

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

CONTRACTOR RECOMMENDATIONS FOR SPARES
PROVISIONING OF THE F/A-18 C/D AIRCRAFT

Report Number 92-053

February 21, 1992

Department of Defense

The following acronyms are used in this report:

ASD (P&L).....Assistant Secretary of Defense (Production
and Logistics)
ASO.....Aviation Supply Office
NADEP-NI.....Naval Aviation Depot, North Island
NAVAIRSYSCOM.....Naval Air Systems Command
PPG.....Provisioning Policy Group



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884



February 21, 1992

**MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL
MANAGEMENT)**

**SUBJECT: Report on the Audit of Contractor Recommendations for
Spares Provisioning of the F/A-18 C/D Aircraft
(Report No. 92-053)**

We are providing this final report for your information and use. A draft of this report was issued to the Navy on November 1, 1991; however, as of February 13, 1992, no comments had been received. The audit was requested by the Office of the Assistant Secretary of Defense (Production and Logistics), Provisioning Policy Group. The audit evaluated the timeliness and use of contractor forecasting factors in spares provisioning of the F/A-18 C/D aircraft.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, the Assistant Secretary of the Navy (Financial Management) is requested to provide comments on the report by April 21, 1992.

As required by DoD Directive 7650.3, your comments should indicate either concurrence or nonconcurrence with the finding and each recommendation. If you concur, describe the corrective actions taken or planned, the completion dates for actions taken, and the estimated dates for completion of planned actions. If you nonconcur, please state your specific reasons. If appropriate, you may propose alternative methods for accomplishing desired improvements. We also ask that your comments indicate concurrence or nonconcurrence with the internal control weaknesses highlighted in Part I.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. James Koloshey at (703) 614-6225 (DSN 224-6225) or Mr. Charles E. Sanders at (703) 614-6219 (DSN 224-6219). The planned distribution of this report is listed in Appendix D.

Edward Jones
Deputy Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Navy
Assistant Secretary of Defense (Production and Logistics)

Office of the Inspector General, DoD

AUDIT REPORT NO. 92-053
(Project No. OLA-0025.03)

February 21, 1992

CONTRACTOR RECOMMENDATIONS FOR SPARES PROVISIONING OF THE
F/A-18 C/D AIRCRAFT

EXECUTIVE SUMMARY

Introduction. Provisioning is the management process of determining and acquiring the range and quantity of support items necessary to initially operate an end item such as an aircraft. For spares provisioning of the F/A-18 C/D aircraft, the Naval Air Systems Command required the prime contractor to recommend the items needed for initial support of the aircraft and to determine whether the items were already stocked by DoD or were new candidates for procurement. The contractor was also required to provide forecasting factors to the Naval Aviation Depot, North Island, for review and approval prior to submission to the Navy Aviation Supply Office for use in its requirements computation model.

Objectives. The primary objectives of the audit were to determine if the Navy was receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of spares for new weapon systems, and to determine if the Navy had effective internal control procedures in place to review and evaluate the quality of contractor estimates and forecasting factors before approving procurement of the initial quantities.

Audit Results. For the F/A-18 C/D aircraft, the Navy Aviation Supply Office initially used maintenance factors for spares provisioning that were not approved by the Naval Aviation Depot, North Island. Also, documentation on the review and use of contractor maintenance factors was not retained. As a result, the Navy may have procured inappropriate quantities of aircraft spares. Further, by not retaining adequate documentation, post-evaluations of provisioning to improve the process in the future cannot be made.

Internal Controls. Internal controls were not in place to ensure that forecasting factors solicited from the contractor for spares provisioning were evaluated in a systematic manner and that adjustments to or nonuse of the contractor's factors were justified and documented. Also, procedures did not provide for

post-evaluation of provisioning to improve the accuracy of forecasting factors used in determining procurement and future provisioning requirements. See finding for details of these weaknesses and Part I for details of our review of internal controls.

Potential Benefits of Audit. The audit did not identify any quantifiable monetary benefits. However, recommended improvements in the provisioning process should result in more accurate procurements of spares in future provisioning of new systems. The potential benefits of audit are summarized in Appendix B.

Summary of Recommendations. We recommended that procedures and controls be established to provide for review and use of contractor forecasting factors and retention of pertinent documentation.

Management Comments. Comments were not received from the Navy as of February 13, 1992. We request the Navy's comments by April 21, 1992.

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This report was prepared by the Logistics Support Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate, at (703) 693-0340.

PART I - INTRODUCTION

Background

Provisioning is the management process of determining and acquiring the range and quantity of support items necessary to operate and maintain an end item, such as an aircraft, a tank, or a ship, for an initial period of service. Primary Defense guidance for provisioning is contained in DoD Directive 4140.40, "Provisioning of End Items of Material," June 28, 1983, (to be combined with DoD Directive 4140.1, "Inventory Management Policies," October 12, 1956) and DoD Instruction 4140.42, "Determination of Requirements for Spares and Repair Parts Through the Demand Development Period," July 28, 1987.

The initial period of support (also referred to as the demand development period) is usually 2 years after the initial operational capability has been established for the system. At the beginning of the support period, spares provisioning requirements are based on contractor identification of items to be stocked and forecasts of maintenance and other usage factors. Follow-on provisioning requirements should be based on a combination of forecasted and actual usage. However, by the end of the support period, follow-on provisioning requirements should be based solely on actual usage.

The audit was requested by the Assistant Secretary of Defense (Production and Logistics) [ASD (P&L)], Provisioning Policy Group (PPG), to assist the PPG in its continuing review of the provisioning process within DoD. To evaluate the reliability of contractor recommendations, we, along with the PPG, selected three aircraft systems: the Army Apache (AH-64) helicopter, the Air Force Fighting Falcon (F-16 C/D) aircraft, and the Navy Hornet (F/A-18 C/D) aircraft. The PPG will consider our audit results in formulating new provisioning policy for DoD. This report is on our audit of spares provisioning for the F/A-18 C/D aircraft. McDonnell Aircraft Company, the contractor, is the prime contractor for the F/A-18 aircraft. The budget for the acquisition and logistics support of 1,200 F/A-18 aircraft was \$38 billion. The F/A-18 aircraft was designed to perform both air to ground attack and air to air fighter missions. Of the 1,200 aircraft, the Navy planned to procure 791 F/A-18 C/D aircraft, of which 341 had been delivered as of July 31, 1991.

Objectives

Our overall audit objective was to determine if the Navy was receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of spares for new weapon systems. We also determined if the Navy

had effective internal control procedures in place to review and evaluate the quality of contractor estimates and forecasting factors before approving procurement of the initial quantities. To accomplish the audit within available resources and a reasonable period, the objectives were narrowed to a specific weapon system, the F/A-18 C/D aircraft.

Scope

To accomplish the audit objectives, we evaluated policies and procedures of the Naval Air Systems Command (NAVAIRSYSCOM); Naval Aviation Depot, North Island (NADEP-NI); and Navy Aviation Supply Office (ASO) regarding the solicitation, review, and verification of contractor recommendations from 1986 through 1988 for initial provisioning of spares for the F/A-18 C/D aircraft. To evaluate the adequacy of contractor recommendations for the provisioning of spares, we selected 27 items from the Armament Control Processor Set, AN/AYQ-9(V) (Stores Management System), that were unique to the F/A-18 C/D aircraft and supported by ASO for at least 2 years. The Stores Management System is representative of the process used by the Navy to provision F/A-18 C/D systems. Emphasis was placed on the maintenance factor, which is one of several forecasting factors and has the greatest influence on quantity buy determinations for spares provisioning.

This economy and efficiency audit was made from February through July 1991 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly, included such tests of internal controls as were considered necessary. Activities visited or contacted during the audit are listed in Appendix C.

Internal Controls

The audit identified material internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Controls were not established or effective to ensure that contractor forecasting factors for spares provisioning were received and reviewed in a timely and systematic manner and adjustments to and nonuse of contractor factors were justified and documented. Additionally, Navy directives did not provide for post-evaluations of provisioning so that reliability of contractor recommendations could be evaluated. The recommendations in this report, if implemented, will assist in correcting these weaknesses. Quantifiable monetary benefits from implementing the recommendations were not identified. A copy of the final report will be provided to the senior official responsible for internal controls within the Navy.

Prior Audits and Other Reviews

Prior audits have not focused on the quality of contractor's estimates and forecasting factors for initial provisioning of Navy end items, but have indicated that the Navy could do a better job of determining its spares provisioning requirements. IG, DoD, Report No. 87-177, "Navy's Supply Requirements for New Weapons Systems," June 19, 1987, stated that \$130.1 million (30.3 percent) of the Navy's early support purchases reviewed for new weapon systems in FY 1984 were not reasonable or were not substantiated. IG, DoD, Report No. 88-140, "Requirements Forecasts On Supply Support Requests," April 27, 1988, disclosed that 74 percent (\$235 million) of the forecasted requirements that the Services sent to the Defense Logistics Agency from FY 1982 through FY 1984 were excessive and not substantiated. The reports did not make recommendations regarding contractor recommendations for spares provisioning.

In March 1989, the Under Secretary of Defense for Acquisition directed the ASD (P&L) to perform a comprehensive review of the provisioning process. The results of the review were published in the "Provisioning and Process Review Study Report," May 1990. The report concluded that the Services needed a more efficient provisioning process and recommended a plan to improve the process. The report did not specifically address the reliability of contractor recommendations for provisioning of spares and other secondary items.

PART II - FINDING AND RECOMMENDATIONS

CONTRACTOR RECOMMENDATIONS FOR SPARES PROVISIONING

The ASO used maintenance factors that were not approved by the cognizant Navy activity in determining initial procurement requirements for spares provisioning of the F/A-18 C/D aircraft. Additionally, NAVAIRSYSCOM and ASO did not retain documentation on the review and use of contractor maintenance factors. These deficiencies occurred because written procedures for the evaluation of contractor maintenance factors were lacking, the approved factors were not forwarded to ASO, and the pertinent data were not retained. As a result, NAVAIRSYSCOM could not make post-evaluations to determine the accuracy of contractor maintenance factors and management decisions for provisioning of the F/A-18 C/D aircraft.

DISCUSSION OF DETAILS

Background

The NAVAIRSYSCOM solicited estimates of various forecasting factors from the contractor, including the maintenance factor, for use in determining procurement requirements for spares provisioning of the F/A-18 C/D aircraft. The maintenance factor measures the frequency of depot repair or replacement of an item per 100 flying hours and is used to estimate demands on the Navy supply system. The contractor was required to develop the maintenance factors in accordance with NAVAIRSYSCOM policies and procedures and provide them in Part II of the Maintenance Plan that was prepared for each major aircraft subsystem. According to the terms of a memorandum of understanding among the contractor and the pertinent Navy activities, the Maintenance Plan was to be provided to the NADEP-NI, a NAVAIRSYSCOM maintenance activity for the F/A-18 C/D aircraft, for review and approval. After the factors were approved, the contractor was required by the Navy to provide the factors to ASO for determination of line item quantities required for provisioning the F/A-18 C/D aircraft.

Provisioning the Stores Management System

Maintenance factors approved by NADEP-NI were not available to ASO at the time of initial procurements for 20 of the 27 line items of the Stores Management System. Approved maintenance factors were available to ASO for the remaining 7 line items, which were procured after October 21, 1988. To accommodate ASO procurement dates, the contractor submitted preliminary factors directly to ASO in June 1986 without NADEP-NI's review and approval. The contractor did not submit these factors to NADEP-NI until September 1987. The NADEP-NI approved the factors

on October 21, 1988. Neither NAVAIRSYSCOM nor ASO could provide us with a provisioning requirements statement with appropriate delivery dates for the maintenance factors. Further, we could not determine what factors were used to determine provisioning quantities for the F/A-18 C/D aircraft or whether the maintenance factors used by ASO were those that were later approved by NADEP-NI because computations of procurement requirements were not retained. Furthermore, the contractor was not required to retain or provide the basis for the forecasting factors.

Appendix A shows maintenance factors that the contractor provided to ASO in 1986 and 1988 and a comparison of the contractor maintenance factors to actual demand rates as of February 28, 1991. Significant differences between the contractor factors and actual demand rates for some items are apparent. However, due to the lack of documentation on the contractor's rationale and assumptions for development of maintenance factors and Navy's review and use of contractor factors, we could make no conclusion on whether the contractor estimates were reasonable based on information available at the time of the estimates.

Processing procedures. The NAVAIRSYSCOM had no written procedures providing for systematic evaluation of contractor forecasting factors. The scope and depth of required reviews of contractor forecasting factors were not defined. Furthermore, NAVAIRSYSCOM procedures did not ensure that contractor forecasting factors submitted to ASO were accurate and approved by NADEP-NI. The NADPE-NI was not required to document its evaluation results relative to accepting or modifying the factors or justifying significant changes to contractor forecasting factors.

Retention of documentation. Navy instructions did not require that the Navy retain documentation to show evaluation and use of contractor forecasting factors in provisioning so that post-evaluations of provisioning could be made. Secretary of the Navy Instruction 5212.5C, "Navy and Marine Corps Records Disposition Manual," February 13, 1991, requires that records concerning integrated material management, including the assignment, transfer, and inventory management of items of supply that are maintained at inventory control points, be destroyed when 2 years old. This limited period precludes retention of most documentation in support of initial provisioning actions.

For example, procurements of some of the initial spares for the Stores Management System were initiated in FY 1986. Contractor forecasting factors should have been reviewed before the initial procurements. With a procurement lead time of 2 years, delivery of items would have occurred in FY 1988. About 2 years of actual parts usage experience would be needed to compare actual and forecasted requirements of the ASO and the contractor.

Therefore, to accomplish a post-evaluation of provisioning of the Stores Management System in FY 1990, documentation for review of contractor forecasting factors and initial requirements determinations for procurement of spares generated before FY 1988 would have had to be retained for at least 4 years. Without reasonable retention of this documentation, neither post-evaluations by management nor independent audit of the process is possible, so the adequacy of the process and the need of any improvement could not be assessed by managers.

RECOMMENDATIONS FOR CORRECTIVE ACTIONS

1. We recommend that the Secretary of the Navy establish policy and procedures that provide for retention of documentation portraying how contractor recommendations were evaluated and used in developing spares provisioning requirements.

2. We recommend that the Commander, Naval Air Systems Command:

a. Direct Navy activities to establish procedures to ensure that contractor forecasting factors for spares provisioning are properly evaluated.

b. Require contractors to retain and make available to the Navy the rationale for rates used in the calculation of estimated provisioning factors.

c. Establish internal controls to ensure that Navy approved forecasting factors are provided to the Aviation Supply Office before spares provisioning.

MANAGEMENT COMMENTS

As of February 13, 1992, the Navy had not provided comments to the draft report. We request that the Assistant Secretary of the Navy (Financial Management) provide comments indicating concurrence or nonconcurrence with the finding and recommendations, as required by DoD Directive 7650.3.

PART III - ADDITIONAL INFORMATION

APPENDIX A - Comparison of Contractor and Actual Maintenance
Factors in Flying Hours

APPENDIX B - Summary of Potential Benefits Resulting from Audit

APPENDIX C - Activities Visited or Contacted

APPENDIX D - Report Distribution

APPENDIX A: COMPARISON OF CONTRACTOR AND ACTUAL MAINTENANCE FACTORS IN FLYING HOURS

Sample Number	Nomenclature	National Stock Number	Contractor Estimate As Of June 18, 1986	Contractor Estimate As Of Jan. 29, 1988	Actual Rate As Of Feb. 28, 1991	June 18, 1986	Jan. 29, 1988
						Estimate	Estimate
						Over Or Under	Over Or Under
						Actual Rate As of Feb. 28, 1991	Actual Rate As of Feb. 28, 1991
1	ENCODER-DECODER COMPONENT	1270-01-240-5410	12,500	20,000	17,720	(5,220)	2,280
2	ELECTRONIC COMPONENT	5999-01-240-5638	16,667	16,667	**	**	**
3	CIRCUIT CARD ASSEMBLY	5999-01-240-5654	7,143	11,111	**	**	**
4	CIRCUIT CARD ASSEMBLY	5998-01-240-5655	4,545	10,000	89,000	(84,454)	(79,000)
5	CIRCUIT CARD ASSEMBLY	5998-01-240-5656	7,692	50,000	89,000	(81,307)	(39,000)
6	CIRCUIT CARD ASSEMBLY	5998-01-240-5657	7,143	5,263	68,300	(61,157)	(63,037)
7	CIRCUIT CARD ASSEMBLY	5998-01-240-5658	5,000	4,000	40,000	(35,000)	(36,000)
8	CIRCUIT CARD ASSEMBLY	5998-01-240-5659	100,000	*	25,371	74,629	*
9	CIRCUIT CARD ASSEMBLY	5998-01-240-5660	100,000	9,091	22,250	77,750	(13,159)
10	CIRCUIT CARD ASSEMBLY	5999-01-240-5661	6,667	5,000	12,657	(5,990)	(7,657)
11	CIRCUIT CARD ASSEMBLY	5998-01-240-5662	33,333	12,500	14,833	18,500	(2,333)
12	ENCODER-DECODER COMPONENT	1270-01-245-7986	12,500	11,111	7,526	4,974	3,586
13	ENCODER-DECODER COMPONENT	1279-01-245-8098	25,000	25,000	4,789	20,211	20,211
14	ELECTRONIC COMPONENT	5999-01-245-8252	33,333	100,000	18,961	14,373	81,039
15	ELECTRONIC COMPONENT	5999-01-245-8253	14,286	4,545	25,281	(10,995)	(20,735)
16	CIRCUIT CARD ASSEMBLY	5998-01-245-8299	33,333	100,000	13,662	19,672	86,338
17	CIRCUIT CARD ASSEMBLY	5998-01-245-8300	100,000	20,000	43,633	56,367	(23,633)
18	CIRCUIT CARD ASSEMBLY	5998-01-245-8301	20,000	20,000	88,616	(68,616)	(68,616)
19	CIRCUIT CARD ASSEMBLY	5998-01-245-8302	100,000	20,000	20,000	80,000	0
20	CIRCUIT CARD ASSEMBLY	5998-01-245-8303	25,000	*	**	**	*
21	CIRCUIT CARD ASSEMBLY	5998-01-245-8304	11,111	9,091	20,833	(9,722)	(11,742)
22	CIRCUIT CARD ASSEMBLY	5998-01-245-8305	50,000	20,000	120,774	(70,774)	(100,774)
23	CIRCUIT CARD ASSEMBLY	5998-01-245-8306	100,000	100,000	55,556	44,444	44,444
24	CIRCUIT CARD ASSEMBLY	5998-01-245-8307	33,333	20,000	47,619	(14,286)	(27,619)
25	CIRCUIT CARD ASSEMBLY	5999-01-245-8308	7,143	7,143	**	**	**
26	CIRCUIT CARD ASSEMBLY	5999-01-245-8309	100,000	100,000	32,758	67,242	67,242
27	CIRCUIT CARD ASSEMBLY	5999-01-248-9228	33,333	20,000	78,960	(45,627)	(58,960)

* The contractor did not submit 1988 provisioning estimates on these items.

** No demands occurred for these items.

NOTE: The higher the flying hours, the fewer the demands placed on the supply system.

APPENDIX B: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT

<u>Recommendation Reference</u>	<u>Description of Benefit</u>	<u>Amount and/or Type of Benefit</u>
1.	<u>Internal Control.</u> Ensure an audit trail for post-evaluation of provisioning.	<u>Nonmonetary.</u> The NAVAIRSYSCOM can improve its provisioning process and reduce the risk of inappropriate procurements.
2.a.	<u>Internal Control.</u> Ensure contractor recommended factors are properly evaluated.	<u>Nonmonetary.</u> The NAVAIRSYSCOM can reduce its risk of procuring inappropriate quantities of aircraft spares.
2.b.	<u>Internal Control.</u> Provide an audit trail for post-evaluations of provisioning.	<u>Nonmonetary.</u> The NAVAIRSYSCOM can improve its provisioning process and reduce the risk of inappropriate procurements.
2.c.	<u>Internal Control.</u> Ensure that ASO is provided with Navy approved forecasting factors for spares provisioning.	<u>Nonmonetary.</u> The NAVAIRSYSCOM can reduce its risk of procuring inappropriate quantities of aircraft spares.

APPENDIX C: ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Office of the Assistant Secretary of Defense (Production and Logistics), Washington, DC

Department of the Navy

Deputy Chief of Naval Operations, Arlington, VA
Naval Air Systems Command, Arlington, VA
Aviation Supply Office, Philadelphia, PA
Naval Aviation Depot, North Island, San Diego, CA

Other Activities

McDonnell Aircraft Company, St. Louis, MO

AUDIT TEAM MEMBERS

Shelton R. Young, Director, Logistics Support Directorate
Gordon P. Nielson, Deputy Director
James L. Koloshey, Program Director
Charles E. Sanders III, Project Manager
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