

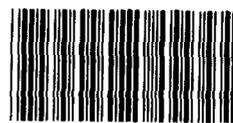
GAO

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

July 1991

# AIR FORCE REQUIREMENTS

## Requirement Computations for Aircraft Consumable Items Can Be Improved



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

National Security and  
International Affairs Division

B-243727

July 17, 1991

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

Dear Mr. Chairman:

In response to your April 17, 1990, request, we examined the accuracy of requirement computations for aircraft consumable items that are managed through the System Support Division of the Air Force stock fund. Specifically, you asked us to determine whether the Air Force could achieve procurement economies for these items by improving their requirement computations.

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## Results in Brief

Air Force policy and procedures governing the requirement computation process for aircraft consumable items have resulted in duplication of requirements for backordered items and exclusion of applicable depot maintenance assets in deciding to buy or cancel items already on order. As a result, Air Force requirements for consumable items were overstated by about \$663 million, as of January 31, 1991. By eliminating the duplication and considering all applicable assets in computing requirements, we estimate the Air Force could reduce fiscal year 1992 procurements by as much as \$159 million. The estimate is based on budget data showing procurements to be about 24 percent of requirements. The \$159 million is 24 percent of \$663 million.

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## Background

The Air Force manages about 400,000 aircraft consumable items ranging in cost from a few cents each to thousands of dollars. For fiscal year 1992, the Air Force has forecasted requirements for consumable items that are valued at about \$9.8 billion. The Air Force plans to buy about \$1.1 billion of consumable items with fiscal year 1992 funds in addition to the \$1.3 billion already on order.

The Air Force's five Air Logistics Centers use a standard automated system to assist in deciding the number of items to procure or the number of items already on order that should be canceled. The system generates a buy notice when assets on hand and on order are less than the reorder level (the quantity of assets that must be on hand or on order to sustain operations). Conversely, an on-order termination notice

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is generated when assets on hand and on order exceed the termination level (the quantity of assets on order that exceeds requirements plus 6 months of forecasted demands).

The consumable item computation system considers a number of factors in making buy and on-order termination recommendations. (See glossary for definitions of these factors.) Buy and on-order termination notices are manually validated by item managers prior to final buy or termination decisions.

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## Backordered Requirements Are Duplicated

The consumable item requirements computation system duplicates backordered requirements in computing reorder and termination levels by including backorders in both the lead time demand and the backorder portions of the computation. The lead time demand portion of the computation is based on the recurring demands, both filled and still on backorder, for the past 24 months. The backorder portion of the computation is based on the unfilled recurring and nonrecurring demands for the same 24-month period. As a result, recurring demands that cannot be filled and become backordered are included in the lead time portion of the computation and are then duplicated as part of the backorder portion of the computation.

The duplication of recurring demand backorders in computing reorder and termination levels results in premature or avoidable buys and precludes the timely identification and termination of on-order excesses, as shown by the following examples.

- In December 1990, the San Antonio Air Logistics Center initiated a procurement of 49 B-1B aircraft right side gearbox shafts (NSN 3040-01-261-5168YP) costing \$534,358 because of a reorder level deficiency of 28 shafts. The procurement quantity included the reorder level deficiency plus a 7.8-month reorder frequency quantity of 21 shafts. In computing the reorder level, seven recurring demand backorders were included twice—once in the lead time demand quantity and once in the backorder quantity. Further, in validating the computation, the item manager adjusted the monthly demand rate from 2.75 to 0.40 without making a corresponding change to reduce the reorder frequency quantity from 21 to 4. Had the duplication and the error not occurred, the procurement could have been reduced by 24 shafts valued at \$261,726.
- In January 1991, the Oklahoma City Air Logistics Center initiated a procurement of 80 F-111 aircraft engine valves (NSN 4810-00-185-1729PQ) at a cost of \$66,756 because the number on hand was 38 less than the

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computed reorder level. The quantity purchased included the reorder level deficiency plus a 6.6-month reorder frequency quantity of 42 valves. In computing the reorder level, a requirement for 13 valves, based on the recurring demand backorders for the past 24 months, was included in both the lead time demand quantity and the backorder quantity. Had the duplication not occurred, the procurement would have been reduced by 13 valves at a savings of \$10,848.

- In October 1990, the requirement computation system at the San Antonio Air Logistics Center recommended an on-order excess termination of 11,385 C-130 aircraft engine blades (NSN 2840-01-291-8116RW) costing \$2,768,035. No termination action was taken because data validation by the item manager showed that after correcting for an error the on-hand and on-order quantity did not exceed the termination level. However, backordered requirements for 13,685 blades were included twice in the computation of the termination level. Had this duplication not occurred, the termination level would have been reduced by 13,685 blades. The reduced termination level, when compared to the corrected on-hand and on-order assets, would have resulted in an on-order termination of 20,318 blades at a procurement cost savings of \$4,939,915.
- In August 1990, the San Antonio Air Logistics Center initiated a procurement of 1,527 F-100 engine probes (NSN 2915-01-109-6194PT) costing \$5,453,252 because the number of assets on hand and on order were 943 less than the computed reorder level. The procurement quantity included the reorder level plus a 1-year reorder frequency quantity of 584. In computing the reorder level, the system included 76 recurring demand backorders twice, in the lead time demand quantity and the backorder quantity. Without the duplication, the quantity purchased would have been reduced by 76 probes saving \$271,412. In October 1990, the system recommended cancellation of 481 on-order probes that had become excess because of declining demands. In January 1991, 1,935 of the 2,285 probes on order were canceled because they exceeded current requirements.

As of January 31, 1991, backordered requirements for consumable items were valued at \$475 million, of which \$446 million represented unfilled recurring demands for the past 24 months. Duplicating these recurring demand backorders in reorder level computations has overstated requirements by \$446 million, which could increase fiscal year 1992 procurements by about \$107 million. This estimate is based on fiscal year 1992 Air Force budget data that show a procurement dollar to requirement dollar ratio of 24 percent.

Air Force officials told us that the inclusion of recurring demand backorders in requirements computations as both a part of the lead time demand requirement and a separate backorder requirement is necessary to compensate for past wholesale stock shortages and to avoid future outages. However, the requirement computation system contains self-correcting features to compensate for past wholesale stock shortages to prevent recurrences. If the shortages were caused by a longer than predicted lead time, the longer lead time would be included in the computation. If past demands were greater than predicted, an increased demand factor would be used.

We recognize that in some cases involving critical backorders additional stocks may be necessary. However, in the examples cited, procurements based on duplicating backorders did not correct the shortage situation any quicker than the system could have without the duplication and in some cases contributed to on-order excesses.

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## Applicable Assets Not Considered in Requirement Computations

In June 1989, we reported<sup>1</sup> that the Air Force overstated its procurement requirements for aircraft consumable items by millions of dollars by excluding on-hand assets applicable to depot maintenance requirements from requirement computations. As a result, the House Committee on Armed Services, in its report on the 1989 Defense Authorization Act, directed Department of Defense activities, including the Air Force, to consider depot maintenance assets in procurement computations. The Committee-directed action was not considered mandatory by the Air Force because it was not upheld by the Senate in the authorization conference.

As of January 31, 1991, the Air Force's requirement computations took into consideration depot maintenance requirements valued at \$363 million but did not consider \$217 million of available assets that were applicable to these requirements.

The failure to consider depot maintenance assets<sup>2</sup> has resulted in overstated procurement requirements, as shown by the following examples.

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<sup>1</sup> Military Logistics: Air Force's Management of Backordered Aircraft Items Needs Improvement (GAO/NSIAD-89-82, June 2, 1989).

<sup>2</sup> Assets recorded in depot supply accounts at Air Logistics Centers and reserved in wholesale storage at these centers for issuance to local tenant depot maintenance activities.

- In April 1990, the San Antonio Air Logistics Center initiated a procurement for 71,608 F-100 engine bushings (NSN 3120-01-040-9446PT) costing \$255,640. The procurement quantity was based on a reorder level requirement of 95,386 bushings offset by 86,314 of the 153,761 bushings on hand and on order, leaving a reorder level deficiency of 9,072 bushings, plus a reorder frequency quantity of 62,536. The reorder level was based on the demands of Air Force customers, including the local depot maintenance activity, for the past 24 months. The 153,761 bushings on hand and on order consisted of 86,314 bushings available for Air Force-wide issuance and 67,447 bushings reserved for issuance to the local depot maintenance activity. In computing the reorder level deficiency of 9,072 bushings that generated the procurement action, no consideration was given to the 67,447 bushings on hand that were reserved for local depot maintenance needs. Had these on-hand assets been considered in the computation, no procurement action would have been warranted during the current fiscal year.
- In August 1990, the Oklahoma City Air Logistics Center initiated a procurement for 5,014 piston rings (NSN 2915-01-246-8929PQ) costing \$928,542. The procurement quantity was based on a reorder level requirement of 6,531 rings offset by 4,083 of the 4,709 rings on hand, leaving a reorder level deficiency of 2,448 rings, plus a reorder frequency quantity of 2,566 rings. The reorder level was based on the demands of Air Force customers worldwide and the local depot maintenance activity for the past 24 months. The 4,709 rings on hand and on order consisted of 4,083 rings available for Air Force-wide issuance and 626 rings reserved for issuance to the local depot maintenance activity. Had the total wholesale inventory of 4,709 rings, including the 626 rings reserved for the depot maintenance activity, been considered in the computation, the procurement quantity would have been reduced by 626 rings valued at \$115,929.

Air Force officials told us that assets reserved for depot maintenance activities are retail assets and are not available to offset wholesale procurement requirements. However, we believe that because (1) wholesale requirements include forecasted depot maintenance demands and (2) assets are being reserved in wholesale storage to satisfy these future demands, it is only reasonable to expect that these reserved assets would be used to offset the wholesale requirements.

We estimate that fiscal year 1992 procurements could be reduced by \$52 million by considering applicable depot maintenance assets in requirement computations. Our estimate is based on fiscal year 1992 Air Force

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budget data that show a procurement dollar to requirement dollar ratio of 24 percent.

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## Matter for Consideration by the Congress

The Congress may want to consider a reduction in the Air Force fiscal year 1992 stock fund budget request to reflect the overstatement of requirements and the possibility of unnecessary procurements.

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## Recommendations

We recommend that the Secretary of the Air Force direct the Commander, Air Force Logistics Command, to make the necessary changes to requirements computation policy and procedures for aircraft consumable items to assure that

- backordered recurring demands are not counted twice in the computation of reorder and on-order termination levels and
- on-hand assets applicable to depot maintenance requirements are considered in requirement computations.

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## Scope and Methodology

We reviewed Air Force policy and standard implementing procedures, as set forth in Air Force Logistics Command Regulation 57-6, governing the requirement computation process for consumable items. We discussed the rationale for current Air Force policy and procedures with consumable item requirement system specialists and inventory item managers at the Air Force Logistics Command and selected Air Logistics Centers.

At two of the five Air Logistics Centers, we selected a limited number of consumable items for which there were recent procurement or on-order termination actions. We evaluated the requirement computations and the related supporting documentation on which these procurement and on-order termination decisions were based.

To determine the magnitude of the duplication and exclusion problems we identified, we obtained information on the value of (1) recurring and nonrecurring backorders and (2) depot maintenance requirements and applicable on-hand assets as of January 31, 1991. We also analyzed the Air Force's budget inventory analysis report, dated March 31, 1990, that showed the ratio of planned procurement dollars to requirement dollars for fiscal year 1992.

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We performed our work at the Air Force Logistics Command and the Oklahoma City and San Antonio Air Logistics Centers between May 1990 and February 1991 in accordance with generally accepted government auditing standards.

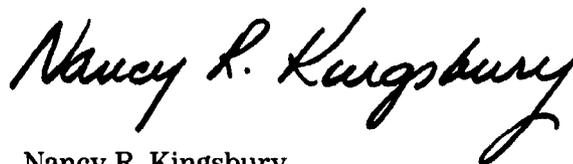
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As agreed with your office, we did not obtain formal Department of Defense comments on this report. However, we discussed a draft of this report with Department and Air Force officials and incorporated their comments as appropriate.

We are sending copies of this report to the Chairman, Senate Committee on Armed Services; the Chairmen, Subcommittees on Defense, Senate and House Committees on Appropriations; the Secretaries of Defense and the Air Force; and the Director, Office of Management and Budget. Copies will be made available to others on request.

Please contact me at (202) 275-4268 if you or your staff have any questions concerning this report. The major contributors to this report are listed in appendix I.

Sincerely yours,



Nancy R. Kingsbury  
Director  
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# Major Contributors to This Report

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# Glossary

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<b>Reorder Level</b>	The quantity of assets that must be on hand and on order to sustain operations. This level is the sum of the lead time demand quantity and other requirements.
<b>Reorder Level Deficiency</b>	The extent to which the quantity of assets on hand and on order falls short of the reorder level. A buy notice is generated by the consumable item computation system whenever a reorder level deficiency occurs.
<b>Lead Time Demand Quantity</b>	The quantity of item assets that are needed to satisfy forecasted demands over the time it takes to order and receive stocks (average of 14 months). This quantity is computed by averaging the recurring demands for the past 24 months, multiplying by a program ratio (future flying hours divided by past flying hours) that predicts whether future recurring demands will be higher or lower than past demands, and then multiplying by the procurement lead time.
<b>Computable Dueouts (Backorders)</b>	The unfilled portion of recurring and nonrecurring demands that occurred during the past 24 months.
<b>Economic Order Quantity (Reorder Frequency Quantity)</b>	This term, which implies the most economical quantity to buy based on considerations of ordering and holding costs, is a misnomer as it is applied in consumable item computations. As applied, it represents a buy quantity that is intended to insure a desired reorder frequency (such as a 6- to 12- month interval between orders). The reorder frequency quantity is calculated by multiplying the monthly demand rate (average of recurring demands for past 24 months factored by program flying hour ratio) by the desired number of months.
<b>Buy Quantity</b>	The sum of the reorder level deficiency plus the reorder frequency quantity.
<b>Termination Level</b>	The quantity of on-hand and on-order assets that will cause the automated computation system to generate an on-order termination notice. It represents the sum of the reorder level, the reorder frequency quantity, and an additional 6 months of forecasted demands.

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**On-Order Termination  
Quantity**

**The quantity of assets on order that, when added to assets on hand, exceeds the sum of the reorder level and reorder frequency quantity.**

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