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Investigation Of Charges Concerning Unsatisfactory Management Practices In The C-5 Aircraft Program At Lockheed-Georgia Company

B-162578

Department of Defense

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

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

B-162578

Dear Mr. Chairman:

This is in response to your letter of October 12, 1971, concerning the testimony of Mr. Henry M. Durham before the Subcommittee on Priorities and Economy in Government, Joint Economic Committee. You requested that we investigate the charges and verify the evidence he presented to the Subcommittee.

Although we found that certain of the conditions Mr. Durham described had been present in the early period of Lockheed's performance under the C-5 aircraft contract, we could not determine how extensive those conditions had been or how they compared in severity with similar problems encountered by other manufacturers in producing new aircraft. We also found that Lockheed's management had been aware of the problems and had initiated corrective actions before Mr. Durham's charges were published.

We interviewed officials and reviewed documents at Lockheed-Georgia Company, Marietta, Georgia, and at Chattanooga, Tennessee. We also interviewed Air Force representatives and reviewed documents at the Air Force Plant Representative Office, Marietta, Georgia; the System Program Office, Wright-Patterson Air Force Base, Ohio; and Air Force Headquarters, Washington, D.C.

Our Atlanta Regional Office prepared a staff study on the results of the investigation. As requested, a copy of this staff study was furnished to your office on March 24, 1972. We explained that we did not have an opportunity to review the study in the normal manner within the General Accounting Office and that additional fieldwork was required. During hearings on March 27, 1972, we suggested that attention be given to:

1. Lockheed's awareness of the problems cited by Mr. Durham.

2. Lockheed's experience on the C-5 aircraft, compared with its past experience and with that of other contractors.

3. The awareness of, and the actions taken by, the Air Force.

We also obtained Lockheed and Air Force comments on the Atlanta staff study in letters dated May 26 and July 13, 1972, respectively.

Mr. Durham's charges, our evaluation, and agency and contractor comments are briefly summarized in this letter and are discussed in the appendix. Due to the volume of the comments received from the agency and contractor, the entire comments are not included in this report. Our review of Mr. Durham's charge concerning aerospace ground equipment is underway, and our finding will be reported to you upon completion of our review.

LOCKHEED-GEORGIA COMPANY, MARIETTA, GEORGIA

Mr. Durham charged that there was mismanagement of assembly operations in producing the C-5 aircraft at the Marietta plant. He charged, in part, that (1) assembly records were inaccurate, (2) parts had been removed without authorization, had been scrapped by mistake, and had been unnecessarily procured, (3) inventory controls over titanium fasteners were inadequate, (4) aircraft were moved along the production line in order to collect payments related to the accomplishment of milestones, although the aircraft were incomplete, and (5) the subterfuge to conceal such problems began with the rollout of aircraft 0001. Mr. Durham stated that, as a result, production costs had been increased significantly.

We found that during the period covered by Mr. Durham's charges:

--Aircraft assembly records did not accurately reflect the physical condition of the aircraft.

--Parts had been removed from aircraft without authorization.

--Parts had been erroneously scrapped.

--There were problems relating to controls over disbursement, handling, and usage of titanium fasteners.

We could not, however, determine the extent of these conditions or their impact on the cost or schedule of the C-5 aircraft program.

With respect to the other charges:

--We did not find evidence to indicate that parts had been unnecessarily procured. This is based on a detailed review of a random sample of purchased parts.

--We did not find evidence to indicate that Lockheed maintained the production schedule in order to collect payments related to the accomplishment of milestones. We did note, however, that the Air Force withheld about $3.7 million from milestone payments on the five test aircraft because of shortages and variances from specifications when the aircraft were delivered to the flight-test organization.

--We did not find evidence to indicate that there was subterfuge involved in the rollout ceremony of aircraft 0001.

We visited several aerospace firms to determine whether problems similar to those experienced by Lockheed could normally be expected in producing a new aircraft. We were advised that conditions such as out-of-sequence work and missing parts exist on every new aircraft program. However, it was also pointed out that management emphasis is directed toward insuring that such conditions do not develop into major problems. We were unable to obtain specific detailed information that could be used for comparison.

Lockheed provided data which compared certain factors in its production experience on the C-141 aircraft with those of the C-5 aircraft. We believe the data to be inconclusive because, from the available information, we could not evaluate the production experience on the two programs.

We also found that Lockheed's management was aware of these problems and was directing corrective action, as evidenced by (1) discussions at special meetings held to review the progress of the C-5 aircraft program and (2) numerous Lockheed internal audit reports which were widely disseminated to Lockheed officials.

We found that the Air Force was also aware of some of the conditions cited by Mr. Durham. For the most part, however, the Air Force did not direct the contractor to take specific corrective action because the Air Force, in administering the contract, followed a philosophy of "disengagement." This philosophy required minimal participation by the Air Force in the day-to-day management of the program as prescribed by the total package procurement concept under which the C-5 aircraft was originally purchased.

LOCKHEED-GEORGIA COMPANY
CHATTANOOGA, TENNESSEE

Mr. Durham charged, in part, that (1) there were inadequate controls over tools, raw materials, and miscellaneous small parts, (2) there was unnecessary procurement of material and high-strength nuts and bolts, and (3) there was mishandling of materials. He stated that these conditions and practices had increased the cost of operating the Chattanooga plant.

At Chattanooga, we found that:

--High-strength nuts and bolts had been purchased for plant maintenance when, for some purposes, lower grade materials would have sufficed.

--Substantial quantities of material and miscellaneous small parts had accumulated as a result of canceled orders and transfer of items from another plant.

--Some items which were available at less cost from the Marietta storeroom had been purchased locally.

With respect to the other charges:

--The practice of not providing detailed inventory controls over certain tools was consistent with the practices of others in the industry.

--Raw materials and miscellaneous small parts were purchased and controlled on an individual job order basis in lieu of detailed inventory controls.

Lockheed commented that Chattanooga had a limited procurement function and was authorized to purchase only usage and maintenance materials, along with some items for production. All standard tools, except for such expendable items as cutters, drill bits, and reamers were charged out to employees and employees were required at the time of termination to pay for tools not returned. Lockheed stated that materials for fabricating aircraft parts were basically supplied from Marietta and that materials for aerospace ground equipment were controlled on the basis of individual job requirements.

The Air Force commented that in July 1971, the Air Force Plant Representative visited Lockheed's Chattanooga plant to review operations and to determine whether there was substance to the newspaper reports of Mr. Durham's allegations. By letter dated August 2, 1971, the Air Force advised Lockheed of certain deficiencies in inventory control, discrepancy reports, and housekeeping matters found by Air Force personnel who visited the plant.

We trust that the information discussed above and in the appendix to this letter is responsive to your needs. We shall be pleased to discuss this information with you or members of your staff if you so desire.

Sincerely yours,

Elmer B. Staats

Comptroller General
of the United States

d The Honorable William Proxmire
Chairman, Subcommittee on Priorities and
Economy in Government
Joint Economic Committee
Congress of the United States TNT 708

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ABBREVIATIONS

AGE	aerospace ground equipment
DR	discrepancy report
MSP	miscellaneous small parts
SPO	System Project Office
VSP	valuable small parts

INTRODUCTION AND SCOPE OF REVIEW

Attached to Mr. Durham's prepared statement to the Subcommittee were 23 exhibits containing examples and explanations of his charges. Some of these charges were referred to in more than one exhibit and some were interrelated with other charges. We have summarized Mr. Durham's principal charges, followed by our evaluation, and, when appropriate, contractor and agency comments.

On October 12, 1971, you requested that we investigate the charges and verify the evidence presented to the Subcommittee. Our Atlanta Regional Office staff met with Mr. Durham on several occasions to discuss his charges in greater detail and to obtain additional documentation.

We conducted our review at Lockheed's plants in Marietta, Georgia, and in Chattanooga, Tennessee. We found that, because the charges concerned conditions in 1969 and in early 1970 at Marietta and in late 1970 and in early 1971 at Chattanooga, we could not verify them by observation. However, at Marietta, the staff did obtain copies of most of Mr. Durham's memorandums, Lockheed's internal audit reports, replies from management officials to the internal auditors, and other records, such as minutes of special meetings by management to review the C-5 aircraft program.

The staff interviewed management and engineering personnel at Marietta, including Mr. Durham's immediate supervisors. These Lockheed employees explained plant operations and controls associated with assembly, quality control, inventory, production control, and other procedures, and provided copies of Lockheed's manufacturing procedures.

We observed and photographed physical conditions at the Chattanooga plant and interviewed the plant manager and other personnel, including several former employees. We obtained copies of Mr. Durham's correspondence and other Lockheed records. We also examined the purchase order files and the system for determining whether material was available in Marietta and obtained copies of pertinent procedures.

The staff interviewed officials of the Air Force and the Defense Contract Audit Agency and obtained available records to determine the extent to which they had investigated Mr. Durham's charges or had been aware of the problems cited.

In most instances, we could not determine the cost impact of the problems because of the passage of time and the lack of records, and because, some problems were due to workers who violated Lockheed's policies and did not record such violations.

At your request, we furnished you a copy of the staff study prepared by our Atlanta Regional Office on March 24, 1972, although we had not had an opportunity to review it in the normal manner within the General Accounting Office. In addition, the staff study indicated that certain charges, primarily related to procurement of parts, management of part kits, and design of aerospace ground equipment, were still being reviewed and would be reported later.

During the hearings on March 27, 1972, the Comptroller General suggested that attention be given to:

1. The contractor's awareness of the problems cited by Mr. Durham and the timeliness and effectiveness of the actions taken, including the communication of such actions to Mr. Durham and others in the contractor's organization.

2. The comparison of Lockheed's experience on the C-5 aircraft with its past experience and with that of other major aircraft companies in producing new aircraft systems.

3. The awareness of, and the actions taken by, the Air Force in respect to these matters.

He also suggested that Lockheed and Air Force comments be obtained on the staff study to insure a full and impartial disclosure of the facts.

We obtained copies of the documentation supporting Lockheed's comments and interviewed appropriate Lockheed personnel who prepared the Lockheed response. In many instances, Lockheed, in preparing its response, encountered problems similar to those we encountered in evaluating the charges--lack of documentation and passage of time. When it encountered these problems, Lockheed obtained signed statements from their employees who had been involved in the problem areas or who had been associated with Mr. Durham.

Lockheed also analyzed the production records on selected aircraft and commented on the results. Because of the sheer volume of these records and the special skills required in analyzing aircraft assembly records, we did not verify these data.

We noted that the primary documents Mr. Durham used in compiling his data on missing parts were known as call sheets. Lockheed stated that these call sheets were not official documents and therefore were not retained when the production records on individual aircraft were retired to storage.

We examined Lockheed's controls over requirement determinations, procurement, inventory, and assembly operations to determine if parts which had been lost or damaged would cause immediate reprocurement to obtain replacement parts. We also examined a random sample of 30 parts in each of three inventory accounts to determine if Lockheed's controls were effective.

We visited several aerospace firms to determine whether problems similar to those experienced by Lockheed could normally be expected in producing a new aircraft. However, we were unable to obtain detailed information that could be used for comparison.

We did obtain information on the total production manhours expended at Chattanooga and found that, at the peak, Chattanooga had accounted for only 3 percent of total program effort by the Lockheed-Georgia Company.

APPENDIX I

We reviewed correspondence to determine the extent to which the records reflected the Air Force awareness of the problems and interviewed Air Force officials and reviewed correspondence related to delinquency notices to determine the action taken by the Air Force.

CHARGES PERTAINING TO

MARIETTA, GEORGIA

UNNECESSARY PROCUREMENT OF PARTS

> Mr. Durham charged that unecessary procurement occurred because a worker would damage a part and, to obtain a replacement, would prepare and submit a discrepancy report (DR). To obtain the replacement part quickly, however, a lost part authorization (LPA) would also be prepared and submitted. Parts would therefore be delivered and replaced through the system using the LPA and, when the DR went through the system, it would replace the same part again. By these means, thousands of parts were double ordered and double procured at great cost.

We found, on the basis of a detailed review of a random sample of purchased parts from three separate inventory accounts, that parts in these accounts had not been unnecessarily procured as a result of production personnel submitting two separate documents, a DR and an LPA, as duplicate authority to replace damaged parts.

We selected three types of materials, as classified by Lockheed, from the eight types which are shown on the C-5 aircraft bill of material. We considered that the types of materials selected, which generally had a unit cost of less than $300, were related to Mr. Durham's charge and were most susceptible to being lost and damaged.

On a random basis, we selected 30 part numbers for examination from each of the three types of material classifications. The total number of part numbers in these three classifications were about 5,800. We then examined all issues to production from January 1969 through June 1972 which were for the replacement of parts that had been lost or damaged. We did not find any instances where two separate authorizations had been used to obtain a replacement part for the same need.

We also noted that submitting an LPA and a DR on the same part to obtain a replacement violates Lockheed's policy and is so stated on the LPA form.

Lockheed comments

Lockheed stated that additional procurement of parts does not automatically occur even though, for some reason, there are multiple issues of parts to the requesting organizations or even though some parts are temporarily misplaced, because Lockheed management has established a comprehensive system of checks and balances and approval requirements over the ordering of any additional parts. If, on the basis of the best information available at the time, some additional parts are ordered, other checks and balances are provided to detect parts overages and to reduce the quantities of parts ordered.

INACCURATE ASSEMBLY RECORDS

> Mr. Durham charged that numerous parts shown to be installed according to aircraft assembly records actually had not been installed and that, in other cases, parts shown by these records as requiring installation already had been installed.

We found that, during the period covered by Mr. Durham's charges, aircraft assembly records in many instances did not accurately reflect the condition of the aircraft received at the flightline from assembly.

The records indicated that early in 1969 Lockheed officials began holding a series of meetings to review the C-5 aircraft program. They considered the corrective action needed to resolve the problems of inaccurate assembly records and out-of-sequence work. For example, as a result of a special meeting on October 25, 1969, the board chairman, Lockheed Aircraft Corporation, directed that a data control center be established at the flightline to coordinate and reconcile aircraft assembly records in order to establish accurate parts requirements.

On December 31, 1969, Lockheed's auditors issued an interim report which indicated that an unusually large number of parts had been missing from aircraft delivered to the flightline and that procedures had not required reconciling assembly records or verifying that work had been performed. Lockheed officials replied that (1) because the assembly line had not been stabilized, it would not be practical to implement corrective action until aircraft 0014 reached the flightline, (2) additional personnel would be assigned to take corrective action, and (3) records would be audited more frequently.

A subsequent audit of aircraft 0013 was undertaken at Lockheed management's request to determine the extent of and cause of the missing parts problem. The report stated that:

--Parts were missing from the airplane but had been recorded as installed. An inspector had verified that some had been installed.

--Parts were missing from some feeder plant assemblies and subcontractor assemblies but had not been reported as missing on assembly records.

--Parts reported as missing had been installed.

The audit report stated also that the quality, schedule, and cost of the C-5 aircraft assembly operations had been affected significantly by inadequate administrative controls over assembly work.

At a special meeting on February 21, 1970, the Director of Manufacturing Control reported the quantity of flightline parts requirements to management officials.

The data showed the following.

Flightline Parts Requirements

Aircraft number	Inconsistencies (note a)	Damaged or unsuitable parts	Known shortages and parts to be installed	Total
9	4,000	1,500	4,943	10,443
10	3,750	1,300	4,692	9,742
11	3,300	1,750	3,915	8,965
12	3,000	1,300	2,882	7,182
13	1,750	1,000	2,414	5,164
14	1,300	500	2,843	4,643
15	650	450	875	1,975
16	600	400	875	1,875
Total	18,350	8,200	23,439	49,989

[a]Inconsistencies represent differences between the assembly records and the physical condition of the aircraft when they were reconciled at the flightline.

A Lockheed internal audit report of aircraft 0019 indicated that the conditions found previously still existed to some extent but that progress had been made since the last audit. The report also indicated that there was a downward trend in the variances between the physical status of the aircraft and the status of the production/inspection records.

The Lockheed internal audit staff planned a followup examination on aircraft 0025. However, because its examination on aircraft 0019 indicated that corrective actions were having the desired effect, this followup audit was postponed. Lockheed internal auditors subsequently selected aircraft 0045 for examination and, in a report dated May 25, 1971, stated that the corrective actions had been fully effective.

Lockheed comments

Lockheed stated that, although there were some problems at the start of the program, Lockheed management had known of the problems and had initiated corrective action before and during the period covered by Mr. Durham's allegations. Lockheed also stated that its procedures were designed to provide good parts control and that, when errors were made, it generally resulted from misinterpretations of record data or from deviations from established procedures by individuals.

SUBTERFUGE IN ROLLOUT OF AIRCRAFT 0001

Mr. Durham charged that the subterfuge began with the rollout of aircraft 0001 with slave landing gears, false landing edges, and a dummy visor (nose of aircraft).

We did not find evidence of subterfuge in the rollout ceremony conducted on March 2, 1968.

The Air Force issued a press release on February 21, 1968, that the C-5 aircraft rollout would be conducted on March 2, 1968. The release also indicated that the C-5 aircraft was scheduled to fly for the first time in June 1968. This would indicate that the aircraft was not considered fully operational at the time of rollout.

We noted that Lockheed, by letter dated February 26, 1968, had notified the Air Force of some 16 item shortages on aircraft 0001, including the main landing gear side braces and slot doors, as well as the wing leading edges and visor. The Administrative Contracting Officer subsequently withheld $412,000 to cover completion of these open items of work and installation of required parts. This amount was in addition to $1,683,420 withheld by the Air Force for refurbishing the aircraft before final delivery.

Lockheed comments

Lockheed denied that there was any subterfuge at the time of rollout. Lockheed stated that aircraft 0001 was a flight-test aircraft and was delivered to the flightline engineering flight-test organization on February 24, 1968, 1 week before the rollout ceremony. At that time and at the time of rollout, the structural configuration of the aircraft was basically complete, with only a minor number of parts not installed on the aircraft and only a few systems not completely functional. Lockheed also stated that the Air Force was formally notified on February 26, 1968, of all significant shortages, along with anticipated dates for installing flyable replacements.

Air Force comments

According to the Air Force, there was no subterfuge with respect to utilizing nonfunctional components on aircraft 0001 at rollout. The Air Force stated that it was aware of the aircraft's condition and of Lockheed's plan to install flyable replacements after rollout. It concluded that using nonflyable components was not in itself a serious problem because it was never intended for the purposes of the rollout ceremony that the aircraft be airworthy.

FAILURE TO CONTROL VALUABLE SMALL PARTS

Mr. Durham charged that Lockheed was facing a $30 million cost overrun resulting from failure to control valuable small parts (VSP).

We found that Lockheed experienced problems related to controls over disbursing, handling, and using VSP. VSP consists of titanium fasteners (generally threaded bolts or screws) ranging in size from less than 1/2 inch to several inches long. The average cost of an individual fastener is about 44 cents each, although the cost ranges from about 16 cents to more than $30 each.

We could not find, nor did Mr. Durham furnish us, a report showing that, as of May 1, 1970, Lockheed had faced a cost overrun of about $30 million due to overprocurement of VSP resulting from inadequate controls. Lockheed agreed that forecasts of VSP cost overruns as high as $30 million had been made and that a Lockheed industrial engineer had mentioned this figure to Mr. Durham. On the basis of the latest available VSP cost projection, the overrun will be about $7 million as of January 1972.

A report dated September 12, 1969, prepared by Lockheed's internal auditors reported that adequate controls over disbursing, handling, and using VSP in assembly had not been provided. As a result, large excess quantities of VSP were possessed by assembly personnel, mishandling of VSP was widespread, and usage appeared to be too high. These conditions were explained, in part, by the large number of new assembly workers and the similarity of VSP to miscellaneous small parts (MSP), which historically had been loosely controlled because of low value.

The audit report also recognized that management had been aware of the problems of controlling VSP in the assembly area and that it had initiated action more than 1 year before to provide better controls. The report recommended that the implementation of some controls should be accelerated and that additional controls should be developed.

Subsequently, additional controls over requirements and physical handling of VSP were implemented in the assembly

area. These new controls included trays to provide assembly workers with an improved method of storing and maintaining segregation of VSP issued to them, stocking of VSP in a crib (stockroom) with an attendant responsible for issuing VSP to assembly workers, and having the attendant sort and return to stock those VSPs which had been mixed together.

A physical inventory of VSP in the cribs was taken and, thereafter, all receipts and issuances were recorded. This information was fed weekly into a computer, and the output provided both requirements and inventory data.

Lockheed adopted other measures, including periodic inspections of workers' tool boxes and working areas, a display board emphasizing the high cost of VSP, and a 14-minute film shown to production workers to improve VSP handling practices.

At the special request of the Assistant Director of Manufacturing Control, Lockheed's internal auditors again reviewed the controls over VSP. In their report dated December 31, 1970, they stated that generally adequate physical controls over stocking and using VSP had been provided at the Marietta plant and that these controls had been effective. With regard to records of stock on hand in the VSP cribs, however, the auditors reported that fully adequate controls had not been provided and that the balances reflected by the records were not reasonably accurate. As a result of this audit, additional controls were imposed to improve the records' accuracy.

In a followup review performed in the spring of 1971, the internal auditors reported that the controls over VSP which had previously been established were still largely effective. They reported also that the overall usage of VSP appeared to be at a reasonable level.

In addition, Lockheed had awarded a purchase order to a subcontractor to clean and sort VSP which had been mixed with scrap and other materials in the assembly area. From July 1968 through January 1972, Lockheed paid about $906,000 for these services and recovered about 43,667 pounds of VSP; 1,334 pounds of miscellaneous parts; and 6,047 pounds of scrap. Although Lockheed did not record the value of the

material returned, it estimated that more than $6 million of VSP had been sorted and returned by the subcontractor.

Lockheed comments

Lockheed stated that it began early in the C-5 aircraft program to exercise controls over VSP and to improve these controls as conditions indicated that improvements were needed.

In the case of high-usage small parts such as VSP, Lockheed stated that certain costs over basic requirements were unavoidable, i.e., costs associated with engineering design changes, usage in excess of basic requirements, and some surplus material. Lockheed also stated that it had experienced problems in establishing physical controls over VSP but that these problems had been largely resolved before significant losses occurred.

UNWARRANTED DELAY IN REPLACING DAMAGED PARTS

Mr. Durham charged that, although parts had been damaged during earlier production stages, proper replacement action had not been taken and that this caused numerous parts to be replaced at the flightline.

We found that numerous discrepancy reports on defective or damaged parts had been prepared at the flightline and that some of these discrepancies were attributable to an earlier production stage, other Lockheed organizations, vendors, or Government-furnished property. We could not determine, however, the reasons these defective parts had not been detected at an earlier stage in the production program.

Records made available to us showed that there had been 2,481 discrepancy reports (DRs) written at the flightline on aircraft 0009, 0010, 0011, 0012, and 0013. Of these 2,481 DRs, 879 were determined to be the responsibility of the division which releases the aircraft to the flightline and 473 were due to vendors, Government-furnished property, and other Lockheed departments. The remaining 1,129 were charged to the flightline.

Lockheed comments

Lockheed stated that both the Lockheed and the Air Force quality assurance programs were such that, although a damaged part might occasionally be overlooked during manufacturing, this damaged part certainly should be disclosed before delivery.

HIGHER COSTS AT SUBASSEMBLY PLANTS

Mr. Durham charged that units assembled at subassembly plants could have been assembled more cheaply at Marietta.

We found that it was more economical to assemble units at a subassembly plant than at the main plant at Marietta.

A 1967 General Accounting Office review of the operations of subassembly plants associated primarily with C-130 and C-141 aircraft components showed that, after learning was substantially complete, subassembly plant costs were less than costs at the main plant because cheaper labor costs had more than offset additional transportation and other costs.

Lockheed established six subassembly plants in depressed labor areas to supplement assembly operations at the main plant. Most of these plants supported the C-5 aircraft program. The plants were located at Clarksburg, West Virginia; Charleston, South Carolina; Logan, Ohio; Shelbyville, Tennessee; Uniontown, Pennsylvania; and Martinsburg, West Virginia. The Shelbyville, Logan, Uniontown, and Martinsburg plants have been closed.

Lockheed comments

Lockheed did not comment on this charge.

PARTS ERRONEOUSLY SCRAPPED

Mr. Durham charged that purchased parts which could have been reworked had been scrapped because of erroneous disposition instructions.

Although we found evidence that some parts had been scrapped because of erroneous disposition instructions, we could not determine the number or the value of these scrapped items.

On April 14, 1970, Lockheed planning officials reported to management that an investigation had shown that expensive salvageable parts and assemblies had been discarded erroneously for various reasons. The officials recommended corrective action which would clarify dispositon instructions by requiring appropriate personnel to attach proper, color-coded tags to parts that had been removed to indicate their disposition.

A Lockheed interoffice memorandum dated April 29, 1970, stated that quantities of purchased and subcontractor parts for C-5 aircraft had been found improperly tagged in scrap gondolas which supposedly contained only scrap materials which could not be reworked. The memorandum also advised that the Lockheed production control department would establish a screening crib to insure proper tagging and the flightline activities had been requested to send scrap gondolas to the crib for review.

Lockheed comments

Lockheed indicated that some reworkable purchased parts were scrapped because relatively inexperienced employees failed to comply with published procedures. Lockheed said that it was not possible once they were scrapped to determine the exact number of reworkable purchased parts which were scrapped.

PROBLEMS WITH KIT INSTALLATION

Mr. Durham charged that, because of poor planning, parts were assembled into kits and shipped to the field at great expense but were not needed or the kits were incomplete and could not be fully utilized. He also charged that control over kits and parts in the field was ineffective.

Palmdale, California

We found that about 90 modification kits had been returned to Marietta from Palmdale. We were advised that the kits were returned because the aircraft were not available long enough for the kits to be installed.

An interdepartmental communication dated April 28, 1970, from the C-5 aircraft Wing Modification Program Manager at Palmdale to Mr. Durham, stated that a considerable number of kits which had been shipped to Palmdale for aircraft 0001, 0002, and 0009 were not part of the work originally planned and, therefore, were not installed. This communication also stated that the kits were being returned for restocking and distribution for future updating on these aircraft.

Lockheed comments

Lockheed stated that a relatively small number of kits had been returned chiefly because the aircraft had not been available for the length of time as had been originally scheduled and because there had been some later engineering changes.

Eglin Air Force Base, Florida

Records made available to us indicate that personnel installing the kits at Eglin Air Force Base encountered only minor problems with the kits. Aircraft 0005 was a climatic test aircraft tested in the Climatic Test Laboratory at Eglin Air Force Base, Florida, and scheduled to go to Panama for tropical testing in November 1969. Lockheed and Air Force officials decided that, instead of returning the aircraft to Marietta for installing the modification kits before departure for Panama, the aircraft would remain at Eglin Air Force Base and the kits would be installed there. Lockheed was to assist Air Force personnel in the modification program.

In a November 3, 1969, memorandum to his immediate supervisor, Mr. Durham stated that the manager of the Lockheed flight-test control department, who visited Eglin Air Force Base on October 31, 1969, found that absolutely no control was being exerted over kits when or after they were received, that parts lists were incomplete, and that parts were scattered.

A week later, a subordinate of Mr. Durham's reported that the kit installation was complete. He suggested that, in the future, tighter controls be exercised over similar modification work, more specifically, that:

1. When kits are shipped, the receiver should be advised of the kit item numbers being shipped and the shipper number.

2. When kits are received, they should be checked for completeness.

3. When new parts are installed, all items removed from the aircraft should be tagged.

There was no mention of problems being encountered by the personnel who were installing the kits.

Another employee submitted a report on November 11, 1969, to his supervisor concerning a visit to Eglin Air Force Base when the kits were being installed. On arrival he was made aware of deficiencies in some kits because miscellaneous small parts, tools, chemicals, paints, sealers, and similar items had been omitted from the kits.

In discussing this matter with the Director of Manufacturing Control, we were advised that, initially, planning papers were incomplete because field installation was not contemplated. Therefore, kits did not include miscellaneous small parts, fasteners, and other items which were available at the main plant but not at field installations. He said that these problems had been corrected.

Lockheed comments

Lockheed stated that Mr. Durham chose to exaggerate the extent and impact of some minor problems which occurred in incorporating a number of updating kits on aircraft 0005 at Eglin Air Force Base after the climatic test program was completed.

UNAUTHORIZED REMOVAL OF PARTS

Mr. Durham charged that there were thousands of parts removed from aircraft without proper authorization.

We found that, during assembly, some parts were removed from aircraft without proper authorization. We could not determine the extent of these removals because such actions would not have been recorded, because they violated Lockheed's production control procedures. We noted, however, that internal audit reports and interoffice memorandums showed that tests of selected items had indicated the following information.

Date of report	Aircraft serial numbers	Number of missing parts investigated	Number of parts improperly removed
Oct. 13, 1969	0009 and 0010	160	13
Feb. 16, 1970	0013	124	12
May 28, 1970	0019	63	31

Another Lockheed interoffice memorandum of April 1, 1970, stated that an audit to determine if parts had been improperly removed from main landing gear assemblies for aircraft 0033 through 0036 showed that 26 parts had been removed. Although certain removals were authorized because of parts shortages or to facilitate completion of aircraft further along in the assembly process, unauthorized removals were contrary to Lockheed's production control procedures.

Lockheed comments

Lockheed stated that, when the first C-5 aircraft moved to the flight line area in March 1969, it became apparent to Lockheed management that some unauthorized parts removals were being made by employees. Accordingly, in April and August 1969, memorandums were issued regarding the need to follow governing procedures. Regarding the April 1, 1970, memorandum, Lockheed stated that there was no indication of whether authorizing paperwork was filed.

INCOMPLETE UNITS FROM SUBASSEMBLY PLANTS

Mr. Durham charged that incomplete units had been shipped from subassembly plants to Marietta because of poor planning and workmanship.

We found that some units shipped from subassembly plants were received at Marietta with parts missing or other discrepancies. We could not, however, determine the extent of these deficiencies.

Lockheed comments

Lockheed informed us that some problems occurred initially because many design changes required parts to be scheduled for replacement after assemblies were received at Marietta. Because of parts shortages, decisions were also made at times to ship some assemblies to Marietta with the parts not installed. Lockheed stated that the status of the parts and assemblies were fully documented in the appropriate paperwork. In addition, early in the program, management took various actions to promptly detect and correct startup problems with assemblies manufactured at subassembly plants.

OVERDESIGN OF AEROSPACE GROUND EQUIPMENT

Mr. Durham charged that aerospace ground equipment (AGE) for the C-5 aircraft was overdesigned and overpriced.

We have initiated a review of AGE procured for the C-5 aircraft and are examining the design criteria and characteristics and the cost incurred by the Air Force in procuring this equipment. We are also comparing AGE Lockheed provided for the C-5 aircraft with similar equipment provided for other aircraft systems.

Lockheed comments

Lockheed stated that a review of the applicable records and discussions with personnel disclosed that Lockheed management had identified 2,847 different items of AGE necessary to support the C-5 aircraft. Furthermore, 1,250 (44 percent) of those items were already available in the Air Force inventory; 155 (6 percent) were standard commercial items procured in the open market; 1,174 (41 percent) were obtained from subcontractors; and 268 items (9 percent) were manufactured by Lockheed. In accordance with competitive bid procedures, the subcontractors were to design and supply the AGE necessary to support the equipment they contracted to manufacture.

Further, Lockheed stated that items which it had manufactured, together with those items subcontractors had supplied, had been produced in accordance with (1) Department of Defense material, design, and process specifications governing support equipment specified in the C-5 aircraft contract and (2) engineering design which the Air Force had previously reviewed, appraised, and approved, as required by the C-5 aircraft contract.

CHARGES PERTAINING TO

CHATTANOOGA, TENNESSEE

UNNECESSARY PROCUREMENT OF MATERIAL

Mr. Durham charged that Chattanooga purchased material from vendors when the material was available from the storeroom at Marietta.

Some items purchased from vendors were available at less cost from the Marietta stores. Our analysis of 20 examples furnished by Mr. Durham showed that the vendors had charged $1,516, which was more than three times the cost that would have been incurred had the items been obtained from the storeroom at Marietta. We examined other items purchased locally and found that some of these items could also have been obtained at lower costs through Marietta. Our analysis of these purchases, however, did not include costs which might have been incurred at the Marietta plant for cutting, preparing, packaging, and transporting the items to Chattanooga.

We also found that minimum order charges were incurred on some items that were available in the Marietta storeroom. During a 3-month period in 1971, 217, or 44 percent, of 489 orders for material were procured at the vendor's minimum order charge of $5 ($4 prior to April 3, 1971), which could have been avoided or minimized by combining the orders. We noted instances in which the same materials having the same dimensions had been ordered separately on the same day, sometimes on consecutively numbered forms.

Lockheed comments

Lockheed stated that over the years the activity at Chattanooga had consisted of approximately 70 percent fabrication of aircraft parts and 30 percent manufacture of AGE. Marietta usually furnished the materials required for producing aircraft parts; materials for AGE were furnished by Marietta when they were available or were purchased by Marietta or Chattanooga procurement organizations. The majority of Chattanooga's procurements were made under blanket purchase orders issued by the Marietta procurement

organization for materials used in manufacturing AGE.

Lockheed also advised us that Marietta's and Chattanooga's procedures for determining and providing material for producing AGE required that the material needed be screened against the inventory at Marietta and the surplus inventory at Chattanooga. These procedures should have precluded unnecessary procurement by Chattanooga. Lockheed recognized that Marietta and Chattanooga personnel could have made clerical errors in this screening function; Lockheed believes that materials procured by Chattanooga that were available in Marietta were those types of errors and were isolated cases.

As for the minimum order charge, Lockheed stated that it ordered parts separately to facilitate matching material and related paperwork. Although a dollar value cannot be placed on this practice, Lockheed believed it saved money by facilitating the material receiving process and by affording better control over the material and the related paperwork.

APPENDIX I

LACK OF CONTROLS OVER TOOLS

> Mr. Durham charged that there was no checkout control system or any effective controls over standard tools. As an example, he stated he had found rusty drills in an old water-soaked cabinet discarded in the backyard.

Lockheed did not control individual standard tools--such as drill bits, reamers, and cutters--but provided them to employees as they were needed. We found that the procedures used by Lockheed to handle small tools at Chattanooga were consistent with the practices at two other aerospace firms. In addition, it is generally impractical to provide a detailed inventory control system for items that are small and inexpensive.

Some standard tools, such as kit-type tools, power tools, and certain hand tools, were controlled. In addition, Lockheed required all employees upon termination of employment to pay for all lost tools charged to them. The cost to provide and maintain such controls over small tools, we were told, would be greater than the cost of the lost tools.

Lockheed provided us with a signed statement from the supervisor of tool cribs about drill bits found rusting in the plant yard. He stated that he had found only a shoe box partly full of such drills. Two former employees told us they had observed substantially more such drill bits and cutters. These statements could not be reconciled or verified because these tools were considered expendable and therefore accountable records were not maintained.

Lockheed comments

Lockheed stated that standard tools, such as kit-type tools, power tools, and certain hand tools, were stocked in cribs. These standard tools were charged out to employees and were accounted for by control records. Furthermore, procedures required that all employees, upon termination of employment, pay for all lost tools charged to them. Management decided in 1966 not to control certain other standard tools such as drill bits, reamers, cutters, etc. This decision was evaluated, but not changed, in 1970.

UNNECESSARY DISRUPTION OF WORKLOAD

Mr. Durham charged that proper planning could have prevented a layoff and a subsequent rehire--a practice which added to the costs of the Chattanooga operations.

We could not determine whether the layoff and the subsequent rehiring of employees could have been avoided. About 70 employees were laid off on March 12, 1971, and 24 were subsequently rehired on April 16, 1971, to perform work transferred from the Marietta plant. The manager of the Manufacturing Services Department advised us that the employees were laid off due to a lack of work. The plant manager stated that, before the layoff, he did not know that work would be transferred from the Marietta plant.

The discharged employees did not receive severance pay; therefore, any additional expense would have been related to the administrative work involved in laying off and rehiring the employees.

Lockheed comments

Lockheed stated that the administrative effort involved in the layoff and rehire was performed by the employees within the responsible organization and no overtime was worked.

LACK OF INVENTORY CONTROLS OVER RAW MATERIALS

Mr. Durham charged that there were no inventory controls over such materials as sheet metal, aluminum, and bar steel at Chattanooga.

Chattanooga did not maintain detailed inventory controls over such materials as sheet metal, aluminum, and bar steel because these materials were purchased for normal production on the basis of engineering requirements and were charged directly to a shop order when received. The plant did not maintain a ready supply of all materials needed for production because of the small quantities of the various types of aerospace ground equipment manufactured at Chattanooga. However, some raw material had been accumulated as a result of such factors as canceled orders and materials left over from completed orders.

The procedures for procuring materials used in manufacturing AGE provided for the release of individual job orders that listed the material requirement for that particular job. The material requirements were to be screened against Marietta inventories and Chattanooga surplus inventories. If materials were not available, Chattanooga procured them. This system was established at Chattanooga so that materials were ordered for each job order and were charged to the job when received rather than being placed in inventory and being charged to the job when used.

We did note that, in a September 1970 memorandum to employees, the Chattanooga manager stated that the accountability and handling of material were out of control. He stated also that plans were underway to install control systems. In addition, he described certain procedures to control and account for material released to the shops. The Plant Manager approved an interoffice memorandum written by Mr. Durham in April 1971 stating that (1) all raw stock and material have been located on specific racks inside and outside the plant and (2) the material locations have been indexed and catalogued.

Lockheed comments

Lockheed stated that it was Chattanooga's policy to order material requirements by job for manufacturing AGE, rather than to maintain a controlled parts and material inventory for manufacturing aircraft, as is done in Marietta.

In regard to the September 1970 memorandum which stated that the accountability and handling of material was out of control, Lockheed pointed out that this communication was written by Mr. Durham for the Plant Manager's signature.

LACK OF INVENTORY CONTROLS OVER MISCELLANEOUS SMALL PARTS

Mr. Durham charged that the MSP inventory at Chattanooga had not been controlled and was excessive.

Chattanooga did not maintain inventory controls over MSP because it was purchased to fill the requirements of specific production orders. MSP consists of bolts, nuts, screws, washers, and similar items costing from less than 1 cent each to a few dollars each. Lockheed advised us that, due to the nature of MSP (i.e. high usage, low cost, and small size) and the fact that MSP usage normally exceeded requirements, it was standard practice to procure more parts than required. In addition, it is generally impractical to provide a detailed inventory control system for items that are small and inexpensive.

An Air Force Plant Representative report of August 2, 1971, indicated that only 813 of the 4,894 MSP were needed for the current assembly orders. The report stated that, when orders were canceled, these parts were neither removed nor sent back to Marietta, but were held in stock for possible future orders.

Lockheed comments

Lockheed stated that it was not economically feasible to maintain MSP inventory levels on the basis of usage because of the many different requirements of the orders for small quantities of AGE. Lockheed believes that the final cost under the system of handling MSP at Chattanooga was no greater, and possibly was smaller, than it would have been to spend additional funds to control the low-cost parts as closely as Mr. Durham recommended.

Regarding the Air Force Plant Representative's report, Lockheed stated that the Plant Manager recognized in April 1970 the possibility of excess MSP. It also stated that the Plant Manager proposed, at that time, that MSP be screened and excess items usable at Marietta be transferred. However, Lockheed indicated this proposed screening was not accomplished until several months after Mr. Durham's employment.

UNNECESSARY PROCUREMENT OF HIGH-STRENGTH NUTS AND BOLTS

Mr. Durham charged that Chattanooga had purchased high-strength nuts and bolts for plant maintenance purposes when lower grade items could have been purchased at lower costs. He explained that the salesman who sold the nuts and bolts would supply whatever he thought was needed and, when this salesman changed companies, he continued selling the items to Chattanooga.

Lockheed purchased high-strength nuts and bolts for ordinary plant maintenance purposes when, for some purposes, lower grade material would have been satisfactory. These purchases were made from a salesman who, for a period of time, represented several competing firms. The salesman was fired in July 1970 by one of the firms when this practice became known. Chattanooga began purchasing nuts and bolts from another vendor in 1971.

The employee in charge of maintenance and general plant service told us that, although he did not have a price list, he knew that the higher strength items were more expensive and that he was responsible for ordering whatever was necessary. He stated also that, in addition to use for general maintenance repairs, some high-strength items were used in a heat treating process and lasted much longer than ordinary lower strength bolts. Some high-strength screws also were used to repair machinery.

Lockheed comments

Lockheed stated that the employee in charge of maintenance operations at Chattanooga explained that the salesman would check the bins, straighten up the bolts and nuts, and separate them if they were mixed, and then the salesman and the employee would determine what was needed. Lockheed also stated that the employee approved each order.

Lockheed stated that it purchased the high-tensile and plated bolts for maintenance purposes because they were safer and they lasted longer.

Lockheed also stated that its investigation disclosed that this salesman, while working for one company, had established two other companies and was representing all three during 1970. He left the first company in July 1970. The investigation also disclosed that prices charged by the two companies which the salesman established were, for the most part, equal to or less than the prices charged by the company he originally represented.

MISHANDLING MATERIAL

> Mr. Durham charged that old scrapped material, new material, old rusty pipes, maintenance equipment, rubber goods, dirt, wood, trash, and other debris were all heaped together. Expensive castings and forgings were piled in old, rusty, water-filled barrels or were buried in the muck.

Although there was apparently a large accumulation of equipment and material in the plant yard at Chattanooga during 1970, at the time we visited the plant in December 1971 we found the plant yard was in reasonably good condition with most material properly stored.

We were advised by Lockheed officials that a large amount of material and equipment had been accumulated in the yard at Chattanooga. Lockheed further advised that this was a temporary condition caused by (1) the cancellation of Air Force orders and (2) the movement of tooling and material from Lockheed Industrial Products to the Chattanooga plant in addition to the normal accumulation of scrap from the production process. This accumulation was sorted, catalogued, and much of it sold.

Lockheed's records of scrap sales indicate that about 603,000 pounds of material, equipment, and other items were sold as scrap for about $37,000 from June 1, 1970, through July 4, 1971. Other items valued at about $77,000 were donated to the Tennessee Department of Health, Education, and Welfare.

Lockheed's records also indicated that these sales included the 42-1/2 tons of scrap cited by Mr. Durham. However, according to Lockheed officials, there were no records available to describe the material sold. As stated in the staff study, these officials told us that it included unidentifiable raw materials, tools, and production scrap. We subsequently determined that a large fixture and a monorail were included. Although the original cost of these items could not be determined, the sale was made at competitively established rates.

The Manufacturing Services Department manager explained that some titanium had been scrapped because it was excess due to engineering changes and because its metallic contents could not be determined.

Lockheed comments

Lockheed stated that there were some inexpensive AGE castings for which no requirements existed stored outside in the drums in which they had been received from Marietta. The castings were rusty, as are many castings when received.

Lockheed stated that in early 1970 plans were underway to make certain plant rearrangements and to improve housekeeping. In a communication to the Plant Manager dated April 14, 1970, the Manager of Manufacturing Services established dates for completing the cleanup of various sections of the facility and stated that the material stored on the exterior grounds would be rearranged and put in order. On August 12, 1970, just prior to Mr. Durham's employment at Chattanooga, the Plant Manager's activity report stated that "The back-yard has been improved considerably and more time will be spent here as time allows."

GENERAL CHARGES

PROBLEMS PERMITTED TO EXIST BY THE AIR FORCE

Mr. Durham charged that Air Force personnel were negligent in that they allowed unsatisfactory conditions to prevail.

Air Force representatives were aware of, and reported to higher headquarters, some of the problems cited by Mr. Durham. However, the Lockheed contract was awarded under a total package procurement concept which, according to the Air Force officials, restricted the Air Force's participation in managing the program and in decisionmaking. The Air Force, therefore, did not believe it could require Lockheed to take specific corrective actions.

The Air Force Plant Representative Office at Marietta prepared a production progress report for October 1968 which discussed specific problems with the late delivery of items needed for assembly operations. The report also disclosed that there was a shortage of titanium fasteners due to lead-time requirements and greater usage than anticipated. The report also cited that Lockheed encountered quality control problems.

In a July 24, 1969, report to the Secretary of the Air Force, the Assistant Secretary of the Air Force (Installation and Logistics) stated that one of the major manufacturing problems on the C-5 aircraft program was titanium fasteners. The report also stated that titanium fasteners, which were introduced to reduce weight, had caused a manufacturing problem because they required close tolerances of component parts and greater skills in assembly operations.

In addition, the Air Force Plant Representative Office and the Defense Contract Audit Agency's office at Lockheed were on the distribution list to receive copies of Lockheed's internal audit reports. Some of these reports related to the specific areas cited by Mr. Durham.

The documents cited indicate that the Air Force was aware of some of the problems encountered by Lockheed. However, in most cases, the Air Force did not provide us with

documentation indicating its awareness of the problems and the effects these problems had on the program.

Air Force comments

The Air Force stated that the C-5 Aircraft System Program Office (SPO) knew many of the problems cited before Mr. Durham's disclosure. In November 1968, the Air Force Plant Representative Office issued a notice to SPO which reported potential delinquencies on aircraft 0004 through 0012. This document cited shortages of fabricated parts, feeder plant assemblies, and subcontracted parts, and late deliveries of wing leading edge panels, air pressure doors, and visor doors.

The Air Force also stated that the Air Force Plant Representative visited Lockheed's Chattanooga plant in July 1971 to review operations and to determine whether there was substance to the newspaper reports of Mr. Durham's allegations. The Air Force provided the results of its review to the President, Lockheed-Georgia Company, in a letter dated August 2, 1971.

The Air Force stated further that there was no question but that there were missing parts and parts shortages; that out-of-sequence work did occur; that there were cases of poor housekeeping and wasteful practices by employees of Lockheed, both at the Lockheed-Georgia Company and at Chattanooga. However, it was difficult to assess the degree to which these situations existed and their real effect on the program. The Air Force went on to say that, although the total-package procurement concept in use at that time limited visibility of the total contractor operation, it was aware of the problems, as evidenced by the large amount of out-of-sequence work, overtime, and behind schedule conditions.

According to the Air Force, specific actions were taken to require a detailed review of out-of-sequence work and of the status of work performed and these actions, along with action undertaken separately by the company, were effective. In addition, out-of-sequence work, which had been a major cause of parts control problems, has been under control since before June 1971, when a special management

review of the program showed that the number of open-work items on aircraft moving from final assembly to the flightline had been reduced to between 10 and 40 per aircraft, compared with 500 and 600 open items on the initial production aircraft 1 year earlier.

SCHEDULE MAINTAINED TO COLLECT PAYMENTS RELATED TO MILESTONES

Mr. Durham charged that Lockheed was moving major assemblies and aircraft on a prescribed schedule, regardless of the state of completion, in order to collect payments as related to milestones.

We did not find evidence that Lockheed moved aircraft and major assemblies on a prescribed schedule in order to collect payments for achieving certain milestones. We did note, however, that the Air Force withheld about $3.7 million from milestone payments for the five aircraft delivered to the flight-test organization because of shortages of parts and variances from specifications.

The original contract contained a provision for billing milestones which related to tooling and flight-test aircraft. The payment for tooling was tied to the milestone of aircraft 0001 reaching assembly position number three. When this event was achieved in December 1967, Lockheed submitted a bill to the Air Force for the contract price for tooling, less the amount previously received in the form of progress payments for tooling.

With respect to flight-test aircraft, the milestone payment was based on delivery of aircraft to the flight-test department and pertained only to the first five aircraft. The payment was specified at 98 percent of the billing price because these aircraft would not be delivered to the Air Force until after the flight-test program was completed at the contractor's plant. The 2 percent was to be withheld until each aircraft was refurbished and delivered to the Air Force. In accordance with the terms of the contract, the Air Force also withheld from the contractor additional funds because of shortages and variances. The amounts received and withheld and the dates of the invoices for the five aircraft are shown in the following tabulation.

	Aircraft Serial Number					
	0001	0002	0003	0004	0005	Total
Invoice date	2-27-68	7-30-68	10-21-68	12-21-68	3-17-69	
Unit billing price	$84,171,000	$70,471,000	$63,888,000	$60,991,000	$59,115,432	$338,636,432
Less funds withheld for refurbishment	1,683,420	1,409,420	1,277,760	1,219,820	1,182,309	6,772,729
	82,487,580	69,061,580	62,610,240	59,771,180	57,933,123	331,863,703
Less funds withheld for shortages	412,438	690,616	313,051	1,195,424	1,158,662	3,770,191
	82,075,142	68,370,964	62,297,189	58,575,756	56,774,461	328,093,512
Less progress payments previously paid	67,137,466	55,927,449	50,959,100	47,914,968	48,258,292	270,197,275
Milestone payment received	$14,937,676	$12,443,515	$11,338,089	$10,660,788	$ 8,516,169	$ 57,896,237

Lockheed comments

According to Lockheed, the payment for initial tooling was requested when aircraft 0001 reached assembly position three. At this point, the aircraft would have been processed through all major jigs and fixtures and, therefore, the bulk of original tooling would be complete.

With respect to the payments for delivering the aircraft to the flight-test organization, Lockheed stated that:

1. The contract specifically provided for delivering aircraft with shortages.

2. The contract provided for withholding 2 percent for the test aircraft under discussion.

3. The 2 percent was automatically withheld and, under the terms of the contract, would have not been paid until each airplane completed the test program. In addition, the Administrative Contracting Office withheld an amount from each billing to cover shortages and variances.

Air Force comments

The Air Force said that the original contract provisions for milestone payments which related to tooling and flight-test aircraft were developed for sound reasons. The contract performance period was very long (7 to 8 years' mimimum, depending on options), and the first 3 years were for

efforts which would not require formal deliveries, and thus repayment of the progress payments made for costs incurred were not allowed. In such cases it is normal to establish billing milestones for those long periods when certain costly, early efforts can be measured as to completion.

Liquidated damages

The original contract provided for liquidated damages of $12,000 a day, up to $11 million, for late delivery of the first 16 aircraft, exclusive of test aircraft. On January 30, 1969, the Air Force notified Lockheed of a delinquency in delivering aircraft. The notice stated that, because of the Government's urgent need for the aircraft, it was not invoking its rights under the contract's "default" clause. In addition, it stated that all rights which the Government had, or which would inure to the Government, because of Lockheed's delinquency were expressly reserved by the Government.

All aircraft to which the liquidated damages applied were accepted with specific reference to the liquidated damages and the reservation of the Government's right to later make claim for such damages. The Air Force did not collect the liquidated damages as the aircraft were delivered.

Lockheed comments

Lockheed stated that the liquidated damages clause of the contract applied only to deliveries of aircraft and not to movements from one assembly position to another. There was only one movement that mattered as far as this clause was concerned--"delivery," defined as delivery of "...aircraft which are acceptable to the Government." In short, Lockheed could not, unilaterally, make a delivery merely to avoid liquidated damages.

Lockheed also stated that it had submitted a claim of excusable delay in connection with this clause, along with extensive documentary evidence to support that claim. This was one of the matters that had been disputed and settled by the restructured contract.

Air Force comments

The Air Force stated that the total $11 million was included in the negotiations which led to the $200 million fixed loss for Lockheed. The Air Force never gave up its claim to liquidated damages until the restructured contract was signed with new terms. The Air Force position throughout the 18 months of negotiations that followed was that the full $11 million was due. The original schedule was not amended until the contract was restructured and the contractor was officially carried as delinquent throughout this period.