for high dollar value items projected to be procured in the next year. As an incentive for contractors to participate, DOD components should provide them with planned procurements.
- Production lead time should be determined by using contractor quotes, when available and considered reliable. Otherwise, production lead time would be based on historical information.

- A history of production lead time quotes and actual performance should be maintained by contractor. New quotes would be compared to history and adjusted when necessary.
- Production lead time, when based on historical information, should include only representative procurements and should be computed as a quantity weighted average of receipt confirmation dates and, if necessary, contract estimated delivery dates.
- When multiple production lead time quotes are received for an item, the quote of the primary contractor should be used if considered valid. Otherwise a composite average of other valid quotes should be used.
- Headquarters elements should conduct periodic supply management reviews of their wholesale inventory managers to increase emphasis on procurement lead time accuracy and adherence to lead time policies.

On the basis of the procurement lead time study, DOD developed uniform guidelines for defining and determining procurement lead times used in computing requirements for secondary items. The uniform guidelines incorporate all of the study recommendations. High dollar value items, for which contractors will quote production lead times at least semiannually, are defined as items having \$25,000 or more in annual expenditures. A draft of DOD's uniform policy guidance was issued on July 6, 1984, to DOD components for review and comments. DOD currently expects to implement its uniform policy guidance for procurement lead time in May 1985.

AIR FORCE USES INACCURATE PRODUCTION LEAD TIME TO
COMPUTE SPARE PARTS REQUIREMENTS (GAO/PLRD-83-85, 6/16/83)

Production lead time is a key element in the computation of item requirements. It is the time between the date of contract award and the receipt of the first significant delivery quantity under normal delivery conditions. The Air Force defines significant delivery as at least 10 percent of the total delivery quantity.

At two of the Air Force's five air logistics centers, GAO statistically sampled the accuracy of production lead times used in computing requirements in 1982 for consumable spare parts having lead time exceeding 360 days and annual demands of \$5,000 or more. The production lead times for this universe of items accounted for 61 percent of the total dollar requirements for consumable spares at the two centers. Of the 257 sample items tested, GAO found that inaccurate lead times were used for 197 items, or 77 percent.

Our tests showed that the two centers overstated requirements by \$137.5 million and understated requirements by \$12 million as a result of using outdated and inaccurate production lead times. This condition existed because Air Force procedures did not require the centers to obtain production lead time updates from contractors frequently enough. Also, the centers did not always use the most current data available even when they had it.

Examples of GAO's findings are presented below.

--Stock No. 2840-00-867-6279RX. The contractor for this item gave the San Antonio center a production lead time estimate of 1,110 days in January 1981 and updated it to 708 days in January 1982. The item manager chose not to use the update because the lead time had decreased. The 1,110 day lead time was still being used to compute requirements in August 1982. At this time the contractor told GAO that the lead time was still 708 days. As a result of not using the updated lead time, requirements were overstated by \$1,364,183.

--Stock No. 5841-00-415-2934LH. A production lead time of 854 days was used to compute requirements in August 1982. This lead time was based on the actual delivery time of an August 1979 contract. On a later contract awarded in August 1981 the contractor advised the San Antonio center that the lead time was 233 days. In August 1982, the contractor told GAO that lead time for

this item was still 233 days. As a result of using the outdated longer lead time, requirements were overstated by 153 items, valued at \$1,841,580.

GAO RECOMMENDATION

We recommended that the Air Force improve its procedures and controls for insuring that appropriate production lead times are used by having air logistics centers:

- Frequently and periodically obtain and use leadtime updates from contractors on items with long production lead times and high annual demands.
- Limit the use of historical data to forecast lead times for items to those cases when current updates cannot be obtained from contractors.
- Stress the importance of up-to-date and accurate lead times and monitor logistics centers progress in correcting outdated and inaccurate data.
- Work more closely with contractors to identify and resolve conditions that result in excessive lead times.
- Coordinate with Air Force plant representatives and Defense Contract Administration Services Management area offices in working with contractors to reduce long production lead times when possible.
- Accept advance deliveries only when advantageous to the Air Force.

STATUS OF ACTIONS TAKEN

By letter dated September 9, 1983, DOD and the Air Force agreed that improvements were needed in the Air Force's procedures and practices for insuring that appropriate production lead times are used in requirement computations. GAO was advised that the Air Force and DOD would take the following corrective actions.

- Implement a redesigned system in September 1984 that would obtain lead time updates from contractors on a more frequent and responsive basis. Also, implement in August 1983 a program designed to improve the accuracy of lead time data used in requirement computations. The program would emphasize the need for accuracy and include specific procedures for quality control.

- Use contractors' current production lead time updates in lieu of historical data if the updates are determined to be representative of routine acquisitions.
- Monitor the air logistics centers' progress in updating lead time data during semiannual headquarter verification reviews of factors used in requirement computations. Additional monitoring would be accomplished during agency audits.
- Task the Defense Logistics Agency with evaluating the feasibility of having its contract administration offices coordinate with air logistics centers in working with contractors to obtain more responsive and reliable lead time data. The Air Force will use the Defense Logistics Agency's response to complete a feasibility analysis by December 31, 1983.
- Specify on Air Force contracts whether advance deliveries will or will not be accepted.

In addition to the above actions, DOD directed its Logistics Systems Analysis Office in August 1983 to conduct a DOD-wide study of procurement lead time for secondary items with an objective of developing uniform DOD policy.

Our follow up review revealed that most actions planned by the Air Force were being held in abeyance pending the outcome of the DOD-wide study of procurement lead time and related development and implementation of uniform DOD policy guidance. The results of the procurement lead time study and the specifics of DOD's proposed uniform policy guidance are described on pages 6-8 of this appendix. In our opinion, DOD's proposed uniform policy guidance for procurement lead time adequately addresses our report recommendations and, when effectively implemented, should provide reasonable assurance that appropriate production lead times are used in computing requirements.

The Air Force did, however, direct its five air logistics centers in April 1983 to develop and implement action plans to improve procurement lead time data in the requirements determination system. Each of these centers has developed and furnished headquarters with its plans, which emphasize more item manager training and increased surveillance over procurement lead time data. Also, the Defense Logistics Agency and the Air Force are continuing to study the feasibility of having air logistics centers coordinate with Air Force plant representatives and the Defense Contract Administrative Services offices in working with contractors to obtain more responsive and reliable production lead time data.

Additionally, we found that the two audited air logistics centers, as of October 1983, had updated production lead time for 79 percent of the sample items for which we found inaccurate lead times were used in computing requirements. These corrections resulted in reducing requirements valued at \$10.3 million and yearly holding costs of \$1.7 million for 126 items. Also, requirements were increased by \$494,150 for 30 items.

NAVY AND ARMY HAVE BETTER SYSTEMS
THAN THE AIR FORCE FOR INSURING THAT
APPROPRIATE PRODUCTION LEAD TIMES ARE
USED IN COMPUTING REQUIREMENTS

As a part our followup examination into the status of actions taken by the Air Force to improve the currency and accuracy of production lead times used in computing requirements, we determined whether similar problems and needed improvements existed in the Navy and Army. We found that the Army and Navy have better procedures and automated systems for updating and insuring that the latest available production lead times are used in computing aircraft spare parts requirements.

Navy

The Navy's Aviation Supply Office receives quarterly production lead time update tapes from 16 contractors for 23,000 line items (10 percent of line items managed). The contractors' updated production lead time quotes are automatically screened against prior lead time observations by a filtering technique. If they are not more than 150 percent greater or 80 percent less than prior lead time observations, they are automatically posted to item master data records. If the updated production lead time quotes are less or greater than these parameters, they are rejected for manual verification by procurement personnel.

For the remainder of its inventory (about 200,000 items), the Aviation Supply Office has an automated program which updates production lead times quarterly by assigning smoothing weights to prior and current lead time observations. A weight of from 60 percent to 100 percent is applied to the latest quarterly lead time observation, depending on the number of quarters since the last observation. The remaining weight is applied to the prior "smoothed" lead time observation. For example, if an item's production lead times for quantities delivered during the prior two quarters was 100 days and 50 days, respectively, a "smoothed" production lead time of 70 days would be automatically calculated by applying a weight of 60 percent to the 50 days and 40 percent to the 100 days. If a subsequent quarterly production lead time of 25 days is

experienced, a 60 percent weight is applied to the 25 days and 40 percent applied to the prior quarter's "smoothed" 70 days, thus arriving at a new "smoothed" lead time of 43 days.

Army

The Army's Troop Support and Aviation Readiness Command¹ receives semiannual production lead time update tapes from six major aircraft contractors for 21,500 items (37 percent of aviation items managed). These production lead time updates are automatically screened against prior lead time observations. If the production lead time updates are within 4 months of the prior observation, they are posted to the master data records and used in computing requirements. If they exceed this tolerance, they are rejected for manual verification by procurement personnel.

For the remainder of its inventory (about 36,000 items), this command has an automated program which computes buy requirements on the basis of the latest representative buy or firm contract delivery schedule.

¹Subsequent to our review, this command was reorganized into two separate commands--Army Troop Support Command; Army Aviation Systems Command.

CONTINUED IMPROVEMENTS NEEDED IN AIR FORCE PROCEDURES AND
PRACTICES FOR IDENTIFYING AND CANCELING EXCESS ON-ORDER
STOCKS (GAO/PLRD-83-36, 2/7/83)

The requirement objective for Air Force stock fund items consists of an economic order quantity, plus stocks sufficient to satisfy procurement lead time, safety level, backorder, programmed maintenance, and war reserve requirements. An item's termination level consists of the sum of the requirement objective, plus a 6-or 12-month stock buffer--depending on annual dollar demand--to prevent uneconomical cancellation.

A standard automated system at the Air Force's five air logistics centers computes requirements objectives for all Air Force stock fund items. This system is run four times a month. One of its functions is to give item managers notices identifying on-order stocks which exceed an item's termination level. After the initial notice, repeat notices are produced periodically as long as the items have on-order stocks in a terminable status.

Upon receiving termination notices, item managers are supposed to determine the amount of on-order stocks above requirement objectives which either have been contracted for or are still in a purchase request status. Those still in a purchase request status should be promptly canceled. If the excess on-order stocks are on contract, termination action should be initiated if such stocks are valued at \$2,500 or more.

The objectives of this followup review were to assess the effectiveness of corrective actions taken by the Air Force in response to our 1979 report and to determine whether significant additional improvements were needed.

GAO's 1979 REPORT FINDINGS
AND RECOMMENDATIONS

In an October 1979 report to the Secretary of Defense, GAO pointed out that the Air Force could save millions of dollars annually in procurement costs by improving its policies, procedures, and practices for identifying and canceling on-order stocks exceeding requirements. We recommended that the Air Force (1) place greater emphasis on canceling excess on-order stocks, (2) eliminate the use of additional levels of stock above item requirement objectives as a buffer in establishing termination levels for on-order stocks, (3) issue repeat termination notices more often, and (4) establish a reporting system which would enable higher management levels to monitor and evaluate the performance of air logistics centers in canceling on-order stock excesses.

The Air Force agreed that there was no historical basis for its use of additional levels of stock above requirements as a buffer in computing termination levels for on-order stocks. However, it declined to eliminate these buffers on the basis that its July 1980 economical procurement termination study showed that its termination criteria compared favorably with other DOD components. As an alternative, the Air Force stated that it would change its policy and automated system to provide that on-order stocks exceeding item termination levels be cut-back to item requirement objectives, rather than to termination levels as was previously done. Also, the Air Force stated that it would change its automated system to provide for issuance of repeat termination notices monthly, rather than quarterly, as was previously the case.

The Air Force advised that the promised system changes could not be made until the planned changeover to updated computer hardware which was expected by August 1981. In the interim the Air Force directed its centers in August 1980 to have item managers, upon receiving termination notices, manually recompute terminable on-order quantities based on a cutback to item requirement objectives.

The Air Force disagreed with the necessity of improving visibility over the performance of its centers in canceling on-order stock excesses. However, the Air Force directed its centers to place maximum emphasis on prompt cancellation of excess on-order stocks.

GAO's 1983 REPORT FINDINGS AND RECOMMENDATIONS

On the basis of our followup review of the effectiveness of corrective actions taken by the Air Force in response to our 1979 report, we reported in February 1983 continuing problems which inhibited the identification and potential cancellations of on-order stocks valued at tens of millions of dollars annually. For the quarter ended December 31, 1981, the five air logistics centers reported to the Air Force Logistics Command that they had on-order stocks valued at \$146.4 million which exceeded termination levels. The report did not show the extent to which the on-order stock excesses were potentially cancellable or were being cancelled.

Our computerized analysis showed that \$39 million, or about 27 percent, of these excess on-order stocks were still in a purchase request status and therefore should have been cancellable. Our review of practices at the Oklahoma and San Antonio Air Logistics Centers showed that less than 6 percent of the dollar value of on-order stocks above termination levels were

being cancelled. Maximum cancellations of excess on-order stocks were not being achieved because item managers (1) made routine certifications that it was not economical to cancel on-order excesses without first making a detailed analysis and (2) incorrectly applied the \$2,500 threshold criteria for economical contract terminations to on-order excesses that were still in a purchase request status.

We also reported that our analysis of requirement data at the San Antonio and Oklahoma City centers showed that the Air Force's planned system change, to compute terminable on-order quantities based on a cutback to item requirement objectives, would have resulted in notices of termination action for additional on-order stocks valued at \$39.4 million for the quarter ended December 31, 1981. However, this planned change had slipped about 2 years because of a moratorium on system changes pending a changeover to updated computer hardware which had been delayed. Although this planned system change increased the potential for canceling excess on-order stocks, it did not provide for identifying and canceling on-order stocks exceeding item requirements but not termination levels. For example, if an item had a requirement of 50 units, a termination level of 68 units (18-unit buffer based on 6 months of supply at a monthly demand of 3 units), no assets on hand, and 60 on order, the 10 units on order exceeding requirements would not be identified for cancellation action because the termination level would not have been breached. However, had 70 units been on order, thus exceeding the 68-unit termination level, cancellation action would be required for the 20 units exceeding requirements.

Also, we found that item managers at these two centers were generally unaware of the Air Force's August 1980 directive to have item managers, as an interim measure, upon receipt of termination notices to manually recompute terminable on-order quantities based on a cutback to item requirement objectives. Finally, we reported that the Air Force was still using excessive buffers of stock above item requirements in establishing termination levels for on-order stocks. Our analysis of the July 1980 study on which the Air Force based its decision to retain the additional levels of stock above requirements in establishing on-order termination levels revealed a number of shortcomings.

The study did not consider that the Air Force already has a built-in stock buffer of 3 months for items with annual dollar demand above \$500 in that the Air Force applies a 6-month minimum buy in computing economical order quantities for these items, whereas other DOD agencies apply the 3-month minimum buy recommended by DOD. For example, if the computed economic order quantity were for a 3-month supply of stock, the Air Force would

buy 6 months of stock because of its minimum buy criteria, whereas the other DOD agencies would buy 3 months of stock. Also, the Air Force did not consider the fact that the study showed that a 3-month stock buffer provided the same protection against uneconomical on-order terminations as a 6-month buffer for items with annual demands above \$500.

Moreover, the Air Force's study did not take into consideration the 12-month stock buffer used in establishing on-order termination levels for items with annual dollar demands of \$500 or less. We concluded that no stock buffer was needed for these items since adequate protection against uneconomical terminations is provided by a 3-year economic order quantity buy and a \$2,500 threshold for contract termination, which alone provided a supply equivalent to 5 years' demand. Our computerized analysis of requirement data for the quarter ended December 31, 1981, at the Oklahoma City and San Antonio centers showed that a 3-month reduction in the 6-month stock buffer and elimination of the 12-month buffer would have increased the amount of on-order stocks identified for termination by \$58.3 million.

We recommended that the Air Force revise its on-order stock termination policy and requirement computation system to provide for (1) a 3-month reduction in the on-order stock termination level buffer for items with annual dollar demands of more than \$500 and (2) elimination of the 12-month stock buffer for items with annual dollar demands of \$500 or less. We also recommended that air logistics centers be required to establish uniform information systems which will enable management to evaluate the performance of the centers in making maximum reductions in excess on-order stocks.

By letter dated March 24, 1983, DOD and the Air Force generally agreed with our findings and with the intent, but not all of the specifics, of our recommendations. DOD stated that the Air Force should not be singled out for action concerning its use of a buffer stock level in establishing termination levels for on-order stocks. DOD pointed out that all of the services and the Defense Logistics Agency used some type of buffer stock level in making termination decisions for on-order stocks. Accordingly, DOD advised that this subject would be addressed on a DOD-wide basis and that a plan would be developed by September 30, 1983, outlining the actions that will be taken to develop a standard termination policy for on-order stocks which exceed requirements.

DOD advised that the Air Force would establish by October 1983 a management information system which would enable the Air Force Logistics Command to monitor and evaluate the performance of air logistics centers in making maximum reductions in on-order stocks exceeding requirements.

STATUS OF ACTIONS TAKEN

Our followup review of the status of actions promised by the Air Force and DOD in response to our 1979 and 1983 reports showed that the standard requirement computation system used by air logistics centers has been reprogramed to issue repeat item on-order stock termination notices on a monthly basis. Also, this system now computes terminable on-order quantities based on a cutback to item requirement objectives.

Additionally, the Air Force Logistics Command now requires its air logistics centers to submit quarterly reports reflecting their performance in canceling excess on-order stocks. For the quarter ended March 31, 1983, the five centers reported to the Air Force Logistics Command on-order stocks exceeding termination levels valued at \$146.3 million. The two centers previously reviewed -- Oklahoma City and San Antonio -- accounted for about \$90 million of this excess on-order amount. These two centers reported cancellations of 24.5 percent and 40.8 percent of the dollar value of their excess on-order stocks. At the time of our earlier reviews these centers were canceling only about 6 percent of their excess on-order stocks.

DOD has not yet developed a plan of action for studying the on-order stock termination policies of the services and the Defense Logistics Agency with the objective of establishing a standard policy. DOD plans to include this topic in its fiscal year 1986 research studies program. This program utilizes either contractor or in-house analytical support to complete priority study topics.

We estimate that actions taken by the Air Force to improve its procedures for identifying and canceling excess on-order stocks will result in procurement cost savings of at least \$47 million annually.

IMPROVED PROCESSES CAN REDUCE REQUIREMENTS FOR
AIR FORCE WAR RESERVE SPARE PARTS (GAO/PLRD-83-81, 7/8/83)

Air Force units that are scheduled to deploy in the event of mobilization are provided with war reserve spare kits. These are air transportable packages of parts which support an initial phase of planned wartime operations of aircraft. The Air Force holds an annual review meeting to select parts to include in war reserve kits and to decide on what factors will be used in determining requirements, such as past peacetime or anticipated wartime failure rates, future flying hours, and mix of aircraft within the same model requiring peculiar parts because of equipment changes.

Pertinent data on the selected war reserve kit parts are input to the DO-29 Requirement Computation System which computes item quantities needed in each kit to support a predetermined number of aircraft for a specified time. The DO-29 system is not programmed to compensate for the fact that each aircraft of a given model does not use the same parts because of production and modification changes. Therefore, DO-29 calculations are made as though each part is used on every aircraft supported by a given war reserve kit. However, note codes identifying whether an item is used or is planned on all aircraft series of a given model are supposed to be input to this system.

The DO-29 computations, run annually, are overlaid quarterly into the Recoverable Consumption Item Requirements Computation System (DO-41). The DO-41, on the basis of note codes furnished by the DO-29 system, factors and reduces kit parts quantities which are not applicable to all aircraft within a given model. Quarterly, the DO-41 system compares peacetime and wartime requirements with available assets and makes the necessary buy or repair decisions.

The objective of our review was to determine whether the Air Force used valid data to compute war reserve spare kit requirements for reparable items. To do this we selected and tested a random sample of items included in a war reserve spare kit of the F-15 aircraft. The requirements for the sample items reviewed were extracted from the DO-41's December 1981 quarterly cycle at the Warner Robins Air Logistics Center. The data on which these requirements were based was input to the DO-29 system in July 1981 and subsequently overlaid to the DO-41 system.

We reported that parts requirements for war reserve kits were overstated by \$12.6 million for 18 of the 32 sample items reviewed. Requirements were overstated by \$4.6 million on 12 of the sample items because the requirements were not adjusted to

reflect changes in item failure rates. About 38 percent of the radar items we sampled experienced failure rate decreases of 20 percent or higher between July 1981 and December 1981. Such changes were not reflected automatically in the DO-29 system nor did item managers adjust them manually. At our suggestion, Warner Robins officials reevaluated, on the basis of more current failure rate data, kit part requirements for items in a purchase status. As a result planned purchases of kit parts, valued at \$2.6 million, were terminated.

Additionally, requirements were overstated by \$8 million on six of the sample items reviewed because they were not adjusted to reflect aircraft part configuration changes. War reserve spare kit requirements for our sample F-15 radar items were significantly overstated because item and system managers lost track of what changes were made in the configuration of the components once aircraft were deployed to operating squadrons.

To illustrate, two versions of radar receivers can be used in any F-15 aircraft, but the individual parts of the receivers (i.e., amplifiers) are not interchangeable with the parts in other receivers. When the F-15 aircraft were delivered to operating squadrons, the Air Force initially knew which versions of the radar receiver were installed in each aircraft. However, replacement of failed radar receivers during base maintenance with interchangeable versions created a situation where the Air Force did not know which radar receiver version was installed in any particular aircraft.

To compensate for this problem Warner Robins item managers ensure that war reserve kits for F-15 aircraft contain enough parts to repair failures on both versions of the radar receiver. To do this the item managers put incorrect codes in the DO-41 system to prevent the factoring of war reserve kit requirements by percentage application of aircraft having the different radar receivers installed.

We also pointed out that this problem may exist with other relatively new aircraft, such as the F-16 and E-3, which are undergoing production changes and modifications on systems and subsystems similar to those which have occurred on the F-15's radar system.

GAO RECOMMENDATIONS

We recommended that the Air Force take the following actions:

- Devise a technique which identifies significant variations in failure rate data recorded in the DO-29 and DO-41 systems.

- Require item managers to (1) review at least quarterly the propriety of war reserve requirements from the latest failure rate data available, (2) coordinate the data with system managers and using commands, and (3) make adjustments in requirements computations.
- Strengthen existing quality controls to insure that requirements are properly adjusted and that purchases for items in excess of requirements are terminated.
- Determine the extent to which the configuration change problem exists on other F-15 avionics items and other aircraft weapons systems, such as the E-3 and F-16, and develop the means to compute realistic war reserve parts requirements.

STATUS OF ACTIONS TAKEN

By letter dated October 20, 1983, DOD and the Air Force indicated general agreement with our findings and recommendations. Our followup review showed that the Air Force has taken or plans the following corrective actions.

The Air Force now has an out-of-cycle system for making adjustments to requirement computations for war reserve kit items when there is a significant variation in item failure rate data during the interim between annual war reserve kit reviews. If it has been at least two quarters since the last annual review and an item's demand rate is substantially decreasing, the item manager will query the equipment specialist to determine the cause. If there is a specific definable reason for this cause, the item manager will send a message to the project manager and affected commands requesting that a reduction be made in the item's war reserve spare kit quantities. If appropriate, corrective action would then be taken to make the necessary reduction in both the DO-29 and DO-41 systems.

Additionally, a feasibility study was undertaken by the Air Force Logistics Command to include other war reserve materiel computations in the DO-41 system. The Air Force feels that if this can be done wartime rates/factors will be present in the DO-41 system and item managers can readily compare peacetime/wartime demand rates and take appropriate actions when there are substantial variations. Further, the Air Force expects a new requirement system, being developed (Requirements Data Bank) and scheduled for implementation in 1987, to include all segments of the requirement computation (i.e., peacetime operating stocks, war reserve kit, and other war reserve materiel).

The Air Force has also improved quality control over war reserve kit requirements through implementation of the senior officer review process. Under this process, a general officer review of selected war reserve kit requirements is accomplished in which all elements of kit buy requirements are validated. The F-4 and the F-111 are currently being reviewed under this program. Also, the Air Force has reemphasized to its logistics command and major operating commands the importance of quality control procedures to ensure the validity of war reserve kit requirements.

The Air Force acknowledges that the equipment configuration change problem adversely affects war reserve kit requirements for other F-15 interchangeable components as well as other aircraft. The Air Force also agreed that the proper use of note codes, showing what units are assigned specific aircraft, in the DO-41 system would cause war reserve kit requirements overlaid by the DO-29 system to be properly factored and reduced. Item managers are required to use note codes denoting percent application of aircraft having peculiar parts in the DO-41 system to factor war reserve kit quantities. The validity of the note codes are now reviewed and validated semiannually.

ARMY'S REQUIREMENTS FOR WAR RESERVE MATERIEL CAN BE
REDUCED WITHOUT IMPAIRING COMBAT EFFECTIVENESS
(LCD-78-422A, 12/14/78)

To meet war reserve requirements, the services must acquire and store large quantities of combat equipment and essential supplies sufficient for wartime consumption until the industrial base and resupply capability can respond to the increased requirements. War reserve materiel supports two types of requirements which relate to a war situation. The first type, prepositioned war reserves, are supplies and equipment positioned (1) as near as possible to the point of potential need and (2) in stateside warehouses to be used as the initial resupply support for forces engaged in combat. The second type, other war reserve materiel or general mobilization stocks, are supplies required to sustain the combat forces through the remainder of the planned wartime support period.

Each DOD component is responsible for establishing appropriate systems to compute war reserve requirements and program their procurement in accordance with DOD guidance. DOD provides annual guidance to the military services and the Defense Logistics Agency specifying the planned wartime support period and other data, such as troop strengths and equipment densities which are needed in developing war reserve requirements.

We reported that the Army had significant shortages in its prepositioned war reserve category for clothing and textile assets which were available in the lower priority other war reserve category. As of the end of fiscal year 1978, the Defense Logistics Agency had \$654.2 million of other war reserve clothing and textile assets earmarked for the Army, while the Army had a \$415.2 million deficit for the same items in its prepositioned war reserves. Also, the Army had shortages of \$154.5 million in its overseas prepositioned category and assets of \$298.1 million in its stateside prepositioned category.

The Defense Logistics Agency, the Army Support Activity, Philadelphia, Pennsylvania and the Army overseas commands manage various aspects of clothing and textile war reserves and are responsible for funding portions of the Army's war reserve stockage objectives. Organizational arrangements and funding procedures between these activities impeded transfer of lower priority war reserve stocks to higher priority need categories.

In order to obtain available lower priority other war reserve stocks to fill high priority shortages, the Army would have to purchase the stocks from the Defense Logistics Agency. Also, an Army Controller's ruling prohibited asset transfers to war reserve stocks from a low priority claimant (stateside) to a higher priority claimant (overseas) without transferring funds.

We also reported that the Army's Aviation Command was using excessive supply pipeline, wartime safety level, and repair cycle time factors in computing war reserve requirements for aviation consumable and reparable items. The computed requirements for a limited number of items tested substantially exceeded anticipated combat consumption during the wartime support period specified in DOD's annual guidance. We tested 6 of the 13,700 air items managed by this activity and found that war reserve requirements could be reduced by about \$1.3 million by limiting requirements to combat consumption during the planned wartime support period.

GAO RECOMMENDATIONS

We recommended that the Secretary of Defense seek legislation to specifically allow transfer of assets between Defense components to fill high priority prepositioned stock shortages. Also, we recommended that the Army be directed to eliminate or reduce supply pipeline, wartime safety level and repair cycle time factors, which resulted in computed war reserve requirements that exceeded expected need during the planned wartime support period.

STATUS OF ACTIONS TAKEN

DOD advised us that its components would be required to coordinate and transfer assets to fill high priority shortage categories where practicable. Also, DOD agreed that the methodology for computing war reserve requirements could be improved and stated that a DOD draft instruction was being processed which would provide a standard methodology for calculation of war reserve requirements.

In June 1979, DOD directed the military services and DLA to balance war reserve stock fund items by issuing low priority war reserve assets to fill peacetime demands and by using the funds generated from these transactions to fill shortages in higher priority war reserve categories which would be needed during the early stages of the wartime support period. Also, the Army was directed to balance its war reserves by transferring assets from low priority storage in the United States to higher priority overseas commands.

Also, DOD Instruction 4140.47 (Secondary Item War Reserve Requirements Development issued on July 11, 1979 and subsequently updated and reissued February 24, 1984) established a standard methodology for calculating war reserve requirements. This instruction directed all DOD components to develop systems for calculating retail (high priority prepositioned) and wholesale (lower priority category) war reserve requirements separately in 30-day increments over the wartime support period.

specified in DOD's annual guidance. Also, the DOD components were to develop a system for determining funding priorities of war reserve deficiencies in order to ensure a balanced position. Additionally, the standard methodology delineated by DOD constrained the computation and funding of war reserve requirements to the authorized wartime support period.

Our followup review disclosed that actions taken by the Army and the Defense Logistics Agency to balance war reserve stocks resulted in a \$241.2 million savings during fiscal years 1979 through 1983 and improved combat readiness. The Defense Logistics Agency issued to military activities for peacetime use \$193.8 million of low priority war reserve stocks and the funds paid for these items were reprogramed to buy higher priority war reserve stocks. The Army transferred \$47.4 million in assets from stateside stored low priority war reserve to satisfy higher priority war reserve needs overseas.

Our followup review also disclosed that the Army has developed and intends to fully implement by June 1985 a revised system, known as the War Reserve Automated Process, for computing war reserve requirements in accordance with DOD Instruction 4140.47. The revised system will enable the Army to compute wholesale and retail war reserve requirements in 30 day increments for the authorized wartime support period. The new system will implement the following improvements:

- Establish a means to prioritize funding requests by monthly breakout of requirements.
- Provide the wholesale level with visibility of retail war reserve assets.
- Establish an end item national stock number weapon system approach to determining secondary item war reserve requirements.
- Use of updated failure factors to compute requirements.
- Provide for systematic release of excess peacetime assets and low priority war reserve assets to fill higher priority war reserve needs.

ESTIMATED COST SAVINGS ATTRIBUTABLE TO ACTIONS
TAKEN OR PLANNED TO IMPROVE THE SPARE PARTS
REQUIREMENTS DETERMINATION PROCESS

<u>Report title</u>	<u>Savings through FY 1984</u>	<u>Savings beyond FY 1984</u>	<u>Page reference</u>
---(millions)---			
Millions of Dollars Can Be Saved By Improved Management of Aircraft Carrier Inventories	\$384.1	\$422.5	1-2
Navy's Budget Requests for Revised Shipboard Allowances Are Overstated	46.0	48.3	4
The Services Should Improve Their Processes for Determining Requirements for Supplies and Spare Parts	112.5		5-6
Air Force Uses Inaccurate Production Leadtime to Compute Spare Parts Requirements	11.5	1.7	12
Continued Improvements Needed in Air Force Procedures and Practices for Identifying and Canceling Excess On-Order Stocks	47.0	47.0	18
Improved Processes Can Reduce Requirements for Air Force War Reserve Spare Parts	2.6		20
Army's Requirements for War Reserve Materiel Can Be Reduced Without Impairing Combat Effectiveness	241.2		25
Total	<u>\$844.9</u>	<u>\$519.5</u>	

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