Audit Report

C-17 PROGRAM SERIALIZATION OF AIRFRAME FRACTURE-CRITICAL AND LANDING-GEAR RELIABILITY-CRITICAL PARTS

Report Number 99-114 March 24, 1999

Office of the Inspector General
Department of Defense

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March 24, 1999

MEMORANDUM FOR ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Audit Report on C-17 Program Serialization of Airframe Fracture-Critical and Landing-Gear Reliability-Critical Parts (Report No. 99-114)

We are providing this report for your information and use. This is the first in a series of reports on life-cycle management of military aircraft landing gear. We considered management comments on a draft of the report and other documentation that management provided in preparing this final report. Based on further discussion with management, we revised the finding, deleted recommendations, and revised the remaining recommendation. The C-17 System Program Office comments conformed to the requirements of DoD Directive 7650.3 and left no unresolved issues. Therefore, additional comments are not required.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Charles M. Santoni at (703) 604-9051 (DSN 664-9051) <csantoni@dodig.osd.mil> or Ms. Delpha W. Martin at (703) 604-9075 (DSN 664-9075) <dwmartin@dodig.osd.mil>. See Appendix B for the report distribution. Audit team members are listed inside the back cover.

David K. Steensma
Deputy Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 99-114 **March 24, 1999**
(Project No. 8AL-3002.00)

C-17 Program Serialization of Airframe Fracture-Critical and Landing-Gear Reliability-Critical Parts

Executive Summary

Introduction. This report is the first in a series on the life-cycle management of military aircraft landing-gear parts. This report addresses the serialization and tracking of airframe fracture-critical and landing-gear reliability-critical parts for the C-17 aircraft.

Objectives. The audit objective was to evaluate the Air Force actions to serialize and provide part-tracking capability of C-17 airframe fracture-critical and landing-gear reliability-critical parts to facilitate life-cycle management. We also evaluated the effectiveness of the management control program as it applied to the audit objective. See Appendix A for details on the management control program.

Results. The C-17 System Program Office did not finish populating its database with serial numbers for tracking airframe fracture-critical and landing-gear reliability-critical parts. The C-17 System Program Office designated the Computer-Aided Maintenance System for Airlift (the G081 System) as the database to be used to perform the tracking function. On January 28, 1997, in response to a recommendation contained in Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997, the C-17 System Program Office stated that serialization would be implemented at the time of the memorandum and that backfill data would be completed by December 31, 1997. Subsequently, the C-17 System Program Office developed an alternative approach that it believed would satisfy the intent of our recommendations. The revised approach is an acceptable alternative. However, the C-17 System Program Office still did not provide a schedule for implementation. Because all serialized data had not been input to the database, contractor and field maintenance personnel were manually tracking landing-gear reliability-critical parts on each C-17 aircraft to ensure that the life-limit capability of the landing-gear reliability-critical parts was not exceeded. Expeditiously capturing all automated information on the landing gear will avoid loss of perishable data and eliminate the cost associated with manual tracking.

Recommendation. We recommend that the Program Director, C-17 System Program Office, establish a schedule by aircraft as to when serialized parts tracking will be accomplished for airframe fracture-critical and landing-gear reliability-critical parts.

Management Comments. System Program Office personnel generally concurred with the report and provided projected schedules for completing the recommended action. A discussion of management comments is in the Finding section of this report, and the complete text of the comments is in the Management Comments section.

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Background

The C-17 aircraft is a four-engine, heavy-lift, long-range military transport aircraft with a short take-off and landing capability. The aircraft was designed to modernize the airlift fleet and improve the capability of the United States to rapidly project, reinforce, and sustain combat forces worldwide. The C-17 aircraft provides airlift capability for outsized combat equipment equivalent to the larger C-5 aircraft and provides short-field performance similar to the C-130 aircraft. In August 1981, the C-17 System Program Office selected Boeing Corporation (previously McDonnell Douglas Corporation) to develop the C-17 aircraft.

The C-17 aircraft program achieved initial operational capability in January 1995, when 12 aircraft were deployed at the 437th Air Wing at Charleston Air Force Base in South Carolina. The Defense Acquisition Board approved the C-17 aircraft for Milestone IIIB, full-rate production, in November 1995. At that time, the Defense Acquisition Board approved Air Force plans to procure 120 C-17 aircraft. Total research, development, and procurement cost is currently projected at $42.2 billion.

Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997, reports that the Air Force could not readily and fully trace all airframe fracture-critical and landing-gear reliability-critical parts for which the contract required serial numbers. The C-17 System Program Office did not maintain information on the specific use and movement of airframe fracture-critical and landing-gear reliability-critical parts for life-cycle management. In response to our report recommendation, the C-17 System Program Office developed time-phased milestones for when it would have complete traceability information, serial numbers, and part tracking implemented for all airframe fracture-critical and landing-gear reliability-critical parts.

Objectives

The audit objective was to evaluate the Air Force actions to serialize and provide part-tracking capability of C-17 airframe fracture-critical and landing-gear reliability-critical parts. We also reviewed the management control program applicable to life-cycle management of landing gear. See Appendix A for a discussion of the audit scope and methodology and our review of the management control program.

Serialization and Tracking of Airframe Fracture-Critical and Landing-Gear Reliability-Critical Parts

The C-17 System Program Office did not finish populating its database with serial numbers for tracking airframe fracture-critical and landing-gear reliability-critical parts. The C-17 System Program Office designated the Computer-Aided Maintenance System for Airlift (the G081 System) as the database to be used to perform the tracking function. On January 28, 1997, in response to a recommendation contained in Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997, the C-17 System Program Office stated that serialization would be implemented at the time of the memorandum and that backfill data would be completed by December 31, 1997. Subsequently, the C-17 System Program Office developed an alternative approach that it believed would satisfy the intent of our recommendations. The revised approach is an acceptable alternative. However, the C-17 System Program Office did not provide a schedule for implementation. Because the serialized data had not been input to the database, contractor and field maintenance personnel were manually tracking landing-gear reliability-critical parts on each C-17 aircraft to ensure that the life-limit capability of the landing-gear parts was not exceeded. Expeditiously capturing all automated information on the landing gear will avoid loss of perishable data and eliminate the cost associated with manual tracking.

Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft"

Parts Serialization Requirement. The C-17 System Program Office and contractor identified 1,280 unique parts that required serialization. Of the parts identified, 469 were airframe fracture-critical parts,[1] and 29 were landing-gear reliability-critical parts. Of the 469 airframe fracture-critical parts, 109 are Category A or B airframe fracture-critical parts (parts with little or no redundancy). All 29 of the landing-gear parts are items that are reliability-critical[2] that could jeopardize crew or passenger safety or significantly affect the overall mission of the C-17 aircraft.

Prior Audit Report Finding. Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997, states that the

[1] Airframe fracture-critical parts and components are those for which failure could cause direct loss of the aircraft.

[2] Although the C-17 System Program Office does not classify landing-gear parts as safety of flight or airframe fracture-critical, the landing-gear parts have not yet tested to levels that show that they can meet their overall life goal without significant supportability costs. Therefore, the parts are classified as life-limited gear. Because the C-17 System Program Office considers the landing-gear parts to be reliability critical, it requires the contractor to serialize the parts.

Air Force could not readily and fully trace all airframe fracture-critical and reliability-critical landing-gear parts on the first 27 aircraft delivered. That condition existed in part because the C-17 System Program Office granted waivers to the contract requirement that airframe fracture-critical and reliability-critical parts be marked with serial numbers and that the contractor provide those serial numbers to the Air Force on the first 27 production C-17 aircraft. Further, the C-17 aircraft contract did not require the contractor to deliver all the serial numbers and serialization data to the Air Force. The C-17 System Program Office granted waivers because the contractor:

- accepted parts from subcontractors without serial numbers or assembled the parts into the aircraft without recording serial numbers because of ambiguous contractor instructions, and

- did not always maintain such information at its facility because the contractor did not require delivery of documentation containing information concerning the manufacture of airframe fracture-critical and landing-gear reliability-critical parts for which serial numbers were required.

Further, the C-17 System Program Office was not maintaining information on the specific use and movement of airframe fracture-critical and landing-gear reliability–critical parts. As a result, the C-17 System Program Office lacked the means to readily identify some of the specific parts that were on the aircraft and could not identify information as to how or by whom the parts were made or the use that they were subjected to as they were employed on and moved from aircraft to aircraft. Without the ability to identify specific parts, their manufacture, and their use by serial number, airframe fracture-critical and landing-gear reliability-critical parts may have to be repaired or replaced prematurely. Those maintenance functions may unnecessarily increase the maintenance burden, and the C-17 fleet could incur unnecessary downtime because the Air Force cannot detect the parts that come from defective manufacturing lots or parts that may have lower than expected reliability. In addition, aircraft life appraisal and extension efforts may be more costly without serialization data and serialized parts-life tracking.

Prior Audit Report Recommendation. The report recommended that the C-17 System Program Office develop time-phased milestones by aircraft as to when it would have complete traceability information, serial numbers, and part tracking implemented for all airframe fracture-critical and landing-gear reliability-critical parts.

Response to Prior Audit Report Recommendation. The Program Director, C-17 System Program Office, and the Air Force Program Executive Officer for Tactical and Airlift Programs concurred with the report and established time-phased milestones to implement serialization starting with production aircraft number P-33. The C-17 System Program Office provided plans to have backfill data completed on aircraft P-1 through P-32 by December 31, 1997. The C-17 System Program Office's plan to backfill the data included loading dummy numbers into the G081 System until maintenance actions provided the actual serial number.

Follow-up Review of the Prior Report

During our review of the Life-Cycle Management Program for military aircraft landing-gear components, we reviewed the status and implementation of the recommendation in Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft."

The Air Force had not completely implemented the recommendation according to the C-17 System Program Office plan and schedule. The C-17 System Program Office had not:

- backfilled and populated the G081 system with airframe fracture-critical and landing-gear reliability-critical serial numbers for aircraft P-1 through P-32 and

- tracked airframe fracture-critical and landing-gear reliability-critical parts through the G081 system because of the missing serialization data.

Of the 20 landing-gear reliability-critical parts, 2 parts, the main landing-gear post and the trunnion collar, have not passed durability testing and are, therefore, life limited. Because information on the two parts was not entered in G081, the contractor started manual tracking of the two parts in June 1997. Manual tracking is necessary to ensure that the number of landings do not exceed the life-limit capability of the landing-gear reliability-critical parts.

Subsequent C-17 System Program Office Actions

After the Inspector General, DoD, issued Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997, the C-17 System Program Office performed a thorough evaluation and took action to manage and track serialized parts, while continuing to establish and define the life-limits of those parts. The C-17 System Program Office focused on the execution and effectiveness of the serialization and tracking effort, including decisions on when to fully automate their tracking system.

Serialization of Airframe Fracture-Critical Parts. The information on serial numbers for airframe fracture-critical parts on aircraft P-1 through P-32 is limited and incomplete because of the failure to capture the serial numbers on those parts during original manufacture. Some contracts with sub-vendors were not specific regarding the requirement for serialization and did not include the flow-down requirement for serialization. Therefore, some suppliers did not serialize their parts. Other suppliers serialized their parts, but the prime contractor did not capture the serial numbers on the build paperwork when it installed the parts. Because the parts were no longer accessible after installation (they were covered by other parts during production), their serial numbers were not loaded into G081, and the contractor submitted a waiver.

The C-17 System Program Office saw no added value in completing the labor-intensive and time-consuming effort of creating and loading dummy numbers

into G081 for earlier aircraft from which airframe fracture-critical serial numbers were not captured, as agreed to in its response to Report No. 97-104.

Tracking of Airframe Fracture-Critical Parts. The contractor implemented a process to capture all airframe fracture-critical serial numbers and entered them into G081 for aircraft P-33 forward. For aircraft P-1 through P-32, the C-17 System Program Office established a process in G081 to record the serial numbers of airframe fracture-critical parts during required maintenance removal and replacement actions. The new serial number must be entered upon installation, or the G081 system will not allow the task to continue. Therefore, the recording of serial numbers will be an "as-touched" maintenance action only. The C-17 System Program Office personnel stated that they have implemented the process and have identified all parts and fields requiring serial number tracking on specific aircraft. Further, C-17 System Program Office personnel provided documentation to support their ability to trace two airframe fracture-critical parts from raw stock to installation on an aircraft. System Program Office personnel indicated that the documents provided were typical of those available to support their ability to track all C-17 airframe fracture-critical parts back to their origins.

Serialization of Landing-Gear Reliability-Critical Parts. The C-17 System Program Office personnel stated that without the analyses derived from completing durability testing (mature landing-gear design), it is impractical to place inspection time intervals into G081 to enable the system to calculate proper inspection milestones. C-17 System Program Office personnel believe that until definitive time intervals are established, all such milestones would be subject to change, that the scope and frequency of such changes would increase the program's cost, that total costs might exceed the costs of the current tracking effort, and that changes would negatively affect fiscal management. Further, the C-17 System Program Office personnel stated that the C-17 prime contractor is maintaining life statistics on all relevant parts to ensure that durability-improved parts are installed well in advance of operational necessity.

Tracking of Landing-Gear Reliability-Critical Parts. For landing-gear reliability-critical parts, the C-17 System Program Office planned to complete the update of landing-gear reliability-critical parts tracking information in G081 as part of the "first major overhaul" of each affected landing gear. However, the C-17 System Program Office recognized the need to accelerate the data gathering to improve tracking capability and has required that the landing-gear reliability-critical part serial numbers be recorded and entered into G081 whenever a major modification (retrofit) of the gear is incorporated into an aircraft. A current retrofit program, initiated in June 1998 and scheduled for completion in August 2002, includes the task to record the serial number data for the landing-gear reliability-critical parts. This action will significantly accelerate the G081 database population effort.

Acceptance of the Revised Serialization Plan

Airframe Fracture-Critical Parts. The C-17 System Program Office provided documentation to support its ability to extract data on airframe fracture-critical parts from the G081 database. We agree with the C-17 System Program

Office's revised serialization plan for airframe fracture-critical parts, and that loading dummy numbers into G081 for airframe fracture-critical parts on earlier aircraft for which serial numbers were not captured may have no added value. However, the C-17 System Program Office needs to provide a schedule for accomplishing the serialization and tracking tasks.

Landing-Gear Reliability-Critical Parts. The C-17 System Program Office response to the Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997, on serialization of landing-gear reliability-critical parts indicated that procedures are in place to pick up all landing-gear reliability-critical part serial numbers in G081 when the landing gear cycles through the first major overhaul. However, no dates were provided for the "first major overhaul." The only date provided in the response indicated that all backfill data would be completed by December 31, 1997. The first major overhaul of landing gear is now scheduled to start in late 1999 or early 2000. C-17 System Program Office personnel stated that without the analyses derived from completing the durability testing (mature landing-gear design), it is impractical to place inspection time intervals into G081 to enable the system to calculate proper inspection milestones. C-17 System Program Office personnel also stated that their prime contractor is maintaining life statistics on all relevant parts to ensure that durability-improved parts are installed well in advance of operational necessity and that manual tracking of the landing gear is being accomplished using the life statistics. However, the C-17 System Program Office needs to provide a schedule of when the contractor will transfer the data to the G081 system. Expeditiously capturing all automated information on the landing gear will avoid loss of perishable data and eliminate the cost associated with manual tracking.

Recommendation and Management Comments

Revised and Deleted Recommendations. Based on further discussion with management, we revised the finding, deleted recommendations, and revised the remaining recommendation.

We recommend that the Program Director, C-17 System Program Office, establish a schedule by aircraft as to when the C-17 System Program Office projects that it will accomplish serialized parts tracking for airframe fracture-critical and landing-gear reliability-critical parts.

Management Comments. System Program Office personnel generally concurred with the report and provided projected schedules, by aircraft, for completing major landing-gear overhaul and aircraft retrofit (Attachments 1 and 2 to Management Comments). System Program Office personnel also provided documentation to support their ability to extract data on main landing-gear post and trunnion collars from the G081 database. The complete text of management comments is in the Management Comments section.

Appendix A. Audit Process

Scope

Work Performed. We conducted this program audit from January 1998 through February 1999 and reviewed data from April 1995 through February 1999. To accomplish the audit objective, we did the following:

- examined the multi-year production contracts F33657-81-C-2108 and F33657-96-C-2059 and the Flexible Sustainment Contract F33657-97-C-0008, including statements of work, warranty coverage, and related correspondence;
- reviewed maintenance data for the C-17 aircraft landing gear;
- examined C-17 test reports for landing gear and related engineering analyses of those tests; and
- Discussed issues and contractor corrective actions on C-17 landing gear tests with the C-17 System Program Office, the user command, and the contractor.

DoD-Wide Corporate-Level Government Performance and Results Act Goals. In response to the Government Performance and Results Act, the Department of Defense has established 6 DoD-wide corporate-level performance objectives and 14 goals for meeting the objectives. This report pertains to achievement of the following objective and goal:

> **Objective:** Fundamentally reengineer DoD and achieve a 21st century infrastructure. **Goal:** Reduce costs while maintaining required military capabilities across all DoD mission areas. **(DoD-6)**

DoD Functional Area Reform Goals. Most major DoD functional areas have also established performance improvement reform objectives and goals. This report pertains to achievement of the following functional area objectives and goals:

- **Acquisition Functional Area. Objective:** Internal reinvention. **Goal:** Minimize cost growth in major defense acquisition programs to no greater than 1 percent annually. **(ACQ-3.4)**

- **Information Technology Management Functional Area. Objective:** Reform information technology management processes to increase efficiency and mission contribution. **Goal:** Institutionalize provision of the Information Technology Management Reform Act of 1996. **(ITM-3.1)**

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in the DoD. This report provides coverage of the Defense Weapons Systems Acquisition high-risk area.

Methodology

Audit Type, Dates, and Standards. We conducted this program audit in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. Accordingly, we included such tests of management controls as we considered necessary. We used technical support from the Engineering Branch, Technical Assessment Division, Audit Followup and Technical Support Directorate of the Office of the Assistant Inspector General for Auditing, DoD.

Use of Computer-Processed Data. We reviewed computer-processed data from the on-line Computer-Aided Maintenance System for Airlift (the G081 system). The C-17 System Program Office selected the G081 system to provide traceability and trackability. We evaluated the competency and completeness of data. We established that data were accurate for the specified audit purpose, but they were not complete. We did not use statistical sampling procedures for this audit.

Contacts During the Audit. We visited or contacted individuals and organizations within DoD and Boeing Corporation, Long Beach, California. Further details are available upon request.

Management Control Program

DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD managers to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of those controls.

Scope of Review of Management Control Program. The Under Secretary of Defense for Acquisition and Technology integrated DoD Directive 5010.38 requirements into the March 15, 1996, revision to DoD Directive 5000.1, "Defense Acquisition," and DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPS) and Major Automated Information System (MAIS) Acquisition Programs." Acquisition managers are to use program cost, schedule, and performance parameters as control objectives to implement DoD Directive 5010.38 requirements. Managers are to identify material weaknesses through initiatives from approved acquisition program baselines and exit criteria. Accordingly, we limited our review to management controls directly related to life-cycle management of landing gear.

Adequacy of Management Controls. We did not identify a material management control weakness, as defined by DoD Directive 5010.38. Our review showed that management controls were adequate as they applied to the overall objective.

Summary of Prior Coverage

During the last 5 years, the Inspector General, DoD, has issued one audit report discussing the C-17 System Program Office populating its database with serial numbers for tracking airframe fracture-critical and landing-gear reliability-critical parts.

Inspector General, DoD

Inspector General, DoD, Report No. 97-104, "Waivers and Deviations for the C-17 Aircraft," March 6, 1997.

Appendix B. Report Distribution

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House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Reform
House Subcommittee on Government Management, Information, and Technology, Committee on Government Reform
House Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform

C-17 System Program Office Comments

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AERONAUTICAL SYSTEMS CENTER (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

09 FEB 1999

MEMORANDUM FOR AFPEO/AT
1230 AIR FORCE PENTAGON (RM 5A266)
WASHINGTON DC 20330-1230

SUBJECT: Final Response to DoD IG Audit Report, "C-17 Program Serialization of Airframe Fracture-Critical and Landing-Gear Reliability-Critical Parts" (Project No. 8AL-3002.00)

FROM: ASC/YC
2590 Loop Road West
Wright-Patterson AFB OH 45433-7142

1. The attached document is the C-17 System Program Office's final response to the subject DoD IG audit report.

2. We have pre-coordinated this response with the DoD IG, and no outstanding issues remain. We expect this response to close the subject audit.

3. Please forward our response to SAF/AQ and SAF/FM, as appropriate. If you have questions, please call.

CHRISTOPHER L. BLAKE, SES
Technical Director
C-17 System Program Office

Attachment
C-17 Response

C-17 System Program Office

Response to DoD IG Report
"C-17 Program Serialization of Airframe Fracture-Critical and Landing-Gear Reliability-Critical Parts"
(Project No. 8AL-3002.00)

Except as noted below, the C-17 System Program Office concurs with the subject DoD IG report.

EXECUTIVE SUMMARY / RESULTS and SUMMARY OF RECOMMENDATIONS
Statement

We have captured 109 fracture-critical, Category A and B parts since 28 August 1997, when aircraft P-33 was delivered. Since then, we have captured and incorporated 100 percent of all serialized parts into G081 for all delivered aircraft (P-48 is the latest delivered aircraft). Since P-32, we have not accepted waivers on any aircraft for failure to capture data for serialized parts.

As we explained, we do not intend to load serial numbers for any fracture-critical parts, installed in aircraft P-1 through P-32, into our G081 database, unless the part is touched during maintenance or other similar action.

In addition, we have established a program to capture landing-gear part numbers and serial numbers for all aircraft prior to P-33. The agreed-to plan for capturing landing-gear data is to collect those data during landing-gear overhaul (Attachment 1 is a notional overhaul schedule). However, we are accelerating this data capture by collecting the information during retrofit--our Global Reach Improvement Program (GRIP). For each aircraft that enters the Boeing Aerospace Support Center at San Antonio, Texas, we capture and enter into G081 the same data that are now captured at delivery of production aircraft. This process began in November 1998 and will continue until all fielded aircraft are complete. Attachment 2 is the GRIP 99 schedule.

SERIALIZATION AND TRACKING OF AIRFRAME FRACTURE-CRITICAL AND LANDING-GEAR RELIABILITY-CRITICAL PARTS
Statement

Refer to our statement in "Executive Summary / Results and Summary of Recommendations" above.

1

INSPECTOR GENERAL, DOD, REPORT NO. 97-104, "WAIVERS AND DEVIATIONS FOR THE C-17 AIRCRAFT"

-- Prior Audit Report Finding

Statement:

(2nd paragraph) This paragraph summarizes the prior audit report but does not clarify the misunderstanding relative to the C-17 Program's maintenance of serialization data and ability to track serialized parts. The information we have provided to the DoDIG has demonstrated our ability to track parts to aircraft. Further, a misunderstanding still exists relative to fracture-critical parts. Since there are no time-change fracture-critical parts on a C-17, the suggestion that these parts may have to be "repaired or replaced prematurely" is not correct. Although this was clearly the conclusion of the initial DoDIG audit report, it is equally clear that we have established that this is not an accurate conclusion today. We suggest this paragraph be deleted or reworded to clarify today's situation.

-- Response to Prior Audit Report Recommendation

Statement:

Refer to our statement under "Executive Summary / Results and Summary of Recommendations."

Clarified, see Page 6, second paragraph of the report.

FOLLOW-UP REVIEW OF THE PRIOR REPORT

Statement:

(2nd paragraph, 1st bulleted item) Landing gear parts were not part of the initial plan. Our comments to the prior report clarified that landing gear parts were to be addressed during first major overhaul.

(3rd paragraph) Attachment 3 contains serial numbers and Customer End-Item numbers for all main landing-gear posts and trunnion collars. We extracted these data directly from G081. The source G081 reports for the trunnion collars are included as Attachment 4.

SUBSEQUENT C-17 SYSTEM PROGRAM OFFICE ACTIONS

-- Serialization of Airframe Fracture-Critical Parts

Statement:

(2nd paragraph) To be specific, we did not create and load dummy numbers because fracture-critical parts are not time-change parts and we have demonstrated our ability to use manual means to track parts if required.

2

-- Tracking of Airframe Fracture-Critical Parts

Statement:

Refer to our statement in "Executive Summary / Results and Summary of Recommendations" above.

(Last sentence) We sent the required documentation to DoD IG on 28 January 1999. The sentence should be changed to "Further, C-17 System Program Office personnel have provided documents that trace serialized parts from raw stock to installation on aircraft. The documents are typical of those available to support any need to trace the aircraft installation, manufacturing process, raw material process, and material procurement of all serialized parts used on the C-17. The C-17 SPO is unquestionably able to trace all serialized parts back to their origins." Changed

-- Tracking of Landing-Gear Reliability-Critical Parts

Statement:

See Attachments 1 and 2 for overhaul and GRIP schedules, respectively.

ACCEPTANCE OF THE REVISED SERIALIZATION PLAN

-- Airframe Fracture-Critical Parts

Statement:

Refer to our statement in "Executive Summary / Results and Summary of Recommendations" above.

-- Landing-Gear Reliability-Critical Parts

Statement:

(7th sentence) We sent the required documentation to DoD IG on 28 January 1999. The sentence should be changed to "The C-17 System Program Office has provided documents that trace serialized parts from raw stock to installation on aircraft. The documents are typical of those available to support any need to trace the aircraft installation, manufacturing process, raw material process, and material procurement of all serialized parts used on the C-17. The C-17 SPO is unquestionably able to trace all serialized parts back to their origins." Changed

(9th sentence) See Attachments 1 and 2 for overhaul and GRIP schedules, respectively.

3

Attachment 1: Notional Major Landing-Gear Overhaul Schedule
Response to DoD IG Report, Project No. 8AL-3002.00

DELIVERY DATE

FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04
P1/89-0365	P4/89-1190	P8/90-0533	P16/93-0600	P23/94-0067	P29/95-0104	P36/96-0004	P45/97-0045	P53	P66	P79	P93	P107
P2/89-0366	P5/89-1191	P9/90-0534	P17/93-0601	P24/94-0068	P30/95-0105	P37/96-0005	P46/97-0046	P54	P67	P80	P94	P108
P3/89-1189	P6/89-1192	P10/90-0535	P18/93-0602	P25/94-0069	P31/95-0106	P38/96-0006	P47/97-0047	P55	P68	P81	P95	P109
	P7/89-0532	P11/92-3291	P19/93-0603	P26/94-0070	P32/95-0107	P39/96-0007	P48/97-0048	P56	P69	P82	P96	P110
		P12/92-3292	P20/93-0604	P27/95-0102	P33/96-0001	P40/96-0008	P49	P57	P70	P83	P97	P111
		P13/92-3293	P21/94-0065	P28/95-0103	P34/96-0002	P41/97-0041	P50	P58	P71	P84	P98	P112
		P14/92-3294	P22/94-0066		P35/96-0003	P42/97-0042	P51	P59	P72	P85	P99	P113
		P15/93-0599				P43/97-0043	P52	P60	P73	P86	P100	P114
						P44/97-0044		P61	P74	P87	P101	P115
								P62	P75	P88	P102	P116
								P63	P76	P89	P103	P117
								P64	P77	P90	P104	P118
								P65	P78	P91	P105	P119
										P92	P106	P120

FY 00-02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12

PROJECTED OVERHAUL DATES

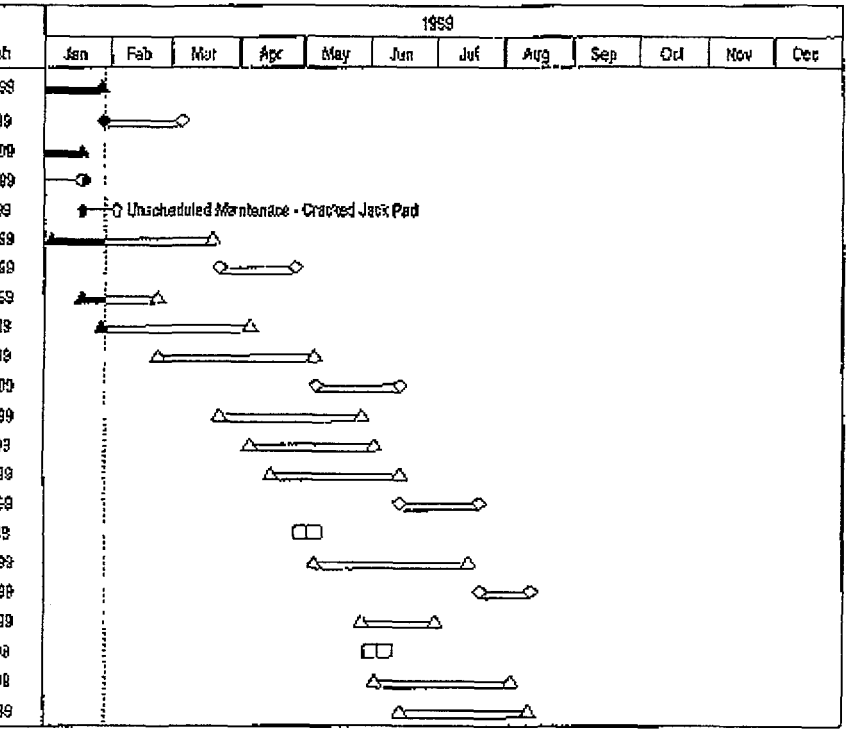
NOTES:

1. Assumes the current 8-year overhaul cycle is retained after completion of the Fleet Leader Program.
2. P1-P5 were flight test aircraft after initial delivery and had extensive gear work done early in their lives. So, their landing gear have been used less than P6-P12.
3. P6-12, as some of the first aircraft, saw high usage early in their lives, so they are all potential targets of the Fleet Leader Program.
4. Delivery dates beyond P48 are estimated groupings based upon Boeing projected delivery dates.

Attachment 2: 1999 GRIP Schedule (as of 26 Jan 99)
(Includes Mods, Paint, ACI & Phase III MLG Work)
Response to DoD IG Report, Project No. 8AL-3002.00

Maintenance & Modifications SUB-IPT

A/C	Site	Project	Start	Finish
P-12	BASC-3	98/G	11/24/98	1/27/99
	LGB	Paint	1/28/99	3/5/99
P-32	BASC-2	DB	12/4/98	1/16/99
		GRIP	12/4/98	1/16/99
		Unsch Mx	1/18/99	2/3/99
P-10	BASC-1	98/99/G	1/4/99	3/19/99
	LGB	Paint	3/22/99	4/26/99
P-34	BASC-2	99	1/18/99	2/22/99
P-17	BASC-3	98/99/G	1/27/99	4/5/99
P-15	BASC-2	99/ACI*	2/22/99	5/5/99
	LGB	Paint	5/7/99	6/14/99
P-18	BASC-1	98/99/G	3/22/99	5/27/99
P-30	BASC-3	98/99	4/5/99	6/2/99
P-13	BASC-4	99	4/15/99	6/14/99
	LGB	Paint	6/14/99	7/20/99
P-19	BASC	Gear	4/29/99	5/5/99
P-14	BASC-2	99/ACI*	5/5/99	7/15/99
	BASC	Paint	7/20/99	8/12/99
P-33	BASC-1	99	5/27/99	6/10/99
P-21	BASC	Gear	5/31/99	6/7/99
P-31	BASC-3	98/99	6/2/99	8/3/99
P-11	BASC-4	99/G	6/14/99	8/11/99



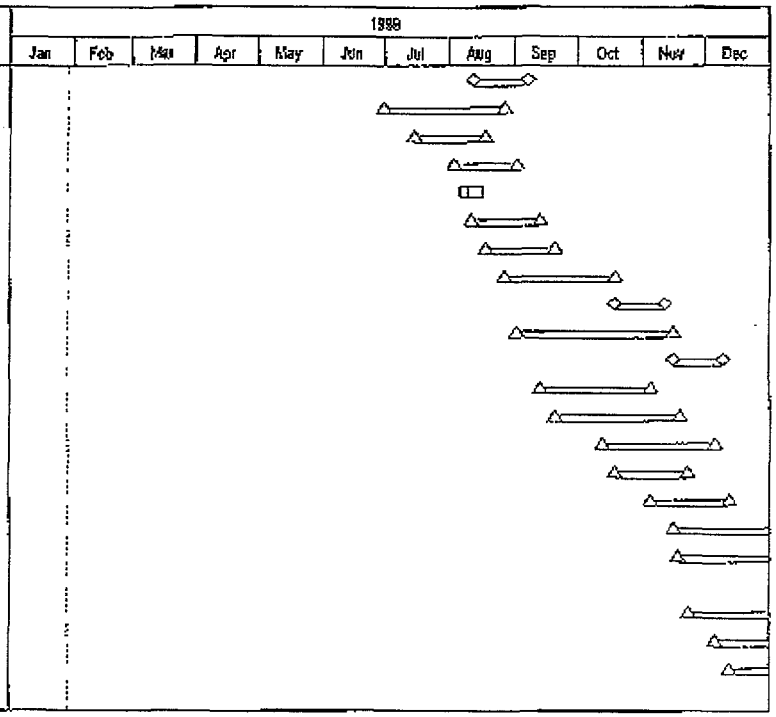
▲ GRIP Work Pkg ◆ Paint ■ Phase III MLG Work

ATTACHMENT 2, Page 1 of 2

Attachment 2: 1999 GRIP Schedule (as of 26 Jan 99)
(Includes Mods, Paint, ACI & Phase III MLG Work)
Response to DoD IG Report, Project No. 8AL-3002.00

Maintenance & Modifications Sub-IPT

A/C	Site	Project	Start	Finish
P-11	BASC	Paint	8/12/99	9/7/99
P-25	BASC-1	98/99	6/30/99	8/27/99
P-33	BASC-2	99	7/15/99	8/18/99
P-38	BASC-3	99	8/8/99	9/2/99
P-1	BASC	Gear	8/9/99	8/13/99
P-39	BASC-4	99	8/11/99	9/13/99
P-37	BASC-2	99	8/18/99	9/20/99
P-22	BASC-1	99/00Upf	8/27/99	10/19/99
	BASC	Paint	10/18/99	11/12/99
P-19	BASC-3	99/99	9/2/99	11/16/99
	BASC	Paint	11/16/99	12/10/99
P-28	BASC-4	99	9/13/99	11/5/99
P-3	BASC-2	98/99/C	9/20/99	11/19/99
P-29	BASC-5	99	10/13/99	12/0/99
P-40	BASC-1	99	10/13/99	11/23/99
P-35	BASC-4	99	11/5/99	12/13/99
P-23	BASC-3	99/G	11/16/99	1/6/00
P-21	BASC-2	99	11/18/99	1/11/00
	BASC	Paint	1/12/00	2/7/00
P-4	BASC-1	99	11/23/99	1/18/00
P-6	BASC-5	99	12/6/99	1/28/00
P-1	BASC-4	99	12/13/99	2/18/00



▲ GRIP Work Pkg ◆ Paint ■ Phase III MLG Work

ATTACHMENT 2, Page 2 of 2

Audit Team Members

The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, produced this report.

Thomas F. Gimble
Charles M. Santoni
Delpha W. Martin
Ramon Garcia