

096684

~~2,5003~~



REPORT TO THE CONGRESS

72-0444



19
7

System For Buying Spare Parts
For Initial Support Of
New Military Aircraft
Needs Substantial Improvements

B-133396

Department of the Air Force

BY THE COMPTROLLER GENERAL
OF THE UNITED STATES

~~700943~~

096684

JAN.31,1972



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-133396

C To the President of the Senate and the
Speaker of the House of Representatives

1 This is our report that the Department of the
Air Force system for buying spare parts for initial
support of new military aircraft needs substantial
improvements. 35

Our review was made pursuant to the Budget and
Accounting Act, 1921 (31 U.S.C. 53), and the Account-
ing and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the
Director, Office of Management and Budget; the
Secretary of Defense; the Secretary of the Air Force;
and the Commander, Air Force Logistics Command.

Comptroller General
of the United States

C o n t e n t s

		<u>Page</u>
DIGEST		1
CHAPTER		
1	INTRODUCTION	5
	F-111 aircraft--background	5
2	CURRENT DATA NEEDED FOR PROVISIONING	7
	Source of data used in provisioning	7
	Delivery schedules not revised	8
	Effect of inaccurate data on provisioning determinations	8
	Need for reliable program data	9
	Agency comments and our evaluation	9
3	OPPORTUNITY TO ADJUST SPARES REQUIREMENTS AND DELAY PROCUREMENTS	11
	Estimates of part usage	11
	Need to evaluate usage experience	12
	Spare parts were procured several times	12
	Agency comments and our evaluation	14
4	PROCUREMENT OF SPARE PARTS FROM PRIME CONTRACTOR	15
	Air Force recognizes need for procurement through sources other than weapon manufacturer	15
	Procurement from parts manufacturer appears feasible	16
	Inadequate justification for procurement from prime contractor	17
	Agency comments and our evaluation	18
5	INTERNAL AUDIT ACTIVITIES	19
6	CONCLUSIONS, RECOMMENDATIONS, AND AGENCY ACTIONS	20
	Conclusions	20
	Recommendations	21
	Agency actions	22
7	SCOPE OF REVIEW	24

APPENDIX

Page

I	Letter dated November 16, 1971, from the Assistant Secretary of the Air Force (Installations and Logistics)	25
II	List of systems on which the programming checklist is or will be used	40
III	Principal officials of the Department of Defense and the Department of the Air Force responsible for administration of activities discussed in this report	41

ABBREVIATIONS

AFLC	Air Force Logistics Command
AMA	Air Materiel Area
ASD	Air Force Aeronautical Systems Division
GAO	General Accounting Office

D I G E S T

WHY THE REVIEW WAS MADE

The Air Force spends hundreds of millions of dollars annually to obtain spare parts needed to support new aircraft during an initial period of operation. This initial support, known as initial provisioning, includes spares and repair parts ranging from bolts and resistors costing pennies to wing assemblies or electronic modules costing thousands of dollars.

The Congress provided the Air Force with over \$1 billion to buy initial spares in fiscal years 1968 through 1970. A significant part of this money was used to support C-5A and F-111 aircraft.

Initial provisioning is one of the most important activities of military supply. If not enough parts are purchased, operational capabilities of new aircraft can be reduced. If too many parts are purchased too soon, or if wrong parts are purchased, money is wasted or prematurely spent.

In view of the hundreds of millions of dollars involved and the importance of maintaining effective support of new aircraft, the General Accounting Office (GAO) evaluated the Air Force's policies and procedures under which initial provisioning was carried out. The F-111 aircraft was selected because the spares acquisition for this program was well under way at the time GAO began its review.

FINDINGS AND CONCLUSIONS

The Air Force spent too much too soon to buy many F-111 spare parts which were not needed during the initial support period or which may never be needed and subsequently may be scrapped. This was the result of a rigid management system that assumes that deliveries of aircraft will be made on schedule, and the system is not flexible enough to permit timely changes in the program for initial provisioning.

The system commits the Air Force to buy large quantities of spare parts to support aircraft which may or may not be delivered or which may be delivered long after originally scheduled. Because of numerous changes in design that invariably occur in the development and production of military aircraft, many of these parts rapidly become obsolete.

By the time the current extent of program delays had become known in the F-111 program, millions of dollars already had been spent for initial spare parts. For the F-111, the initial-provisioning system's lack of flexibility resulted in:

- Buying about \$116 million worth of spare parts before they were needed. (See p. 8.) Spare parts worth \$9.6 million have already been declared excess. (See p. 14.)
- Buying substantial quantities of spare parts several times, even though data available to the Air Force showed that there was no current need for these parts. (See p. 12.)

The impact of these problems was compounded by the fact that the Air Force committed itself early in the program to buy all the spares at a markup from the prime contractor rather than buy them directly from the manufacturers.

GAO estimates that markup totaled about \$56 million on \$291 million worth of spares manufactured by subcontractors.

Moreover many of the spares were shipped by subcontractors directly to Air Force activities. The Air Force did not make an evaluation of the trade-off between the markup and the value of the service provided by the prime contractor.

The opportunity for the Air Force to obtain spares directly from manufacturers and to effect savings through minimizing the incurrence of markup was lost. (See p. 15.)

GAO also inquired into the examinations of provisioning by the Air Force Auditor General. Although the examinations performed by the Air Force were adequate for those areas of provisioning covered and resulted in corrective action's being taken, GAO believes that future reviews should be expanded to consider evaluation of the basic provisioning concepts, practices, and policies. (See p. 19.)

RECOMMENDATIONS OR SUGGESTIONS

GAO recommends that, to minimize the impact of such problems as those encountered on the F-111 aircraft in the provisioning of future weapons systems, the Secretary of the Air Force develop policies to limit initial-provisioning activities to support of only those aircraft which reasonably can be expected to be delivered in the short run, such as the first 12 months of deliveries. These policies should permit the decelerating of initial-provisioning activities if and when potential significant program slippages become known. (See pp. 21 and 22.)

GAO recommends also that the Secretary direct those responsible for managing provisioning activities to:

1. Provide realistic aircraft delivery documentation to those responsible for provisioning actions. (See p. 22.)
2. Require the use of available flying experience and spare-parts usage data in evaluating whether further procurements are necessary. (See p. 22.)
3. Require, in future provisioning actions, that an evaluation be made to determine whether parts should be obtained directly from the manufacturer or through the prime contractor. (See p. 22.)

In addition, GAO recommends that the Air Force Auditor General be directed by the Secretary to broaden its coverage in future reviews of provisioning. (See p. 22.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Department of the Air Force generally concurred in these recommendations and stated that it was continuing to study the problem with the objective of further reducing initial spares purchases.

Concerning each of the recommendations listed above, the Air Force said:

- That its policies and guidelines for determining material requirements would be revised to emphasize that initial provisioning was to apply to short-term deliveries. (See p. 27.)

- That a schedule showing realistic projected aircraft deliveries to the user would be provided when slippages were forecast. (See p. 28.)
- That Air Force activities which computed requirements had been instructed on the importance of making appropriate adjustments to estimated demand rates for new items and that the Department of Defense had included this matter in a current study. (See p. 29.)
- That currently actions were being evaluated, which should permit an expansion of competitive procurements from other than the prime contractor, and that a new system would be developed and tested. (See p. 30.)
- That current weapons systems audits, as well as those planned by the Auditor General, would include evaluations of basic provisioning concepts, policies, and practices. (See p. 31.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

The Appropriations Committees of the Congress and other committees may wish to consider the matters discussed in this report in connection with future Air Force requests for spare parts to initially support new weapons systems.

CHAPTER 1

INTRODUCTION

There is a need to obtain an adequate supply of materiel and spare parts to support and maintain new equipment during the initial period of its operation--usually 1 year--until usage experience can be acquired and spare parts and materiel can be replenished from the normal supply systems. This initial support--known as initial provisioning--includes spares and repair parts which may range from bolts and resistors costing pennies to wing assemblies or electronic modules costing thousands of dollars.

Initial provisioning is a complex procedure. Ideally the minimum number of spares necessary to support the aircraft should be available at the time of the aircraft deliveries. This reduces the risk of obsolescence and minimizes both early commitment of funds and early storage requirements without affecting the mission capability. This ideal is difficult to achieve, however, because of (1) production delays and design problems usually associated with the development of a new weapons system, (2) conjecture as to how new parts will operate, and (3) budgeting changes which might affect production of the system.

The tax dollars committed to initial-provisioning procurement have been significant. During fiscal years 1968 through 1970, for example, the Congress appropriated over \$1 billion to the Air Force for initial spares. Most of these funds were used to support the C-5A and the F-111 aircraft. As of December 31, 1970, about \$350 million had been obligated by the Air Force for F-111 spares.

The Air Force Systems Command, through the Air Force Aeronautical Systems Division (ASD), is responsible for the development, modification, and acquisition of new weapons systems, and the Air Force Logistics Command (AFLC) is responsible for keeping these systems at high levels of operational readiness. A key AFLC function is that of ensuring that spares and repair parts are delivered when and where needed to support and maintain newly acquired weapons systems. AFLC carries out its responsibilities at five installations, known as Air Materiel Areas (AMAs). Each AMA is responsible for various weapons systems.

F-111 AIRCRAFT--BACKGROUND

The F-111 was acquired under conditions which resulted in some telescoping of research, development, training, engineering, and production. The Air Force allowed the contractor to begin full production as soon as the design was far

enough along to permit it but before various problems relative to the performance of the aircraft had been resolved. During development and production numerous design changes and modifications were made to the aircraft. As flying experience was gained, additional performance problems were encountered, which required those aircraft which were operational to be grounded and modified on several occasions.

In 1965 the proposed Air Force program for the F-111 tactical aircraft consisted of 1,370 planes costing an estimated \$4.6 billion. Initially this program was for one model, and deliveries were expected at a rate of 30 aircraft each month over a 6-year period. The Air Force later added production of a bomber version, the FB-111, at an estimated cost of \$1.7 billion for 263 aircraft. As a result of the funding and approval processes, the Air Force makes, in effect, annual incremental purchases of each aircraft model.

The following table shows the current F-111 program and the quantities of aircraft funded, the years in which they were funded, and their model designations.

Approved and Funded Procurements of
F-111 Aircraft by Fiscal Year as of January 1971

<u>Model</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>Total</u>
F-111A	10	48	83	-	-	-	-	141
F-111D	-	-	-	3	85	8	-	96
F-111E	-	-	10	84	-	-	-	94
F-111F	-	-	-	-	-	58	24	82
FB-111	-	-	10	24	42	-	-	76
Total	<u>10</u>	<u>48</u>	<u>103</u>	<u>111</u>	<u>127</u>	<u>66</u>	<u>24</u>	<u>489</u>

Note: Seventeen additional aircraft were approved under the research, development, test, and evaluation contract.

CHAPTER 2

CURRENT DATA NEEDED FOR PROVISIONING

Aircraft delivery schedules are used by the Air Force as a major source of data in determining spare parts to be procured as initial support. These schedules are not revised however, to show actual deliveries when changes occur in the contractor's production schedules. As a result, spare parts are procured and delivered long before delivery of the aircraft they are intended to support. In the case of the F-111 aircraft, significant quantities of spares were procured in 1967 and 1968 and delivered to support aircraft which were not delivered until 1970.

Although the F-111 may not illustrate a typical program, it did illustrate weaknesses in the provisioning processes applicable to other Air Force aircraft programs. Since the same problems could occur in connection with provisioning for a number of other aircraft models, premature acquisition of spare parts by the Air Force could be substantially more extensive than that noted during our review.

SOURCE OF DATA USED IN PROVISIONING

ASD prepares production-planning schedules which show the monthly delivery schedules for aircraft based on the provisions of the contract. These documents are used by AFLC to calculate the average number of aircraft to be supported. These data, together with operational data furnished by Headquarters, U.S. Air Force, are used to prepare the programming checklist.

The programming checklist is furnished to the contractor and the AMAs to inform them of when provisioning is to begin, the number of aircraft to be supported, and the expected number of flying hours each month. Using this data, together with data furnished by the contractor on the time required to produce and deliver spare parts and the expected wear-out rate on parts, the AMAs determine the quantity of spare parts that will be required for initial support.

In those instances where the factors used in provisioning determinations are current and accurate, this system should be effective in providing spares in the quantities and at the times needed. When these factors are not revised to reflect changed conditions or inaccurate predictions, such as delays in aircraft deliveries or unachieved flying hours, however, an imbalance is created between the spare parts procured and the aircraft to be supported.

DELIVERY SCHEDULES NOT REVISED

The F-111 program illustrates the result of making provisioning determinations on factors which are not revised to reflect changed conditions. Early in the F-111 program, significant design problems were experienced that led to delays in delivery of aircraft. These delays have continued to such an extent that production and deliveries have been as much as 2 years behind the originally contemplated program.

The Air Force, although aware of slippages in aircraft deliveries, did not revise the production-planning schedules to show expected deliveries on the basis of actual deliveries being experienced. The delivery schedules consistently have shown delivery rates which exceeded those the contractor had demonstrated he could meet.

Revisions which were made to the production-planning schedules every 3 months consisted of decreasing the monthly deliveries in the first several months of proposed production and increasing the deliveries in the latter months. The revisions did not extend the time for completion of deliveries beyond that initially contemplated. Consequently the total number of aircraft to be supported by initial spares remained essentially the same. It was not until April 1970 that deliveries were stretched out over longer periods--too late for use in the provisioning determinations made in 1967 and 1968.

EFFECT OF INACCURATE DATA ON PROVISIONING DETERMINATIONS

Since the delivery schedules reflected in the production-planning schedules are major factors in the programming checklist data, the programming checklist likewise did not reflect delays in deliveries. Therefore provisioning actions using these programming checklists were based on monthly delivery rates which were far in excess of those being experienced. As a result spare parts were being purchased and delivered long before the aircraft they were intended to support were delivered.

Substantial quantities of spares were prematurely procured for the F-111D and FB-111 aircraft beginning in 1967. By April 1970, when the delivery periods for these series finally were stretched out, spares valued at about \$116 million already had been purchased. Of this amount, spares valued at \$45 million had been received although no operational aircraft of these series had been delivered and future deliveries were still uncertain. By the end of October 1970,

aircraft deliveries were still drastically lagging and only 30 F-111D and FB-111 aircraft, including six aircraft directed to the test program, had been delivered against a program which had originally contemplated delivery of several hundred aircraft by that time.

NEED FOR RELIABLE PROGRAM DATA

Air Force officials have informed us that the production-planning schedules take several factors into consideration, such as contractual obligations, proposed force structures, potential contractor capacity increases, and mobility plans. These factors may not be valid for spares acquisition purposes. We also have been informed that, since the contractor is furnished with copies of production-planning schedules, the Air Force is reluctant, on programs where deliveries are slipping, to reflect deliveries as they are being experienced, which would extend the program completion date. This could indicate to the contractor that the Air Force is accepting the delayed deliveries and could lead to a request for a later contract completion date.

As stated previously, the current practice, as in the case of the F-111, is to retain the original time frame and increase the delivery rates in the latter months. As delays continue, however, eventually the program completion date must be extended, the contract must be amended, and the rate of delivery must be reduced.

In our opinion, the production-planning schedule is not the proper basis on which to make provisioning determinations, since it results in the procurement of spares at a time when the delivery rates for aircraft are most optimistic. By the time these rates are finally adjusted, the spares for the originally scheduled aircraft deliveries already have been bought.

During our examination we were informed by Air Force officials that there were 20 aircraft models for which they had utilized, or would be utilizing, data in the production-planning schedule for provisioning determinations. (See app. II.) The reliability of these data is therefore highly important to ensure that spare parts are not prematurely acquired.

AGENCY COMMENTS AND OUR EVALUATION

The Department of the Air Force commented on our observations in our draft report concerning aircraft delivery schedules and the production-planning schedule. (See pp. 34 and 36.)

The Air Force offered reasons for not revising delivery schedules and for delays in delivery of aircraft. During our review we were informed of the Air Force's reluctance to revise delivery schedules. (See p. 9.) Our position is that provisioning actions should be delayed so that spare parts are not procured and delivered far in advance of the delivery of the aircraft they are intended to support. The Air Force apparently agrees with this position, since it has concurred in our recommendation on delivery schedules. (See p. 28.) An additional schedule showing realistic projected deliveries will now be provided for use by those making provisioning determinations.

The Air Force agreed that the program-planning schedule used alone would not be the proper basis for making provisioning determinations and stated that other data, such as flying-hour rates and item-usage rates, were used. As noted on page 7, these data are furnished with the program-planning schedule. By not revising delivery schedules which are included in the program-planning schedules as slippages occur, however, these other data also become invalid for use in provisioning determinations. For instance, if the anticipated quantities of aircraft are not received, the projected flying hours cannot be accumulated. The additional schedule to be provided, as noted above, should be of benefit in ensuring that spare-parts deliveries are more commensurate with aircraft deliveries.

CHAPTER 3

OPPORTUNITY TO ADJUST SPARES REQUIREMENTS

AND DELAY PROCUREMENTS

Although the Air Force system provides for the acquisition of additional parts when usage is underestimated, it does not provide for curtailing procurement when usage is overestimated. In the case of the F-111, the Air Force was not taking advantage of spare-parts usage data accumulated on earlier models when provisioning for the later models. As a result, spares were procured for later models when data available at the time cast doubt on the need to obtain the spares because the expected failures had not materialized. This situation emphasizes the need for careful evaluation of additional procurements in the light of experience and usage.

ESTIMATES OF PART USAGE

The need for a spare part is primarily related to the number of times the part is expected to wear out or fail during a given number of flying hours. During initial provisioning, flying experience normally is not available and therefore potential spare-part failures and usage have to be estimated.

For initial provisioning the contractor suggests to the Air Force those parts which should be considered for spares acquisition and provides estimates of the failure rates to be expected on new parts. The failure rate is measured in terms of the number of times a part can be expected to fail for each 100 flying hours. After the part has failed, it will be replaced and/or repaired.

For practical purposes in computing spare-parts requirements, the Air Force applies the rate to the total flying hours accumulated by all aircraft rather than to the flying hours accumulated by individual aircraft. The Air Force's view is that, if the part is expected to fail every 2,000 flying hours, failure will be random and will occur about every 2,000 flying hours, regardless of the number of aircraft in operation. The formula used to determine how many parts to buy therefore assumes a random-failure pattern.

Estimated-failure rates are used for about 2 years after the part has been procured; actual experienced failure is used thereafter to calculate requirements. If the part historically fails more often than originally anticipated, a new and higher failure rate is used. There is no provision in the system,

however, for adjusting estimated-failure rates downward when failures have been less than anticipated during this 2-year period.

NEED TO EVALUATE USAGE EXPERIENCE

The F-111 provided the Air Force with a reasonable basis for considering usage experience. First, initial-provisioning activities extended over several years. Second, one model of the aircraft--the F-111A--was accumulating flying hours and parts usage experience while provisioning on the later models--the FB-111 and the F-111D--was taking place. Third, because of the high degree of commonality between models, many of the spare parts which were being procured for the later F-111 models had been procured previously for the F-111A, and usage experience on these parts was being accumulated.

We reviewed the acquisition of about \$159 million worth of spare parts which were common to more than one of the F-111 models. We found that many of these parts had been procured again as initially provisioned items for the FB-111 and F-111D, although experience on the F-111A indicated little or no usage for many of these parts. The Air Force was not adjusting estimated-failure rates downward in its initial-provisioning computations to reflect experience gained on the F-111A before making further spares procurements.

Failure rates were being adjusted upward, however, when failures were in excess of those originally estimated. We believe that consideration of available data on usage, or lack of usage, would have resulted in significant savings, because spare-parts acquisitions on the later models could have been delayed and/or reduced.

SPARE PARTS WERE PROCURED SEVERAL TIMES

We selected for review a number of spare parts initially provisioned for several annual aircraft procurement increments and found that about 40 percent had been procured previously for use on the F-111A. At the time they were purchased for the FB-111 and/or the F-111D, there was no demand for these spare parts, which indicated that they never had failed. This was a much better record than the contractor had suggested in his estimates of their failure rates. The example below illustrates.

Part number: 12 L 107-9
Federal stock number: 5315-903-8508BJ
Estimated cost: \$95 each
Predicted failure rate: 1 in 2,000 hours
Actual failure rate through Feb. 1968: None in 7,000
hours

Procurement history of this part is summarized in the table below.

<u>Initial spare procurement date</u>	<u>Aircraft increment for which procured</u>	<u>Quantity procured</u>	<u>Actual experienced failure rate</u>	<u>Flying hours accumulated on the F-111A at the time of spare requirement</u>
May 1966	F-111A	5	-	800
Oct. 1966	F-111A	18	-	1,400
Dec. 1967	FB-111	16	-	5,300
Feb. 1968	F-111D	5	-	7,000

Note: There was no usage on this part until late in 1969. By August 1970 all F-111 aircraft had flown a total of about 50,000 flying hours and had used only four of these parts.

As shown above, by the time initial spares procurement on the FB-111 was initiated in December 1967, experience for the same part on the F-111A indicated that the part might not fail until the FB-111 had been flown at least 5,300 hours. (Significant deliveries of the FB-111 were not scheduled to take place until early in 1969.) The flying-hour program for the FB-111 in December 1967 indicated that 5,300 hours would not be reached until late in 1969. The Air Force needed a lead time of 7 months to acquire and receive this item, and, on the basis of this information, we believe that the procurement could have been delayed about 1 year.

By early in 1968, when the part was procured for the F-111D, there still had not been any failure of the part on the F-111A, which had flown 7,000 hours, and 39 spares were on hand. The F-111D was not scheduled to reach 7,000 flying hours until sometime in 1970. Again, procurement could have been delayed.

In short we believe that, had the Air Force used actual-experience data on the F-111A, it could have delayed, reduced, or eliminated procurement of a significant number of spare parts common to later models. If this low usage continues, it is possible that many of the parts procured for all three aircraft models eventually will be declared excess and will be scrapped.

Air Force officials stated that, because of the technical problems identified during the early phases of F-111 flight-testing, the Air Force placed a restriction on the altitude

and speed at which pilots were allowed to fly the F-111 and that these restrictions were substantially below the aircraft's designed performance levels. These officials stated also that in some cases, because of these restrictions, actual experienced-failure rates may not have been representative. We recognize this possibility but believe that such circumstances should have emphasized the need to delay further buys of such parts (since some parts already were on hand) until the restrictions had been lifted.

Over \$9.6 million worth of F-111 and FB-111 spare parts already are excess to known requirements due to (1) the projected program flying hours' not being achieved and (2) the flight restrictions. To avoid scrapping these parts, the Air Force has instituted a freeze on all spare-parts disposals for the F-111. Current plans are to reconsider possible disposal in 1973. We believe that this situation emphasizes the need for more careful consideration and evaluation of flying experience and parts usage prior to initiating new procurements to determine whether opportunities exist to delay such procurements.

AGENCY COMMENTS AND OUR EVALUATION

The Air Force, in commenting on our draft report, stated that the system provided for both increasing and decreasing procurement factors on the basis of actual usage. At the time of our review, however, procurement was not curtailed, even though available data showed that estimated-usage rates were higher than actual rates being experienced.

CHAPTER 4

PROCUREMENT OF SPARE PARTS FROM PRIME CONTRACTOR

Significant economies can be achieved when the Government procures subsystems, components, or spare parts directly from their manufacturers, rather than through the weapon system prime contractor. The economies are realized through the avoidance of markups by the prime contractors and subcontractors. The Air Force did not take advantage of these savings to the extent possible, because it continued to acquire F-111 initial spare parts from the prime contractor although most of them were manufactured by subcontractors.

We estimate that the Air Force has paid the prime contractor a markup of about \$56 million on \$291 million worth of spare parts which were manufactured by subcontractors. We believe that a significant part of these costs could have been avoided by buying directly from the subcontractors.

AIR FORCE RECOGNIZES NEED FOR PROCUREMENT THROUGH SOURCES OTHER THAN WEAPON MANUFACTURER

When an item qualifies for procurement under initial-provisioning methods, the Air Force expects its commands to give consideration, where feasible, to the breakout of items for direct purchase from the actual manufacturer. AFLC allows deviation from this policy on a case-by-case basis on items for which:

1. Previous procurements were made in nominal quantities or were made to support a test program.
2. Procurements are made to support aircraft which were bought over a period of several years.
3. Engineering and specification data have not been finalized.
4. Application is identified too late to allow support within the expected time required.

According to the Air Force, in 1967, in 1968, and early in 1969, when most spares were purchased for the F-111, conditions 3 and 4 were especially prevalent for many of the spares because of the high instability in the design of this aircraft.

AFLC and AMA personnel said that they were forced to buy from the prime contractor to avoid receiving the wrong part configuration from vendors.

There were literally thousands of design change actions on spares already acquired or in the process of being acquired. To minimize the receipt of obsolete spares, the Air Force required the contractor to ship only the latest approved configuration of each item. Air Force personnel told us that the instability of design, coupled with the concurrent processing of new part proposals and design change actions, created a work load far in excess of their manpower capability. They stated that, although they were aware of the economies of going directly to vendors or to manufacturers, the possibility or practicality of buying directly from the part manufacturer in this case usually had not been evaluated.

PROCUREMENT FROM PARTS MANUFACTURER APPEARS FEASIBLE

In spite of the impact of design instability on spares procurements, we believe that a significant number of the procurements from the prime contractor could have been avoided and that, as a result, substantial savings would have been realized.

As of April 1970 about \$159 million of the \$350 million obligated for F-111 initial spares procurements under the production contract was for spares which were common to two or more of the F-111 models. A random statistical sample of provisioning records indicated that about 84 percent of the parts were manufactured by other than the prime contractor and that about 60 percent had no change in design configuration between models. Procurements of these parts to support new F-111 procurements were made on several occasions.

Most of these spares were procured several times in 1967, in 1968, and early in 1969 while the Air Force Resident Provisioning Team was active at the contractor's plant. Under the concept at the time of the procurements, spares proposals were source-coded and cataloged and the requirements were computed at the contractor's plant by the team. Discussion with personnel formerly with the team indicated that they had not determined whether parts should be procured from other sources. It appears that, instead, AMA personnel were expected to make this evaluation. A sampling of 36,604 parts common to more than one F-111 model acquired under this system reflects that most procurements were made first to support the F-111A and later to support newer model series applications.

Our analysis at one AMA indicated that excessive work load and inexperienced personnel had created significant backlogs of documentation. Therefore, AMA evaluations of procurements approved by the Resident Provisioning Team more than likely were cursory and most buys, including the successive buys noted above, probably were made from the prime contractor fairly automatically.

We recognize that uncertainties of design can be associated with the first procurements of this kind. We believe, however, that design stability on the first parts procured should have been evaluated before it was decided to procure new quantities from the prime manufacturer. We found no evidence that this had been done.

INADEQUATE JUSTIFICATION FOR PROCUREMENT FROM PRIME CONTRACTOR

Air Force personnel recognized that vendor items (items which the prime contractor must procure from other sources) cost less when procured directly from these sources. They believed, however, that design instability was the basic reason why this type of procurement was impracticable. They have indicated that the price paid the prime contractor can be justified, to a great extent, by the fact that it represented payment for such services as technical data and spares management. They also said that they believed that such services ensured that spares procured and shipped were of adequate quality and were always of the latest design configuration.

We found no evidence, however, that the Air Force had made an evaluation of the trade-off between the markup (\$56 million) thus incurred and the value of the services provided by the contractor in exchange. About 90 percent of the vendor items acquired from the prime contractor were shipped directly from the vendors to the Air Force. Prime contractor officials said that most of the items were shipped directly because the prime contractor knew that the vendors had resident Government inspectors and adequate quality control. Therefore the Air Force may not have received the full value of management services implied by AMA officials.

In view of the substantial sum of \$56 million involved, it seems, from a cost-effectiveness standpoint, that the Air Force should have taken the actions necessary to ensure that an adequate evaluation of the feasibility of procuring directly from the manufacturers was made.

AGENCY COMMENTS AND OUR EVALUATION

The Air Force, in commenting on our draft report, stated that there were conditions which hampered making procurements directly from manufacturers rather than from the prime contractor. The instability of design, need for configuration control, and late identification of requirements by the contractor were cited as examples. The Air Force stated also that an evaluation as to the feasibility of direct procurement of spares was made in 1967. Although direct procurement was considered feasible, it was not undertaken because of program cutbacks which resulted in the availability of production assets for use as spares. The conditions existing in 1967 may have warranted the Air Force's decision not to procure spares directly from the manufacturer.

We found no evidence, however, that further consideration had been given to direct procurement in 1968 and 1969 when substantial quantities of spares were procured from the prime contractor. The Air Force concurred in our recommendation on this matter and advised us that it was then evaluating the feasibility of bringing configuration management services in-house as much as possible, which should permit an expansion of direct and competitive procurements. (See p. 30.)

CHAPTER 5

INTERNAL AUDIT ACTIVITIES

Air Force-wide reviews of initial-provisioning activities were made by the Air Force Auditor General in 1967 and 1969. One review covered selected aspects of initial spares acquisition; the other covered phased-provisioning activities. These reports cited numerous deficiencies.

The purpose of the 1967 audit was to review procedures and controls over initial provisioning for spares and their components. The auditors reported on 11 areas which required improvement, including (1) administrative problems affecting the validity of data portrayed on funding documents, (2) requirement computations containing unsupported deviations from policies, (3) the procurement of some spares as initial spares without benefit of competition when similar spares previously had been procured competitively by the Air Force, and (4) the performance of various review steps inadequately or on an untimely basis.

The purpose of the 1969 audit on phased-provisioning activities was to review system management and contract documentation for selected major weapons systems to determine whether phased provisioning was being adequately utilized. In phased provisioning, procurement of all or part of the total quantity of selected items is deferred until requirements can be more reliably predicted. This method of provisioning is used for selected high-cost items and for items for which requirements cannot be reasonably estimated.

Air Force auditors found that the Air Force had not utilized the phased-provisioning concept to the maximum extent possible. The Air Force concurred in the specific findings and agreed to develop and implement new policies and procedures for ensuring corrective action.

These reviews by the Auditor General were directed more toward compliance with the existing procedures for provisioning rather than toward an evaluation of the overall provisioning process. The coverage thus had included examinations into various aspects of provisioning actions which we did not consider. Although these examinations were adequate for those areas of provisioning covered and resulted in corrective actions' being taken, we believe that future reviews should be expanded to consider evaluations of the basic provisioning concepts, policies, and practices.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS, AND AGENCY ACTIONS

CONCLUSIONS

Under the current provisioning system, the Air Force is required to commit most of its initial-spares dollars, on an accelerated basis, at a time when:

1. Aircraft delivery schedules are most subject to change.
2. Parts usage is generally unpredictable because of the lack of aircraft flying experience.
3. Design problems inherent in the production of any new sophisticated weapon system are most likely to be prevalent.

If for any reason management expectations fail to materialize, which occurs more often than not, decisions have long since been made and the spares provisioning dollars have been spent. To the extent that early provisioning decisions may have resulted in underprocurement, more spares can be bought. But what of those spares which may have been procured unnecessarily? Their ultimate fate: the scrapyards.

Although little can be done to alleviate the uncertainties and the problems usually associated with the production of a weapon system, we believe that the impact of these problems upon initial spares provisioning actions can be reduced significantly. We believe, however, that the system used by the Air Force is too inflexible to do this; it appears to have the opposite effect, namely, compounding the problems.

Provisioning, by its nature, is to a considerable extent guesswork. It is difficult to predict whether aircraft deliveries will occur as planned, whether designs will be stable, and whether parts will operate as expected. Therefore, for lack of better information, assumptions have to be made initially that the program will, in the short run at least, proceed as expected. Initial-provisioning actions have to be geared to these assumptions. The problem facing the provisioner is to evaluate quickly the range and quantities of spares needed to support the aircraft by the time that deliveries begin. This task requires significant effort on the part of the contractor as well as the Air Force.

Such an effort was required to provide support in time for delivery of the first few F-111A's. As delays began to occur, however, the Air Force system did not provide for a corresponding decrease in provisioning activities. Instead, as new aircraft models (F-111E, F-111D, and FB-111) were funded by the Congress, they were added in full to the provisioning effort.

Relative to the failure to adjust spares requirements and to delay procurements, we believe that the F-111 program offered a unique opportunity for the Air Force to base initial-provisioning decisions for the later models on the actual flying experience of the F-111A.

In our opinion, the management system, as it is currently designed, is oriented solely to prevent underprocurement of spares. It provides no incentive to minimize procurements. We believe also that, had the Air Force considered usage data available on the F-111A, millions of dollars worth of procurements on the FB-111 and the F-111D could have safely been delayed or eliminated. Many of these spares currently are becoming excess and someday may be scrapped because of lack of usage.

The Air Force commented that policy and procedures for determination of initial spares requirements provided for minimum buys without jeopardizing support. It was pointed out that one method for accomplishing minimum buys was the use of the average-month program which is directly related to the delivery rate of aircraft. The average-month program was reduced on the F-111E and F-111D aircraft in April 1970. As noted on page 8, however, substantial quantities of spares were procured beginning in 1967 so that, by the time the delivery period was stretched out in April 1970, nearly all spares had been purchased.

The Air Force maintains that it was prevented from purchasing from the parts manufacturers because of the heavy work load and inexperienced personnel. These problems cost the Air Force an estimated \$56 million in markup, a significant part of which, we believe, could have been avoided. In our opinion, there was a definite need to evaluate the benefits to be obtained from the performance of services by the contractor in exchange for the \$56 million versus the performance of those services by the Air Force.

RECOMMENDATIONS

We recommend that, to minimize the impact of such problems as those encountered in the initial support of the F-111 aircraft in future weapons systems, the Secretary of the Air

Force develop policies which will limit initial-provisioning activities to support of only those aircraft which reasonably can be expected to be delivered in the short run, such as the first 12 months of deliveries, and which will decelerate initial-provisioning activities if and when potential significant program slippages become known.

In our opinion, this would reduce to a reasonable level the problems discussed in this report concerning premature procurement of large quantities of spares and large dollar-procurement of spares from the prime contractor at markups.

We recommend also that the Secretary direct those responsible for managing provisioning activities to:

1. Provide aircraft delivery documentation used by AFLC to prepare programming checklists which realistically reflect aircraft deliveries for provisioning purposes. (ASD personnel have indicated willingness to prepare such a document.)
2. Require personnel to use available flying experience and spare-parts usage data in evaluating whether further spare procurements are necessary.
3. Require that, in provisioning spares on future weapons systems, an evaluation of the services to be provided by the contractor in exchange for the markup be made to determine whether (1) the services can be more economically performed in-house or (2) they should be negotiated as separate line items with the contractor, which would allow the Air Force the option of procurement direct from the part manufacturer.

In addition, we recommend that the Air Force Auditor General be directed by the Secretary to broaden its audit coverage in future reviews of provisioning.

AGENCY ACTIONS

The Department of the Air Force commented on our findings and recommendations in a letter dated November 16, 1971. (See app. II.) In general the Air Force concurred in our recommendations and stated that the Air Force was continuing to study the problem of computing requirements for initial spares with the objective of further reducing initial spares purchases.

In response to our recommendations, the Air Force informed us:

1. That Air Force Manual 57-1 would be changed to emphasize that initial spares provisioning was to apply to short-term deliveries, such as those for 12 months, and that procurement in initial provisioning would be permitted for support of a maximum of 2 years of aircraft deliveries.
2. That programming schedules, which currently reflected when the Air Force accepted an aircraft rather than when the aircraft was delivered to the using command, would be supplemented by an additional schedule showing realistic projected deliveries to the user when slippages were forecast.
3. That, in respect to parts usage data, those Air Force activities which computed requirements had been instructed on the importance of making appropriate adjustments to estimated-demand rates for new items and that the Department of Defense had included this matter in a current study.
4. That the Air Force was currently evaluating the feasibility of bringing configuration management services, then being performed by contractors, in-house as much as possible. According to the Air Force, this effort should permit an expansion of direct and competitive procurements from other than the prime contractor and a new system will be developed.
5. That current weapons systems audits, as well as those planned by the Auditor General, would include evaluations of basic provisioning concepts, policies, and practices.

CHAPTER 7

SCOPE OF REVIEW

In performing this review, we analyzed pertinent provisioning data at the Sacramento AMA, which is the System Manager for the F-111 aircraft. Our review included interviews with various Air Force officials, tests of records, and extensive use of computer programs. In addition, our staff made a review of the programming checklist and related planning documentation at Headquarters, AFLC, and at the F-111 System Project Office, ASD, Wright-Patterson Air Force Base, Ohio.

The findings noted in this report were discussed with responsible Air Force officials at Headquarters, AFLC, and at ASD.

DEPARTMENT OF THE AIR FORCE
WASHINGTON 20330



OFFICE OF THE ASSISTANT SECRETARY

NOV 16 1971

Dear Mr. Bailey:

The Secretary of Defense has asked me to reply to your report of September 8, 1971, "Need to Effect Improvements on the Acquisition of Spare Parts for Initial Support of Aircraft" (OSD Case #3339).

Initial spares have historically been a difficult management problem. The logistician must, at a very early point in the life of the program, assess the subjective value of maintaining forces in a ready status versus the risk of buying excessive amounts of spares.

In recent years, positive efforts have been made to more accurately assess this risk, and to reduce the amount of spares procured. As a single example, the factor currently used for computing initial spares for the B-1 airframe is 15.8%; the corresponding factor for the B-36 was 34%.

We are continuing to study this problem with the objective of further reducing initial spares purchases. In this regard, the "fly before buy" concept will provide a better basis for estimating requirements.

Attached are a series of comments on each of the recommendations and on each major item of concern mentioned in the report.

I appreciate the opportunity to comment on the report.

Sincerely,

PHILIP N. WHITTAKER
Assistant Secretary of the Air Force
(Installations & Logistics)

- 2 Attachments
1. AF Comments on
Report Recommendations
2. AF Comment on
Specific Items in the Report

Mr. Charles M. Bailey
Director, Defense Division
General Accounting Office
Washington, D. C.

ATTACHMENT #1

AIR FORCE COMMENTS ON REPORT RECOMMENDATIONS

COMMENTS ON THE REPORTS RECOMMENDATIONS

The draft report stated: "In order to minimize the impact of problems such as those encountered in the initial support of the F-111 aircraft in future weapons system, we recommend that the Secretary of the Air Force develop policies which will limit initial provisioning activities to support only those aircraft which can reasonably be expected to be delivered in this short run, such as the first twelve months of deliveries; and to decelerate initial provisioning activities if and when potential significant program slippages become known."

Air Force Comments: Concur. It is Air Force general policy that initial spares procurement will be limited to new items and that such items will migrate to replenishment spares computation methodology upon reaching repetitive procurement. AFM 57-1 will be changed to emphasize that initial spares provisioning is to apply to short term deliveries such as for 12 months. Further, to retain required flexibility for low production runs in the first twelve months, for unqualified items, etc., procurement in initial provisioning will be permitted for support of a maximum of two years of aircraft deliveries. Any exceptions will require approval by Air Force Headquarters.

Reaction to significant program slippages decelerate provisioning activities. These reactions are triggered by updated programming documentation and by reports from inplant representatives.

APPENDIX I

The draft report recommended that the Secretary direct those responsible to:

1. Provide aircraft delivery documentation used at AFLC to prepare programming list which realistically reflects aircraft deliveries for provisioning purposes.

Air Force Comments: Concur, in general. The programming schedules currently display production/acceptance schedules, i.e., they reflect when the Air Force accepts the aircraft (signs the DD 250) rather than the delivery to the using command. Delivery normally occurs within 30 days after acceptance. An additional schedule, showing realistic projected deliveries to user, will be provided by the System Program Office when slippages are forecast.

The draft report recommended that the Secretary direct those responsible to:

2. Require personnel to use available flying experience and parts usage data in evaluating whether further spares procurements are necessary.

Air Force Comments: Concur. Current policies and procedures require use of available parts usage data related to actual flying experience in evaluating additional spares procurement. These policies and procedures are programmed into replenishment spares computation systems to eliminate use of estimated rates as soon as possible.

In respect to parts usage data, those Air Force activities which compute requirements were instructed several months ago on the importance of making appropriate adjustments to estimated demand rates for new items. Adjustment of estimated rates has been included in current study of the DOD advisory group for secondary item requirements.

APPENDIX I

The draft report recommended that the Secretary direct those responsible to:

3. Require that in provisioning spares on future weapon systems, an evaluation of the services be provided by the contractor in exchange for markup be made to determine if (1) they can be more economically performed in-house; or (2) they should be negotiated as a separate line item with the contractor, allowing the Air Force the option of procurement direct from the part manufacturer.

Air Force Comments: Concur, in general. As the report indicated on page 20, there are, however, certain situations which make such determinations impracticable. These include design instability, the need for configuration control, and late identification of requirements by the contractor. In addition, the state of hardware development and supporting equipment requirements may dictate prime contractor support to meet operational dates because of technical and administrative considerations. The Air Force is currently evaluating the feasibility of bringing configuration management services, now being performed by contractors, in-house as much as possible. This effort should permit an expansion of direct and competitive procurements from other than the prime contractors as specified in AFR 57-6 "DOD High Dollar Spare Parts Breakout Program." Other new acquisition policy directives, including DODD 5000.1, AFR 800-2 and AFSCR 800-2 allow for greater flexibility in the system acquisition process. Under these policies, a system will be developed, tested and "debugged" in order to establish a firm development phase baseline. AFSCR 800-2 further directs the deferment of investment in resources for spare parts until the production phase.

The draft report recommended that the Air Force Auditor General broaden its audit coverage in future reviews of provisioning.

Air Force Comment: Concur. The Auditor General acknowledged that the two audits referenced by GAO were compliance oriented rather than being directed to an evaluation of overall provisioning process. The Auditor General pointed out that more recent audits did review basic provisioning concepts, policies and practices, acting as a particular example the report "Selected Aspects of Logistic Support Relating to Line Replaceable Units Subassemblies, and J-79 Engines for F-4 aircraft, 26 February 1971." In addition current and planned weapon system audits will include evaluations of the same broad scope.

APPENDIX I

ATTACHMENT #2

AIR FORCE COMMENT ON SPECIFIC ITEMS IN THE REPORT

SPECIFIC ITEMS NOTED IN DRAFT REPORT

GAO Comment: "In view of the substantial sums involved, and in view of the importance of maintaining affective initial support of weapons systems, GAO evaluated the Air Force's provisioning policies and procedures. The F-111 aircraft was selected as the vehicle for making this evaluation because the spares acquisition for this program was well underway at the time our review was initiated.

Air Force Comment: The Air Force wishes only to note that the F-111 is not a typical program by which to judge the entire initial provisioning process.

The program began with one type, model and series (TMS) F-111A, and one user, TAC. The program direction changed to include multiple types (FB-111, F-111A, F-111D, F-111E, F-111F) and multiple users (SAC and TAC).

For a time there were two services involved (USAF/NAVY) and two foreign countries (Australia and the United Kingdom).

The production contract/option began in May 1965 via a letter contract--a definitive contract was negotiated in May 1967.

In addition to this, there were voluminous engineering changes resulting from new requirements, contractor generated changes and major design deficiencies. The incident most relevant to the spares provisioning process, and most atypical in regard to other programs, was the wing box failure and subsequent recovery program.

APPENDIX I

GAO Comment: Aircraft delivery schedules are used by the Air Force as a major source of data in determining spare parts to be procured as initial support. These schedules are not revised, however, when appropriate to show actual deliveries when changes occur in the contractor's production schedules.

Air Force Comment: The schedules referenced in the comment show aircraft acceptances rather than deliveries to the user. The schedules noted were initially optimistic in forecasting a "get well" condition in view of the slippages in actual acceptances and were not changed until it was determined that the technical problems precluded recovery by the contractor. The object of this was to convince the contractor of the Air Force's intention to hold him to the original contract requirements. When it was definitely established that the missed acceptances would not be made up, the schedules were revised. At the time initial provisioning decisions were made, the dates, as noted, were optimistic. At that time, however, there were many quick-fix-type actions underway in an effort to recover. If a pessimistic approach had been taken, and initial support actions terminated, a successful recovery program would have led directly to a nonsupport posture. The delivery of procured items was delayed when the program slippage was official.

The December 1969 accident resulted in the grounding of the fleet and establishment of the recovery program. Aircraft which had previously been accepted by the Air Force were recycled into this recovery program. New aircraft coming off the line were not assigned to the user until completing the recovery program.

In a more typical program, aircraft will be delivered to the using command within 30 days of acceptance. If a schedule slippage is known, it will be reflected in the next updating of the schedule which is published quarterly. A report showing delivery to the user will be furnished when required.

GAO Comment: Substantial quantities of spares were procured for the F-111D and FB-111 aircraft beginning in 1967. By the end of October 1970, aircraft deliveries were still drastically lagging and only 24 aircraft had been delivered against a program which had originally contemplated delivery of several hundred by that time.

Air Force Comment: By 30 September 1970, there were 75 F-111A, 28 F-111E, 1 F-111D and 29 FB-111 operationally active. Most of the remaining F-111Ds were complete except for the MARK II avionics. However, the requirement for the aircraft to be cycled through the recovery program delayed delivery to the using command. The MARK II Avionic Program and the Recovery Program could not reasonably have been foreseen when the initial spares estimates were made.

APPENDIX I

GAO Comment: "In our opinion, the program planning schedule is not the proper basis from which to make provisioning determination since it results in the procurement of spares at a time when the delivery rates for aircraft are most optimistic."

Air Force Comment: Used alone, the program planning schedule would not be the proper basis from which to make provisioning determination. However, when used as a management tool by the System Program Office in conjunction with real time information from plant representatives and other data sources, the schedules play a useful role. Other data consideration used in provisioning initial spares include flying hour rates, anticipated aircraft attrition rates, item usage rates and base deployment schedules.

GAO Comment: Although the Air Force system provides for the acquisition of additional parts when usage is underestimated, it does not provide for curtailing procurement when usage is overestimated.

Air Force Comment: The Air Force system now provides for both increasing and decreasing procurement factors based on actual usage. In the case of the F-111, the volume and frequencies of changes were such that there were instances where more research could have been done. On the typical case, however, the requirements data systems provide for a periodic factors print out for appropriate adjustments prior to follow-on procurement actions. Current policies and procedures also require reduction in item usage rates based on actual experience. These rates are applied to the authorized initial spares program to arrive at the requirement. Usage experience gained on earlier series of the end article is applied for the later series when the same or similar item is used.

Subsequent buys of initial spares for aircraft models of later series are generally limited to new items. Engineered estimates are used until failure rate data becomes available.

APPENDIX I

GAO Comment: Significant economies can be achieved when the Government procures subsystems/components or spare parts directly from their manufacturer rather than through the weapon system prime contractor...it would seem that the Air Force should have taken the actions necessary to ensure that an adequate evaluation of the feasibility of procuring directly from the manufacturer was made.

Air Force Comment: There were conditions which hampered such actions because of instability of design, need for configuration control, and late identification of requirements by the contractor. Procurement data packages were also late. An evaluation as to the feasibility of direct procurement of F-111 spares was conducted in 1967. Although breakout was determined feasible, it was not undertaken because of program cutbacks. These cutbacks resulted in availability of production assets which were subject to termination costs. It was determined more feasible to acquire these assets as spares, to the extent justified, than to initiate direct procurements.

GAO Comment: In our opinion, the management system, as it is presently designed, is oriented solely to prevent underprocurement of spares. It provides no incentive to minimize procurements.

Air Force Comment: The policy and procedure for determination of initial spares requirements provide for minimum buys without jeopardizing support. To achieve this, several constraints are invoked; these include application of single program policy, deferral of wear-out replacements, phased provisioning and use of average month program for determining operating and depot pipeline needs. The average month program is directly related to the delivery rate published in the WA/WM. As an example of its use, the average month program per 87 F-111E aircraft were reduced by 30% and for 85 F-111D aircraft were reduced 6%, based on the revision number 2 to WA 70-1, dated 1 April 1970.

APPENDIX II

LIST OF SYSTEMS ON WHICH
THE PROGRAMMING CHECKLIST IS OR WILL BE USED

B-1	C-5A
F-111 series	C-130E
FB-111	C-9A
F-4E	T-37C
RF-4C	T-38A
F-5A	HH-1H
F-5B	UH-1H
RF-5A	UH-1N
F-5E	CH-53C
F-15A	HH-53C
TF-15A	
A-7D	
A-37B	

PRINCIPAL OFFICIALS OF THE DEPARTMENT OF DEFENSE
AND THE DEPARTMENT OF THE AIR FORCE
RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES
DISCUSSED IN THIS REPORT

<u>Tenure of office</u>	
<u>From</u>	<u>To</u>

DEPARTMENT OF DEFENSE

SECRETARY OF DEFENSE:

Melvin R. Laird	Jan. 1969	Present
Clark M. Clifford	Mar. 1968	Jan. 1969
Robert S. McNamara	Jan. 1961	Feb. 1968

DEPUTY SECRETARY OF DEFENSE:

David Packard	Jan. 1969	Present
Paul H. Nitze	July 1967	Jan. 1969
Cyrus R. Vance	Jan. 1964	June 1967

ASSISTANT SECRETARY OF DEFENSE
(INSTALLATIONS AND LOGISTICS):

Barry J. Shillito	Jan. 1969	Present
Thomas D. Morris	Sept. 1967	Jan. 1969
Paul R. Ignatius	Dec. 1964	Aug. 1967

DEPARTMENT OF THE AIR FORCE

SECRETARY OF THE AIR FORCE:

Dr. Robert C. Seamans, Jr.	Jan. 1969	Present
Dr. Harold Brown	Oct. 1965	Jan. 1969
Eugene M. Zuckert	Jan. 1961	Sept. 1965

UNDER SECRETARY OF THE AIR FORCE:

John L. McLucas	Mar. 1969	Present
Towsend Hoopes	Oct. 1967	Feb. 1969
Norman S. Paul	Oct. 1965	Oct. 1967
Dr. Brockway McMillan	June 1963	Sept. 1965

ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS AND LOGISTICS):

Phillip N. Wittaker	May 1969	Present
Robert H. Charles	Nov. 1963	May 1969

Tenure of office
From To

DEPARTMENT OF THE AIR FORCE (continued)

COMMANDER, AIR FORCE LOGISTICS COM-
 MAND:

Gen. Jack G. Merrell	Mar. 1968	Present
Lt. Gen. Lewis R. Mundell	Feb. 1968	Mar. 1968
Gen. Thomas P. Gerrity	Aug. 1967	Feb. 1968
Gen. Kenneth B. Holson	Aug. 1965	July 1967
Gen. Mark E. Bradley, Jr.	July 1962	Aug. 1965

