



REPORT TO THE CONGRESS

The Cost Of Aerospace Ground Equipment Could Be Reduced B-177751

Department of the Air Force

*BY THE COMPTROLLER GENERAL
OF THE UNITED STATES*

770601 / 087403

SEPT. 11, 1974



COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON, D.C. 20548

B-177751

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

This is our report on how the cost of aerospace ground
equipment could be reduced in the Department of the Air
Force.

We made our review pursuant to the Budget and Accounting
Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing
Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director,
Office of Management and Budget, and to the Secretaries of
Defense and the Air Force.

James B. Stacks

Comptroller General
of the United States

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ABBREVIATIONS

AGE	aerospace ground equipment
GAO	General Accounting Office

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

THE COST OF AEROSPACE GROUND
EQUIPMENT COULD BE REDUCED
Department of the Air Force
B-177751

D I G E S T

WHY THE REVIEW WAS MADE

Air Force expenditures for aerospace ground equipment (AGE) average an estimated \$600 million each fiscal year. This equipment is used to repair, maintain, overhaul, and operate aircraft and related subsystems while on the ground.

GAO examined 88 special AGE items purchased for use on 4 aircraft--the C-5, F-111, A-7, and C-141--to determine whether there was a need for such equipment or whether less costly alternatives would satisfy Air Force requirements.

FINDINGS AND CONCLUSIONS

The cost of 9 of 88 special AGE items could have been substantially eliminated--\$341,500 out of \$343,600--if the Air Force had used maintenance procedures not requiring special AGE. (See p. 2.)

An additional \$339,900 could have been saved on 23 items if the Air Force had considered the less costly alternative of manufacturing AGE in-house in lieu of procurement from the contractors. (See p. 4.) Thus the cost of 32 of 88 items could have been reduced by \$681,400. (See p. 2.)

Further savings could have been realized if nine additional items had been standardized to perform common functions on several aircraft. (See p. 7.)

GAO concluded that procedures used in selecting and screening AGE needed strengthening, particularly the information used to determine what equipment is available to perform various maintenance functions.

When it is necessary to acquire new AGE, the Air Force should consider local manufacture if it is a more economical method of satisfying its needs.

RECOMMENDATIONS

GAO recommends that the Secretary of the Air Force:

- Evaluate and strengthen procedures to insure that new AGE items are not acquired until it has been determined that maintenance cannot be performed without AGE or cannot be performed with common AGE already in inventory.
- Establish a program to develop complete, current, and accurate information on common AGE already available in inventory.
- Consider manufacturing AGE in-house. (See p. 9.)

AGENCY ACTIONS

The Air Force concurred with these findings and recommendations and said a pending regulation provides criteria for depot manufacture of support equipment in lieu of

procurement from contractors.

Air Force also said it is currently evaluating effectiveness of its policies and procedures for acquiring AGE and will take actions to improve or strengthen the process. This study began in April 1974 and is expected to last a year. The Air Force study also will examine the adequacy of data presently used to screen new AGE items recommended by contractors. (See p. 9.)

MATTERS FOR CONSIDERATION
BY THE CONGRESS

This report directs the attention of the Congress to an acquisition technique which could reduce Government costs and to corrective actions the Air Force is taking. The total potential for cost reduction will not be known until the Air Force evaluation is completed and any necessary changes are fully implemented.

CHAPTER 1

INTRODUCTION

Aerospace ground equipment (AGE) is used to repair, maintain, overhaul, and operate aircraft and related subsystems while on the ground. Air Force expenditures for AGE average an estimated \$600 million each fiscal year. A Logistics Management Institute report estimated the value of the Air Force inventory of AGE to be about \$4.43 billion.

"Common" AGE is equipment used on two or more aircraft and is usually preferred over peculiar AGE due to its availability in inventory. "Peculiar" AGE is equipment used on only one aircraft and is usually provided by the aircraft prime contractor or its subcontractors as a new item in inventory. Generally, contractors identify and recommend the type of AGE--common or peculiar--that will be required to perform various maintenance functions.

The Air Force System Managers and Logistics Command review the contractors' recommendations to determine if there is a need for AGE to perform the maintenance function, and if so, whether there is common AGE available in inventory to satisfy the need, or whether peculiar AGE is required. This information is conveyed to the System Project Office which is responsible for determining whether AGE will be procured, and if it will be common or peculiar AGE. Contractors cannot proceed with development or procurement of the AGE until the System Project Office gives its approval.

CHAPTER 2

USE OF LESS COSTLY ALTERNATIVES NEEDED

TO REDUCE THE COST OF AGE

The cost of 41 AGE items could have been substantially reduced or, in some cases, entirely eliminated by using various options to satisfy requirements rather than procuring them from the prime contractors. The options were (1) using maintenance procedures not requiring special (peculiar) AGE, (2) in-house manufacturing of AGE at the depot, and (3) standardizing AGE to perform maintenance functions common to most aircraft.

Potential Cost Reductions

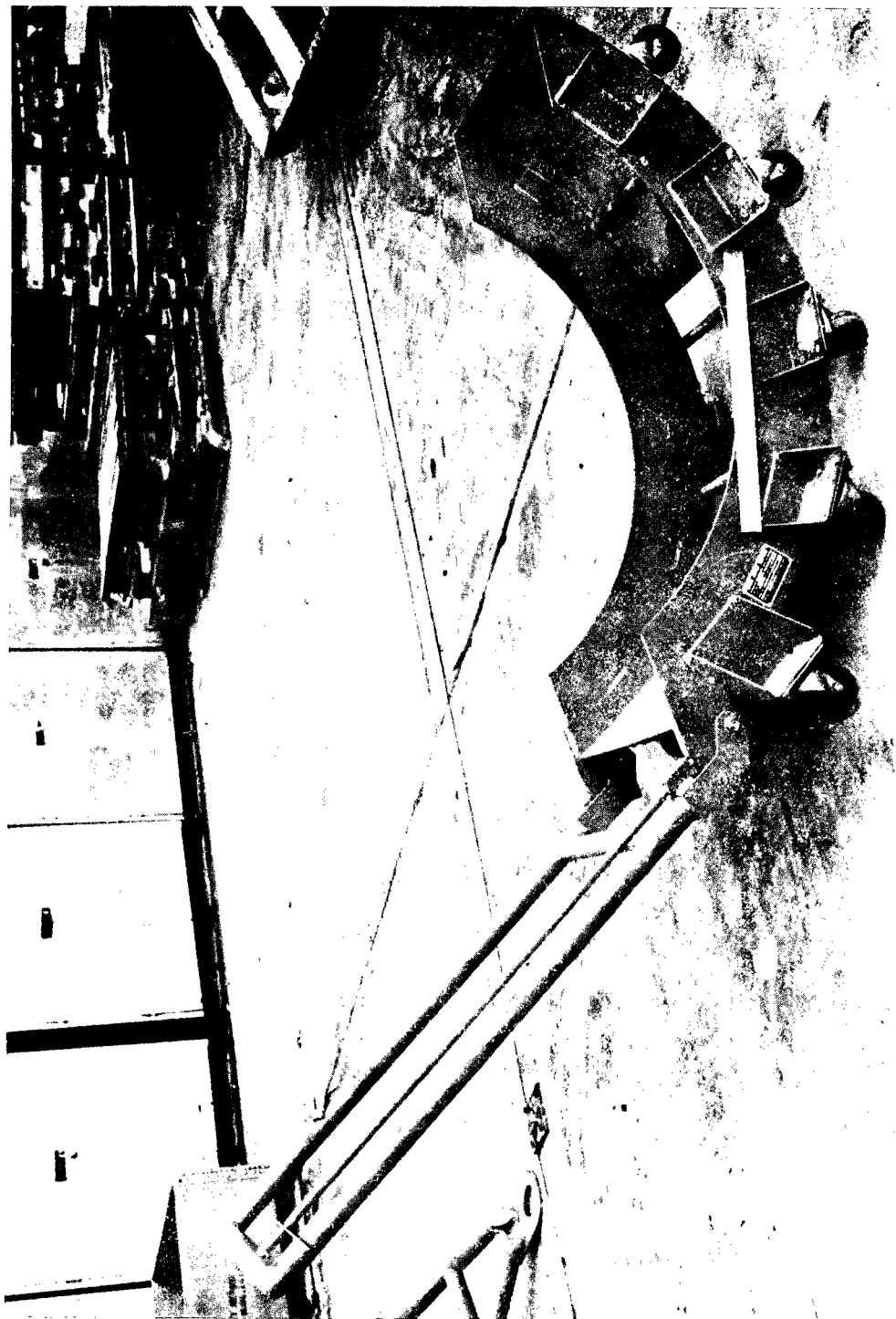
<u>Number of items</u>	<u>Estimated contractor cost</u>	<u>Less costly alternative</u>	<u>Estimated cost reduction</u>
9	\$343,600	Maintenance procedures not requiring special AGE	\$341,500
23	575,600	In-house manufacture	339,900
<u>9</u>	<u>-</u>	Standardization	<u>(a)</u>
<u>41</u>	<u>\$919,200</u>		<u>\$681,400</u>

^aIt was not possible to estimate the amount of savings that could have been realized because of the different time periods during which the special AGE was procured and the varying quantities procured for each program.

NO NEED FOR SPECIAL AGE

The estimated cost of \$343,600 for 9 of the 88 special AGE items could have been almost entirely eliminated if the Air Force had used maintenance procedures that do not require special AGE. Interviews with maintenance personnel and observations of the items showed that a less expensive method could have been used.

As an example, the Air Force purchased special wheel and tire trucks to provide a means of removing and replacing the main landing gear wheel and tire assembly on the C-5 and C-141. A photograph of the C-5 tire truck is shown on the following page.



WHEEL AND TIRE TRUCK UNIT (\$1,923)

<u>Description</u>	<u>Amount</u>	
	<u>C-5 truck</u>	<u>C-141 truck</u>
Quantity procured	34	11
Unit cost	\$ 1,923	\$ 5,471
Total cost	\$65,382	\$60,181

At the two depots responsible for the maintenance of the two aircraft, we were told that the wheel and tire assemblies were being changed manually and the special trucks were not used. The Military Airlift Command said that the special tire truck for the C-5 was not needed because the item was considered unnecessary and undesirable for safe tire changing. Also maintenance testing showed three men were required to replace a wheel assembly with the truck, whereas two men could perform the task without the truck.

Two additional examples are shown in appendix I.

DEPOT MANUFACTURE RATHER THAN PROCUREMENT
FROM THE CONTRACTOR

An additional \$339,900 could have been saved on 23 items if the Air Force used the less costly alternative of manufacturing AGE in-house in lieu of procurement from contractors.

Air Force personnel provided cost estimates for in-house manufacturing which were comparable to the contractor-provided items and included labor, material, and overhead. Cost of procuring contractor-furnished AGE consisted of recorded factory costs, catalog prices, or average unit prices paid for the items, excluding development costs.

Contractor costs exceeded the estimated Air Force costs by 50 percent on all but one of the 23 items shown below.

<u>Contractor costs exceeded estimated Air Force costs</u>		<u>Number of AGE items</u>
Under	50%	1
50 to	99	4
100 to	499	12
500 to	999	3
Over	1,000	<u>3</u>
Total		<u>23</u>

STANDARDIZING AGE

Further savings could have been realized on 9 items, if the Air Force had standardized the items to perform maintenance functions common to most aircraft.

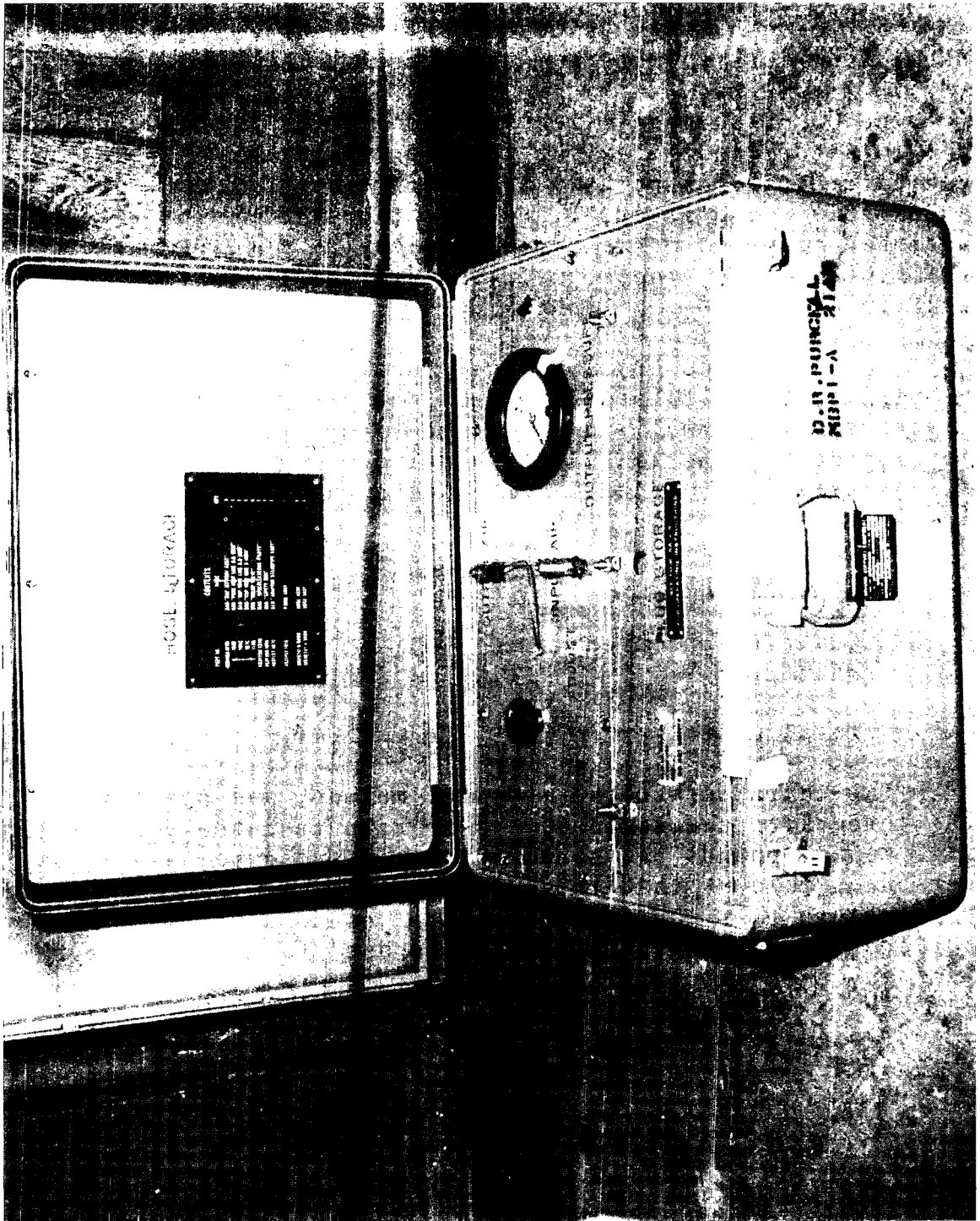
We discussed each item's usage with maintenance personnel to determine the extent to which the item was peculiar to the aircraft it supported. We also reviewed functional descriptions and material specifications for comparable AGE designed to perform the same functions as the specialized items. Actually, these functions are common to most aircraft.

The Air Force procured individual test kits for C-5, F-111, and C-141 to pressure test the aircraft fuel systems. Test kits are normally used to check repaired fuel tanks for leakage before the tanks are refueled. A photograph of one of the kits is shown on the following page.

<u>Description</u>	<u>Test kits</u>		
	<u>C-5</u>	<u>F-111</u>	<u>C-141</u>
Quantity procured	6	9	34
Unit cost	\$11,625	\$ 2,823	\$ 2,030
Total cost	69,750	25,407	69,020

The characteristics, physical makeup, and operation of the three kits are similar. These kits test the fuel systems at 3 to 5.5 pounds per square inch air pressure, and depot personnel told us that the C-5 and C-141 kits could be used to pressure test the fuel systems of other aircraft. We believe the F-111 kit could also be used to test fuel systems on other aircraft.

Two additional examples of possible standardization are shown in appendix III.



TEST KIT UNIT (\$11,625)

One of the items included in the above table was special electrical cables. The Air Force purchased different cables for the C-5, F-111, and A-7. Cables for the C-141 were manufactured in-house. A photograph of one of the procured cables is shown on the following page. The other cables are similar except for varying lengths.

<u>Description</u>	<u>Electrical cables</u>		
	<u>C-5</u>	<u>F-111</u>	<u>A-7</u>
Quantity procured	2	2	15
Contractor unit cost	\$166	\$306	\$ 225
Total contractor cost	\$332	\$612	\$3,375
Air Force estimate to manufacture in-house	\$ 44	\$ 35	\$ 62
Total Air Force estimate	\$ 88	\$ 70	\$930
Total possible cost reductions	\$244	\$542	\$2,445

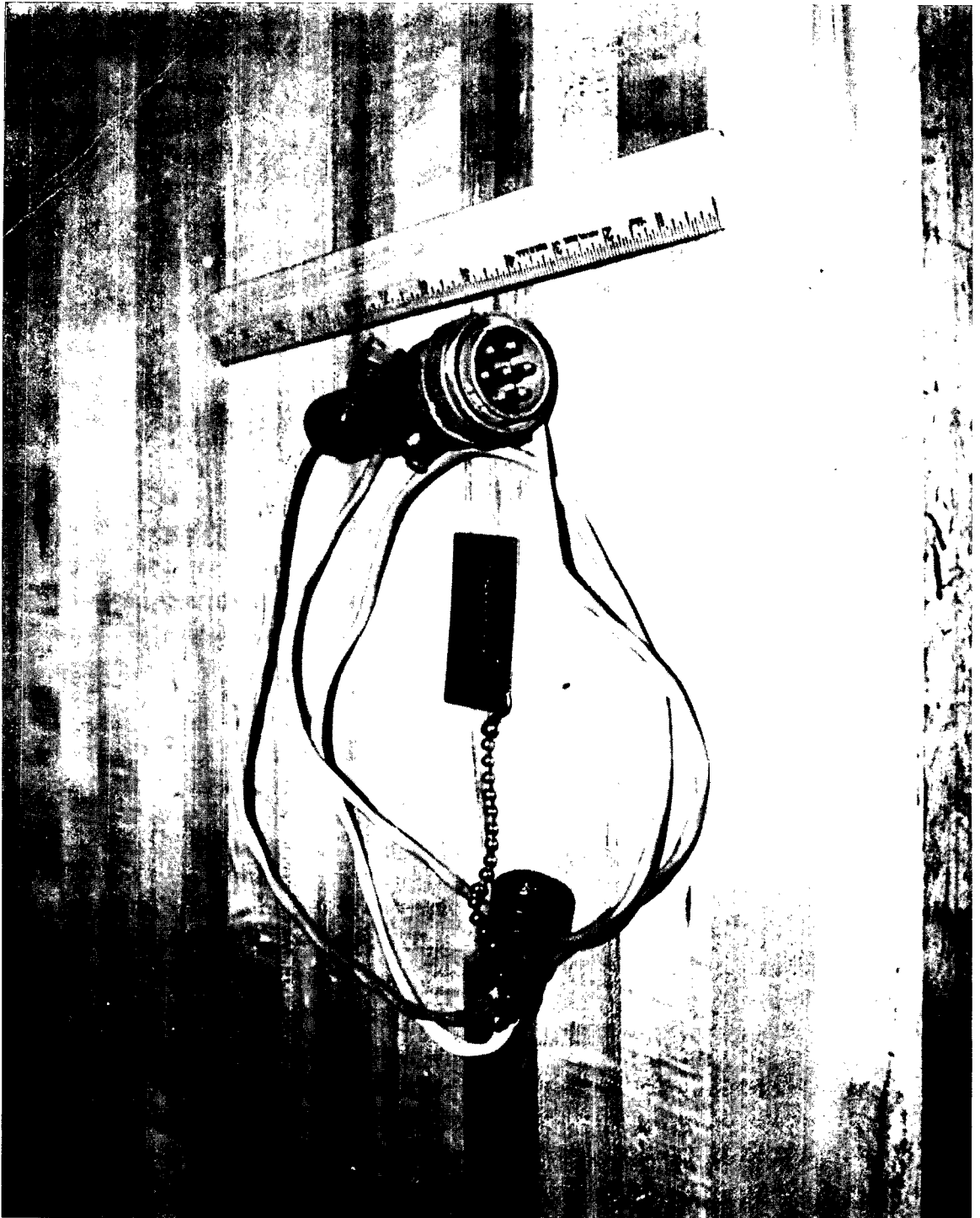
In addition to manufacturing costs, contractors' development costs totaled \$9,530.

The cost difference for the cable used on the C-5 was due primarily to labor hours. The contractor recorded 6 hours to assemble the cable components and Air Force personnel estimated 1.5 hours to assemble an identical cable.

We could not analyze the cost difference for the cable used on the F-111 aircraft because the price was based on a total sum negotiation for a number of different items. The difference between the proposed and negotiated prices was then allocated to the individual items.

The prices paid for the 15 cables used on the A-7 ranged from \$62 to \$322 per item for an average price of \$225. The \$62 is identical to the Air Force estimate to manufacture the cable in-house. We did not obtain an explanation as to the reason the prices varied.

Three additional examples are shown in appendix II.



ELECTRICAL CABLE UNIT (\$166)

CHAPTER 3

CONCLUSIONS, RECOMMENDATIONS, AND

AGENCY ACTIONS

CONCLUSIONS

Our review of 88 items identified 32 for which about \$681,400 of program costs could have been saved, if the Air Force had used less costly alternatives to satisfy its AGE requirements. Nine other AGE items should have been standardized for additional savings.

We believe the procedures used in selecting and screening AGE need strengthening, particularly in the information used to determine what equipment is available to perform various maintenance functions.

RECOMMENDATIONS

We recommend that the Secretary of the Air Force:

- Evaluate and strengthen procedures to insure that new AGE items are not acquired until it has been determined that maintenance cannot be performed without AGE or cannot be performed with common AGE already in inventory.
- Establish a program to develop complete, current, and accurate information on common AGE already available in inventory.
- Consider manufacturing AGE in-house.

AGENCY ACTIONS

In a May 8, 1974, letter (see app. IV), the Air Force agreed that there was a need to reexamine the AGE acquisition process which permitted the conditions cited in our report to occur. Regarding our recommendations, the Air Force said:

- The Logistics Management Institute has been issued a Task Order to determine the effectiveness of currently prescribed policies and procedures for acquiring AGE.

- Action will be taken to improve or strengthen and streamline the acquisition process for AGE at Task Order's conclusion.
- The technical information file used for determining common AGE items in inventory will be examined for deficiencies because of inadequate data, failure to follow procedures, or both.
- A pending regulation provides criteria for manufacturing AGE at the depot in lieu of procuring it from the contractor.

CHAPTER 4

SCOPE OF REVIEW

We examined Air Force policy and procedures covering AGE procurement and reviewed correspondence and documents to determine Air Force and contractor responsibilities in acquiring AGE.

We selected 88 AGE items designated peculiar by 4 aircraft contractors who provided the aircraft, as well as AGE, to the Air Force. For ease of analysis, we selected relatively simple items used to perform maintenance functions common to most aircraft.

We interviewed Air Force management and engineering personnel of the System Project Offices and the air materiel areas responsible for depot maintenance of the aircraft.

The review was conducted at the following locations:

Wright-Patterson Air Force Base, Dayton, Ohio.

San Antonio Air Materiel Area, San Antonio, Texas.

Sacramento Air Materiel Area, Sacramento, California.

Warner Robins Air Materiel Area, Warner Robins, Georgia.

Oklahoma City Air Materiel Area, Oklahoma City, Oklahoma.

ADDITIONAL EXAMPLES OF
OPPORTUNITIES TO REDUCE
COST OF AGE BY
ELIMINATING THE NEED
FOR SPECIAL AGE

FILM CASSETTE CARRYING CASE

The Air Force procured a special carrying case to protect a film cassette during transportation between the aircraft and the maintenance shop. Five cases were procured at \$560 each for a total cost of \$2,800.

Before buying the cases the Air Force questioned the need for them because they were considered overprotective. The contractor replied that a light polyurethane bag would provide adequate protection if the cassette were carefully handled. However, the contractor felt this type of care would not be exercised. The requirement was subsequently approved by the Air Force and the cases were procured.

At the time of our review, the film cassette had been removed from the aircraft only once at the depot, and it was transported in a plastic bag. Depot personnel said a simple briefcase would provide adequate protection for the tape cassette. A case, similar to the one proposed by depot personnel, is available from Federal supply sources for less than \$10.

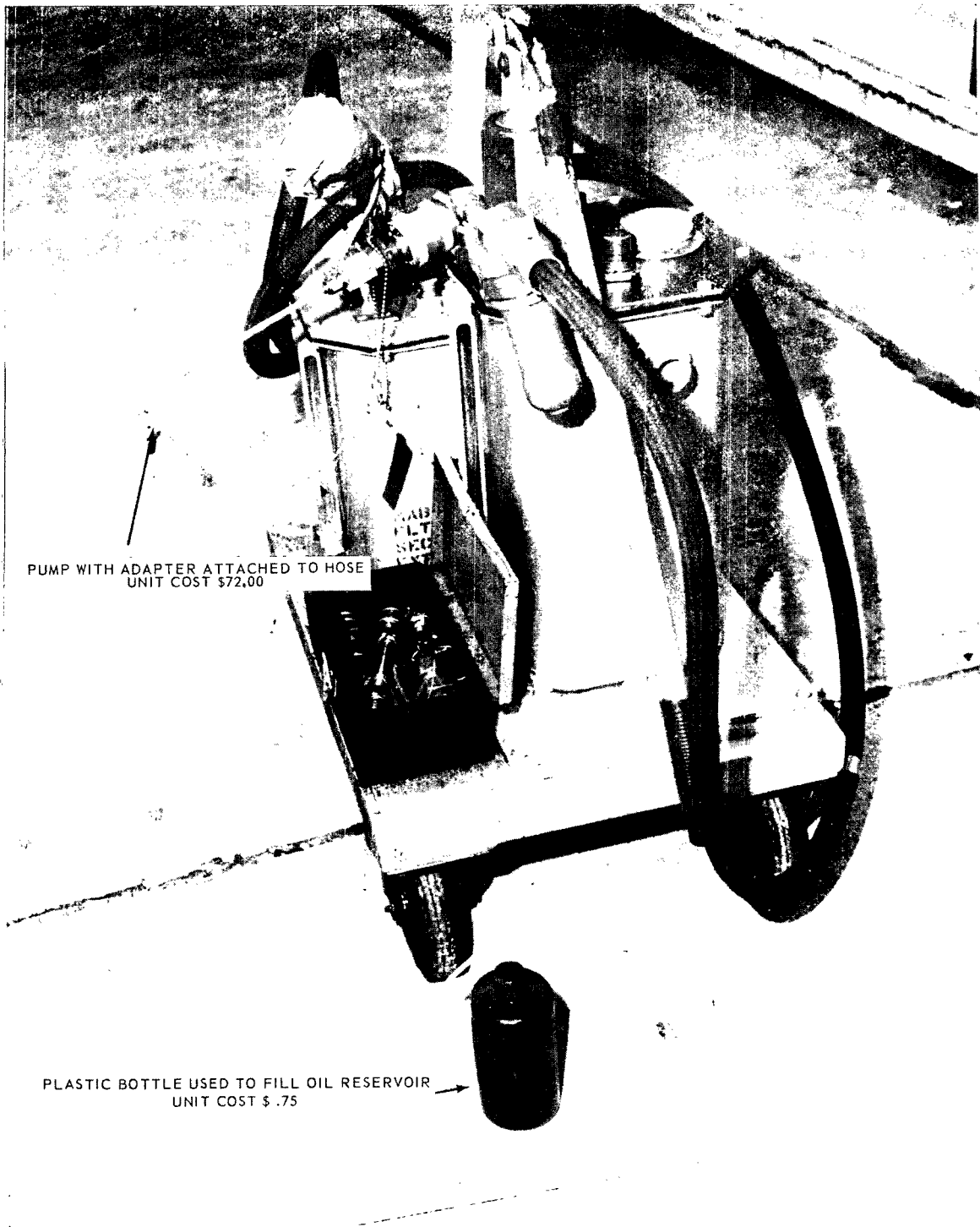
STARTER ADAPTER

The Air Force procured 41 special adapters at a unit cost of \$72 each for a total cost of \$2,952. The adapter is used to service a jet engine starter.

Depot personnel stated a plastic squeeze bottle was used rather than the adapter. The plastic squeeze bottle, which is stocklisted for 75 cents, was much easier to use according to depot personnel. A photograph of the adapter and the plastic squeeze bottle is shown on page 14.

Plastic squeeze bottles similar to the one used on the above aircraft are also used on at least three other aircraft.

APPENDIX I



PUMP WITH ADAPTER ATTACHED TO HOSE
UNIT COST \$72.00

PLASTIC BOTTLE USED TO FILL OIL RESERVOIR
UNIT COST \$.75

STARTER ADAPTER

ADDITIONAL EXAMPLES OF
OPPORTUNITIES TO REDUCE
COST OF AGE BY
DEPOT MANUFACTURE

UNIVERSAL LIGHT-DUTY MAINTENANCE STAND

The Air Force procured 20 stands at \$941 each for a total of \$18,820 to perform maintenance functions on the C-5. In addition to factory costs, the contractor recorded \$11,907 to develop the stand.

The stand is essentially a sawhorse used to support various aircraft parts during maintenance. A photograph of the stand is shown on the following page.

We noted that wooden sawhorses were being used to support aircraft parts at all four depots, and at one depot they were being used interchangeably with the maintenance stands to support aircraft parts. The cost of making wooden sawhorses ranged from \$22 to \$38 each, totaling \$440 to \$760.

The maintenance function--supporting aircraft parts--can be performed by wooden sawhorses; therefore, we question the purchasing of stands.

TORQUE WRENCH ADAPTERS

The Air Force obtained wrench adapters to remove and install wheel-retaining bolts during ground servicing operations on three aircraft.

<u>Description</u>	<u>Torque wrench adapters</u>		
	<u>C-5</u>	<u>F-111</u>	<u>C-141</u>
Quantity procured	53	62	140
Contractor unit cost	\$ 1,148	\$ 295	\$ 715
Total contractor cost	\$60,844	\$ 18,544	\$100,100
Air Force estimate to manufacture in-house	\$ 272	\$ 414	\$ 476
Total Air Force Estimated cost	\$14,428	\$ 25,668	\$ 66,640
Total possible reductions	\$46,416	\$ (7,124)	\$ 33,460

APPENDIX II

It is generally less costly to manufacture selected items at the depot rather than procuring them from the contractors. However, there are exceptions, such as the adapters for the F-111.

BUSHING REPLACEMENT TOOLKIT

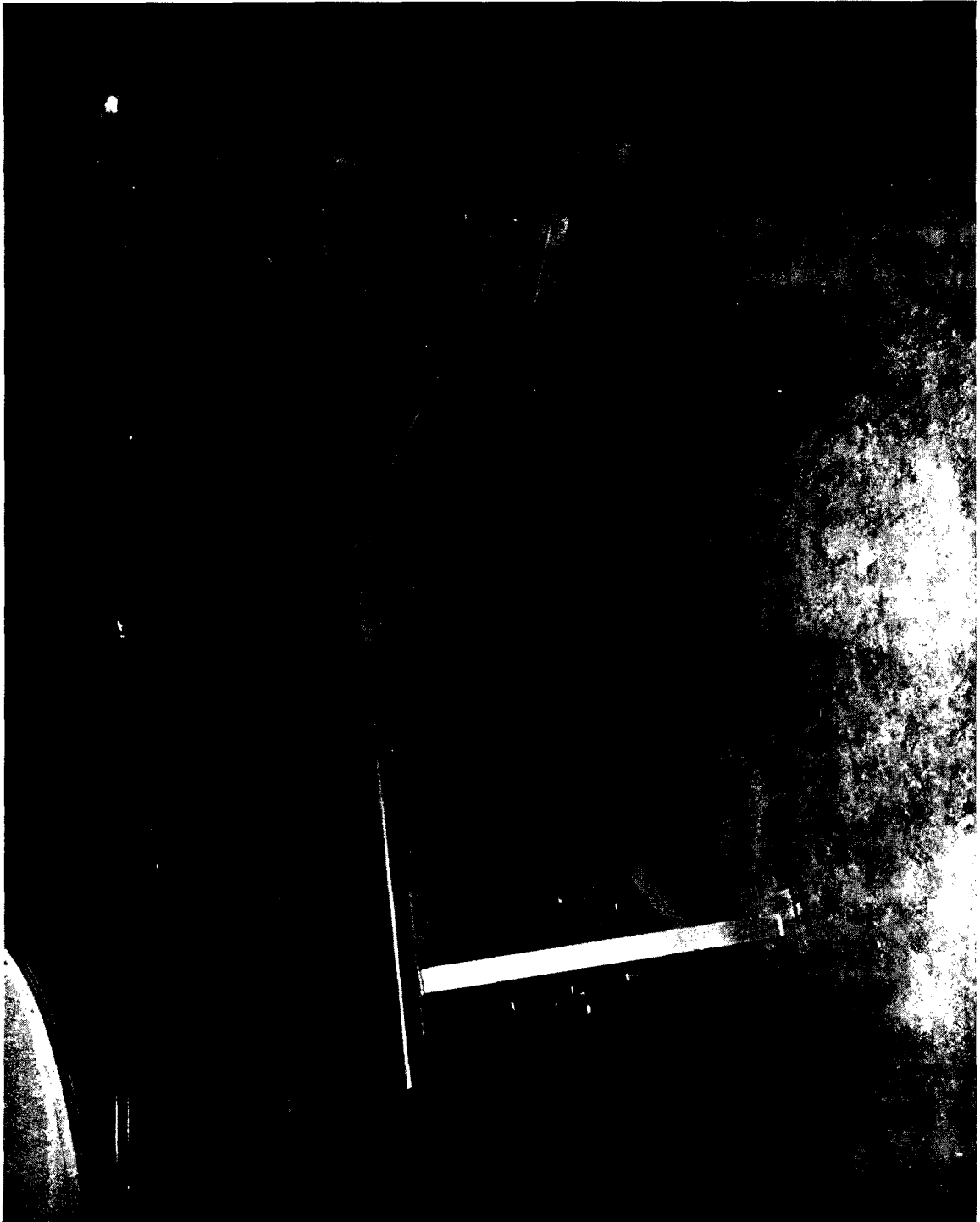
The Air Force procured special toolkits to remove and install bushings on C-5 and F-111 during maintenance.

<u>Description</u>	<u>Kits</u>	
	<u>C-5</u>	<u>F-111</u>
Quantity procured	6	1
Contractor unit cost	\$ 4,751	\$556
Total contractor cost	\$28,506	\$556
Air Force estimate to manufacture in-house	\$ 398	\$162
Total Air Force estimated cost	\$ 2,388	\$162
Total possible reductions	\$26,118	\$394

The contractor recorded \$17,972 to develop the kits.

The difference between the contractor's cost and the depot estimate for the kits used on the C-5 were: (1) the contractor's unit cost includes about 244 labor hours to make the tools and to assemble them into a kit--the estimated labor hours for depot manufacture of the tools was about 29 hours and (2) the contractor's unit cost includes \$208 for an aluminum toolbox, although the depot estimate does not include the cost of toolboxes. Toolboxes, if needed, are available from Federal supply sources for less than \$5 each. Tools used on the F-111 are stored in a canvas bag.

We could not analyze the cost for the kit used on the F-111 because the price was based on a total sum negotiation for a number of different items. The difference between the proposed and negotiated price was then allocated to the individual AGE items.



MAINTENANCE STAND UNIT (\$941)

APPENDIX III

ADDITIONAL EXAMPLES OF OPPORTUNITIES TO REDUCE COST OF AGE BY STANDARDIZATION

CRIMPING TOOLKITS

The Air Force procured special toolkits for all four aircraft covered in our test. The toolkits are used to remove and install crimp connectors on electrical wire.

Although the kits consist primarily of commercial hand tools, each kit was designated by contractors as peculiar to the individual aircraft. Most of the tools had been obtained by contractors from commercial sources; in fact, over one-half of the tools were obtained from four vendors.

<u>Description</u>	<u>Toolkits</u>			
	<u>C-5</u>	<u>F-111</u>	<u>A-7</u>	<u>C-141</u>
Quantity procured	38	25	30	156
Unit cost	\$ 3,614	\$ 2,125	\$ 4,230	\$ 2,054
Total cost	\$137,332	\$53,125	\$126,900	\$320,424

Depot personnel said crimping tools were not peculiar to any one aircraft and that tools from two of the kits were used on several other aircraft. One of the two kits, the C-141 kit, has been designated for use on the A-37 aircraft and UH-1 helicopter.

The maintenance function of all the kits--crimping connectors to electrical wiring--is the same and is performed with commercial tools. Therefore, we believe the Air Force should develop a standard kit for this function.

CUTTING AND DEBURRING TOOLKITS

The Air Force procured special cutting and deburring toolkits for use on the C-5 and A-7 aircraft. The kits are used to cut damaged hydraulic tubing and to prepare the tube ends for welding and brazing.

<u>Description</u>	<u>Toolkits</u>	
	<u>C-5</u>	<u>A-7</u>
Quantity	10	1
Unit price	\$ 16,436	\$14,009
Total cost	\$164,360	\$14,009
Number of tools per kit	29	29

No special toolkits were procured for the F-111 and C-141. However, a commercial handtool costing \$1.80 is used to cut and deburr tubing on the F-111.

Both toolkits are manufactured by the same company and can be used on about the same size tube. The Air Force purchased the toolkit used on the A-7 directly from the manufacturing company, but the 10 sets for the C-5 were procured from the contractor. The only parts used on the C-5 were the manual cutters. We found the set for the A-7 had not even been uncrated.

APPENDIX IV

DEPARTMENT OF THE AIR FORCE

WASHINGTON 20330

MAY 8, 1974



OFFICE OF THE ASSISTANT SECRETARY

Mr. R.W. Gutmann
Director, Procurement and
Systems Acquisition Division
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20543

Dear Mr. Gutmann:

The Secretary of Defense has asked me to reply to your report of March 13, 1974, "The Cost of Aerospace Ground Equipment Could Be Reduced," (OSD Case #3791).

Air Force review of the report has not resulted in any basic disagreement with its findings and recommendations. Although we do not believe the undesirable conditions found within the sample lot of 88 items are widespread throughout our Aerospace Ground Equipment inventory, we recognize the need to re-examine the acquisition process which permitted those conditions to occur. Our specific, positive responses to each of the report's recommendations are set forth in the attachment to this letter.

We appreciate the opportunity to comment on the draft report and consider the report findings and recommendations to be of significant value to improvement of Air Force operations.

Sincerely,

Richard J. Keizer

107-100-100-100
107-100-100-100
107-100-100-100

1 Attachment
Air Force Response
to GAO Recommendations

APPENDIX IV

RESPONSE: The Air Force concurs with this recommendation. Since the late 1950's the Air Force has published the Technical Information File (TIF) (Military Handbook-300) as a "tool" for use by contractors and Air Force personnel in determining the existence of common items in Air Force inventory. Current Air Force procedures call for contractor and Air Force screening of items in the TIF for possible use prior to approval of new development or acquisition. The LMI study will determine whether the deficiencies found result from inadequate data in the TIF, failure to follow established procedures, or both.

RECOMMENDATION 3: "That the Air Force consider in-house, manufacture of AGE when it is a more economical method of satisfying its needs for special AGE."

RESPONSE: The Air Force concurs in this recommendation. The soon to be published Air Force Regulation 800-12, Acquisition of Support Equipment, states, in part:

"Simple Low Cost Support Equipment and Modified Hand Tools. Centralized, depot level manufacture of simple low cost support equipment and modification of hand tools is frequently more cost-effective than procurement from a contractor. Designation of an item for depot level manufacture or modification must be based on the following criteria:

- a. Cost-effectiveness analysis verifies the decision.
- b. Any materials and the necessary manufacturing data available.
- c. Process of manufacture or modification must be compatible with tools, equipment, or skills locally available.
- d. Quantities required must be small, or not impose an undue workload.

Items which do not meet the above criteria should be considered for procurement from vendors or suppliers by economic lot."

AIR FORCE RESPONSE TO GAO REPORT RECOMMENDATIONS
(OSD CASE #3791)

RECOMMENDATION 1: "That the Air Force evaluate, and where necessary, strengthen their procedures to insure that new AGE items are not acquired until it has been determined that the maintenance function:

- a. cannot be performed without AGE, or
- b. cannot be performed with common AGE already in inventory."

RESPONSE: The Air Force concurs with this recommendation. In February 1974, the Air Force requested OSD issuance of a Task Order to the Logistics Management Institute for a task entitled, "Case Studies of the Air Force Aerospace Ground Equipment (AGE) Acquisition Management Process." The purpose of the task is to determine the effectiveness of currently prescribed Air Force policies and procedures for acquiring AGE in terms of stated objectives. By an analysis of the process, LMI is to determine those areas that are not implementary or are not achieving their intended purpose and recommend changes that will permit objectives to be attained and to streamline the process. During the course of the task, LMI will develop and document a procedural flowchart which describes in detail the current AGE acquisition process. They will then conduct a number of case studies on AGE items being introduced through that process to provide a basis for determining the effectiveness of the process. The case studies will then be analyzed to determine; (a) the extent to which AGE acquisition policies, regulations and procedures are being followed; (b) the principal reasons for deviation from current policies, procedures and regulations; and, (3) the necessary actions required to improve or strengthen the current AGE process. The task order will soon be accepted by LMI and work will commence in April 1974. The duration of the task is approximately one year.

RECOMMENDATION 2: "That the Air Force establish a program to develop complete, current, and accurate information on common AGE already available in inventory so such items are used whenever possible."

PRINCIPAL OFFICIALS
RESPONSIBLE FOR MATTERS
DISCUSSED IN THIS REPORT

Tenure of office	
From	To

DEPARTMENT OF DEFENSE

SECRETARY OF DEFENSE:

James R. Schlesinger	June 1973	Present
William P. Clements, Jr. (acting)	Apr. 1973	June 1973
Elliot L. Richardson	Jan. 1973	Apr. 1973
Melvin R. Laird	Jan. 1969	Jan. 1973
Clark M. Clifford	Mar. 1968	Jan. 1969
Robert S. McNamara	Jan. 1961	Feb. 1968

ASSISTANT SECRETARY OF DEFENSE
(INSTALLATIONS AND LOGISTICS):

Arthur I. Mendolia	Apr. 1973	Present
Hugh McCullough (acting)	Jan. 1973	Apr. 1973
Barry J. Shillito	Feb. 1969	Jan. 1973
Thomas D. Morris	Sept. 1967	Jan. 1969

DEPARTMENT OF THE AIR FORCE

SECRETARY OF THE AIR FORCE:

John L. McLucas	July 1973	Present
Dr. Robert C. Seamans, Jr.	Feb. 1969	May 1973
Dr. Harold Brown	Oct. 1965	Jan. 1969

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

Lewis E. Turner (acting)	Oct. 1972	Present
Philip N. Whittaker	May 1969	Sept. 1972
Robert H. Charles	Nov. 1963	May 1969

APPENDIX V

Tenure of office

From To

DEPARTMENT OF THE AIR FORCE (continued)

COMMANDER, AIR FORCE LOGISTICS

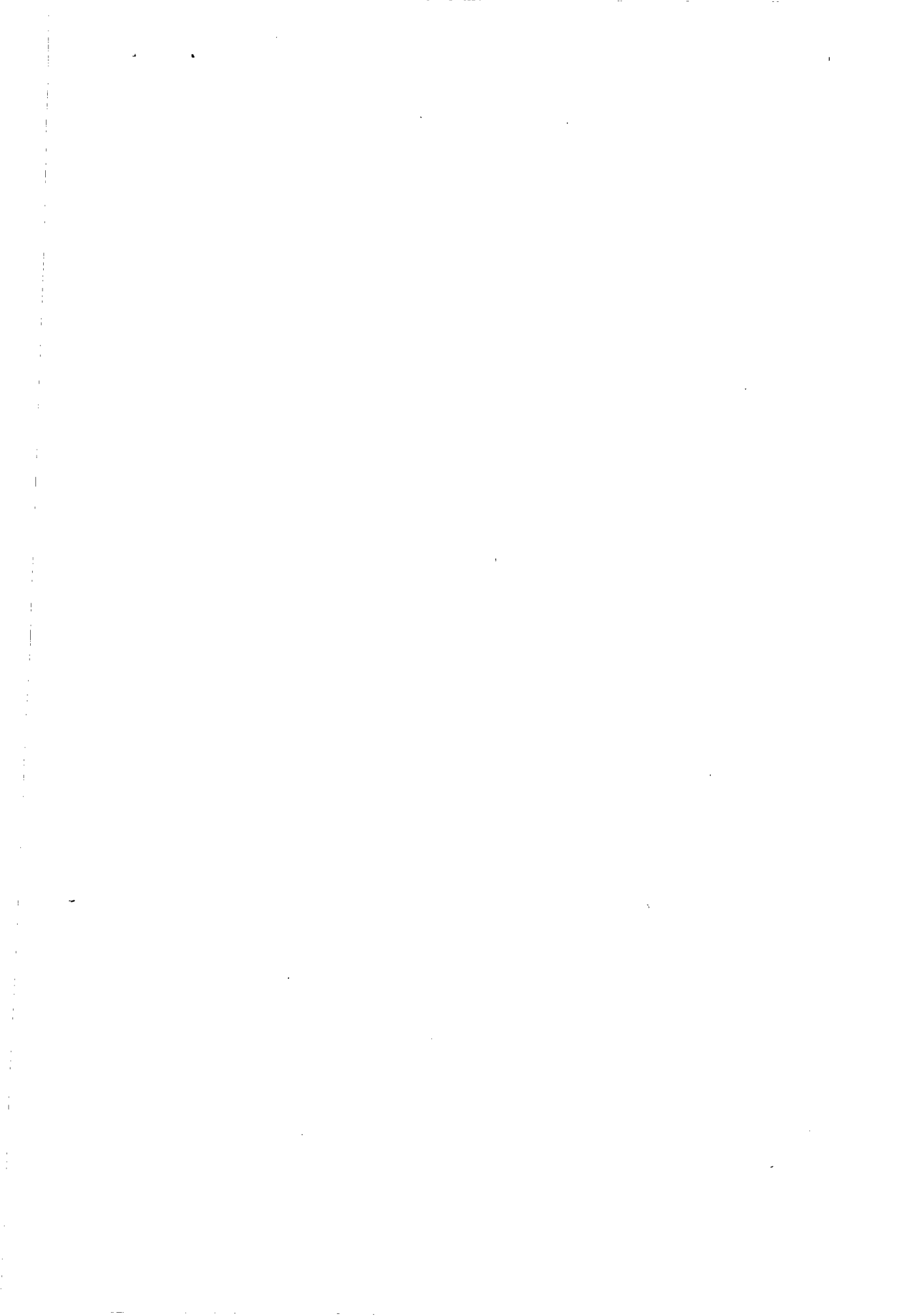
COMMAND:

General Jack J. Catton	Sept. 1972	Present
General Jack G. Merrell	Mar. 1968	Sept. 1972
Lt. General Lewis R. Mundell	Feb. 1968	Mar. 1968

COMMANDER, AIR FORCE SYSTEMS

COMMAND:

General Samuel C. Phillips	Aug. 1973	Present
General George S. Brown	Sept. 1970	July 1973
General James Ferguson	Sept. 1966	Aug. 1970



AUTHOR

B-177751
Sept. 11, 1974

TITLE

DUE NAME

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