



UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

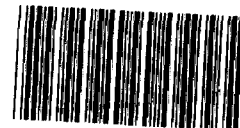
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NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-216912

MARCH 22, 1985

Major General Orlando E. Gonzales, USA
Commanding General
U.S. Army Aviation Systems Command
St. Louis, Missouri 63120-1798



126528

Dear General Gonzales:

Subject: Army Contracts Overpriced Due to Misapplication
of Spares Formula Pricing Factor
(GAO/NSIAD-85-27)

We have examined selected aspects of the pricing of five Army contracts awarded by the Troop Support and Aviation Materiel Readiness Command (predecessor of the Aviation Systems Command), St. Louis, to Turbomach, a Division of Solar Turbines, Inc., San Diego, California. The firm fixed-price contracts, valued at about \$4 million, provide for producing auxiliary power and electronic sequence units as spares for the UH-60 helicopter program.

The review was prompted by a GAO Fraud Hotline call which alleged that Turbomach had sold auxiliary power units to the Army at prices that were higher than those charged Sikorsky Aircraft, the helicopter prime contractor. We initiated the review to determine the reasons for any price differences and the reasonableness of the prices paid by the Army.

CONTRACTS WERE OVERPRICED

The contracts were overpriced by about \$872,000, because Turbomach did not give Army contracting officials information relative to the use of a spares formula pricing factor.

The spares formula pricing factor,¹ which was added by Turbomach to the proposed manufacturing/acquisition and material-handling cost, was to apply only to procurements of

¹For a description of this factor, see page 5, enclosure I.

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spare parts and components. Since the contracts we examined were for complete end items manufactured by Turbomach, although used by the Army as spare parts in UH-60 helicopters, the pricing factor, in our opinion, should not have been used. In addition, our review of contract and pricing files showed that Turbomach did not disclose to Army contracting officials pertinent information on the use of this factor. For example, Turbomach did not disclose that it had sold the same items to Sikorsky at substantially lower prices because the pricing factor was excluded from these sales.

While the use of the pricing factor was not appropriate, certain of the elements, or portions thereof, included in the factor, such as general and administrative expense and profit, would have been appropriate for pricing both spares and complete end items. These elements were considered in estimating the extent of overpricing, as shown in enclosure III.

Turbomach officials did not agree that the pricing factor had been misapplied to the contracts and further stated that application of the factor had been disclosed during contract negotiations. Army procurement officials agreed with the facts presented in this report and stated that pertinent information on the application of the factor had not been disclosed during contract negotiations. They stated that had this information been provided, they would have tried to negotiate lower prices. They also stated that an evaluation would be made to determine the legal rights to contract price reductions and that, where necessary, the appropriateness of voluntary refunds would be discussed with the contractor.

RECOMMENDATION

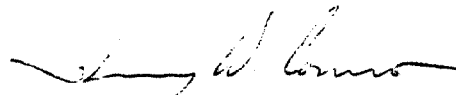
We recommend that, where justified, you obtain contract price adjustments. If you determine that the contracts were overpriced but that a legal basis does not exist for recovery, appropriate procedures should be followed as outlined in the Secretary of Defense memorandum of July 25, 1983, on spare parts procurement. In this memorandum, the Secretary directed the military services to aggressively pursue refunds through discussions with senior company managers.

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The details of our review are included in the enclosures. Although we did not obtain formal comments on this report, we discussed the contents with Army officials and Turbomach representatives. Their comments have been included in the report as appropriate. Copies of this report are being sent to

the Secretary of Defense; the Secretary of the Army; and the Vice President and General Manager, Turbomach.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Henry W. Connor".

Henry W. Connor
Senior Associate Director

Enclosures - 5

PRICING OF UH-60 HELICOPTER AUXILIARY POWER
AND ELECTRONIC SEQUENCE UNITS PROCURED BY THE ARMY
FROM TURBOMACH, A DIVISION OF SOLAR TURBINES, INC.

INTRODUCTION

The GAO Fraud Hotline received a call alleging that Turbomach, a Division of Solar Turbines, Inc., had sold auxiliary power units (APUs) to the Army Troop Support and Aviation Materiel Readiness Command (TSARCOM) at \$48,750 a unit while sales to Sikorsky Aircraft, the UH-60 helicopter prime contractor, were at \$38,000 each. It was also alleged that sales to the Army did not include electronic sequence units (ESUs) while sales to Sikorsky included ESUs in the contract prices. The following Army contracts were cited in the allegation:

DAAJ09-81-C-0715
DAAJ09-81-C-0716
DAAJ09-81-C-1806

The APU procured by the Army for UH-60 helicopters is a gas turbine engine that provides power for starting the main engine and electrical power for ground operation of on-board systems. It can also be used in flight to restart the main engine in case of a power failure. The ESU initiates and controls a sequence of events for operation of the APU, including monitoring turbine rotor speed, exhaust gas and oil temperature, oil pressure, and engine condition for fault isolation.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to determine the reason for the unit price differences and whether the prices paid by the Army were fair and reasonable. Our review was conducted at Turbomach, the Army Aviation Systems Command, and cognizant field offices of the Defense Contract Administration Services (DCAS) and the Defense Contract Audit Agency (DCAA).

We reviewed prime contract file documentation; contract price proposals; negotiation records; spares formula pricing agreements and related correspondence; and purchase order files and related price proposals. We also talked with contractor representatives and government procurement, contract administration, and contract audit officials.

We limited our review to the applicability of the spares formula arrangement in pricing the Army contracts identified in enclosure II and, therefore, did not review other contract cost estimates. Our review was made during the period July through September 1984, in accordance with generally accepted government auditing standards.

CONTRACTS WERE OVERPRICED

Army contracts awarded to Turbomach for APUs and ESUs were overpriced by about \$872,000, because Turbomach did not give Army contracting officials information relative to the use of a spares formula pricing factor. Although the contract prices included a spares formula pricing factor, the contracts, for the most part, were for complete end items. A review of contract and pricing files and discussions with Army contracting officers disclosed no evidence that Turbomach had informed the Army during contract price negotiations (1) what the ground rules were for applying the spares formula pricing factor to gas turbine engine contracts, (2) that the pricing factor would not apply if APU and ESU requirements were placed on a single contract as complete end items, or (3) that lower prices had been paid for the same items by Sikorsky Aircraft, the UH-60 helicopter prime contractor, as shown in enclosure II. Army contracting officials advised us that had they been provided this information, they would have tried to negotiate lower prices. Details of the overpricing are provided in enclosure III.

Spares formula pricing factor

On August 8, 1977, Solar (predecessor to Turbomach) and the cognizant DCAS office entered into an agreement referred to as the "Titan Support Pricing Formula." It provided for applying a formula pricing factor of 95 percent to proposed standard manufacturing/acquisition and material-handling costs for Titan gas turbine engines. The agreement applied to the pricing of support items identified as spares, aerospace ground equipment, and retrofit kits. The purpose was to expedite the processing of Titan engine spares orders and permit the contractor to recover costs allocable to the Titan engine program.

Formula pricing is a systematic method used in place of detailed cost estimates of individual parts and assemblies. It is used where a large volume of orders necessitates efficient and expedient pricing. Under this method, fewer contractor and government personnel are needed to perform pricing functions than under a method where detailed cost estimates are required to price individual parts and assemblies. Formulas are subject to analysis and review by government audit and pricing personnel before use in pricing orders.

The allocable elements comprising the pricing factor included (1) obsolescence, (2) packing material, (3) general and administrative expenses, (4) annual product development and maintenance engineering, (5) spares support, (6) cost of money under Cost Accounting Standard 414, and (7) profit. Although the use of the spares formula was not appropriate in the cases we examined, certain of these elements or portions thereof, such as

general and administrative expenses and profit, would have been appropriate for pricing both spares and complete end items. These elements were considered in estimating the extent of overpricing, as shown in enclosure III.

Neither the agreement nor the government negotiation memorandum defined "spare part". In early 1980, however, Turbomach defined a spare part as less than a complete end item manufactured and sold by Turbomach. This definition was provided in response to a request from Sundstrand Aviation for information on spares sales order processing and cost accumulation on items purchased from Turbomach.

The APU procured by the Army for the UH-60 helicopter program, Turbomach model T-62T-40-1, is a Titan gas turbine engine. All the Army contracts and modifications that we reviewed, as shown on enclosure II, included the 95-percent spares formula pricing factor.

On February 4, 1982, subsequent to the award of the five contracts included in our review, the government administrative contracting officer canceled the agreement. An interim agreement was established in March 1983 which provided that the pricing factor did not apply to the pricing of complete engines or orders exceeding \$250,000. The administrative contracting officer stated that for purposes of the agreement, an APU without an ESU was a complete engine.

After the agreement was canceled, the Army procured complete end items and spare APUs under contracts DAAJ09-82-C-B249 and -83-C-B159 awarded July 28, 1982, and May 31, 1983, respectively. The contracts were priced without the pricing factor.

Overpricing of Army contracts
from misapplication of
spares formula pricing factor.

The Army contracts identified in enclosure II were overpriced because the APUs procured with ESUs or on a stand-alone basis were complete end items, not spare parts. Therefore, in our opinion, the pricing factor should have been excluded from the contract prices. The following information developed during this review establishes that Turbomach misclassified the Army procurements of APUs and ESUs as spare parts and, therefore, inflated the contract prices with the formula factor.

1. Where APUs and ESUs were procured in equal quantities at the same time under separate contract solicitations and awards (as in the case of the Army), the procurements essentially involved complete end items by Turbomach's own definition. Had the Army combined APU and ESU requirements on a single contract

solicitation (as done by Sikorsky), Turbomach's sales order system would have classified the procurements as complete end items. In our opinion, the issuance of two solicitations and contracts should not have resulted in the spare parts classification and the higher prices.

2. Where APUs and ESUs were not procured in equal quantities or where APUs were procured without ESUs, the APU nonetheless conformed to the definition of a complete end item manufactured and sold by Turbomach. The ESU is not manufactured by Turbomach, but rather procured from outside vendors with no Turbomach fabrication or assembly before shipment to customers. Turbomach performs an acceptance test on the ESU when received from the vendor and ships the unit to the customer independently of the APU. While the ESU operates in conjunction with the APU, it is not physically attached to or incorporated into the APU. Accordingly, the APU is a complete end item for UH-60 helicopter application as contrasted with a component part or assembly that more aptly fits the traditional definition of a spare part. The component parts and assemblies are illustrated in enclosures IV and V.

3. The standard manufacturing/acquisition and material-handling base costs over which spares-related Titan gas turbine engine costs were allocated in the August 8, 1977, spares formula agreement did not include any orders for complete end item engines, such as those procured by the Army. The base costs in the formula agreement consisted of costs for orders of spares component parts and assemblies. Since the Army contracts were for complete end items, application of the spares formula pricing resulted in an excessive recovery of spares-related Titan gas turbine engine costs.

4. The price of an APU acquired on a stand-alone basis was higher than if it had been obtained as a complete end item with an ESU because of the pricing factor. Army contracting officers advised us that Turbomach had not informed them that acquiring APUs and ESUs as complete end items would result in substantial savings over stand-alone procurements. Further, our review of the contract and pricing files disclosed no evidence that such information was provided by Turbomach.

Contract DAAJ09-81-C-1806
and modification P00001 to contract -1161

TSARCOM procured 60 APUs and ESUs on contracts -1806 and modification P00001 to contract -1161, respectively. The awards were made following the issuance of proposal requests DAAJ09-81-R-0994 for APUs on July 14, 1981, and DAAJ09-81-Q-0552 for ESUs on July 15, 1981. Turbomach responded with a separate price proposal for the APUs on July 23 and for the ESUs on July 15.

Contract price negotiations were completed on September 14 for the APUs under contract -1806 and on July 28 for the ESUs under modification P00001 to contract -1161.

The Turbomach price proposal for the APUs was not subjected to a separate cost analysis. Instead, the Army contracting officer relied on the results of a March 1981 DCAA audit report made in connection with a TSARCOM purchase of five APUs under contract DAAJ09-81-C-0715. DCAA accepted the 95-percent spares formula pricing factor included in the proposed price for contract -0715. The Army contracting officer likewise accepted the pricing factor in the proposal for contract -1806.

The ESU price proposal also was not subjected to a separate cost analysis. The contracting officer relied on the results of a May 1981 DCAA audit report made in connection with a TSARCOM purchase of 23 ESUs under contract -1161 and a TSARCOM price analysis. The pricing factor was accepted by the Army contracting officer for modification P00001 to contract -1161 because it had previously been included in the 23-unit ESU price proposal and had been accepted by DCAA.

Contracts DAAJ09-81-C-0715, -0322, and -0716
and modification P00002

TSARCOM procured 11 APUs and ESUs on the following contracts and related proposal requests:

<u>Prime contract</u>	<u>Proposal request</u>		<u>Quantity</u>	
	<u>Number</u>	<u>Date</u>	<u>APU</u>	<u>ESU</u>
DAAJ09-81-C-0715	DAAJ09-80-R-0378	August 11, 1980	5	
DAAJ09-81-C-0322	DAAJ09-80-R-0479	September 30, 1980		11
DAAJ09-81-C-0716	DAAJ09-81-R-0374	February 5, 1981	4	
-0716 and modif. P00002	DAAJ09-81-Q-0568	June 4, 1981	2	

Turbomach submitted price proposals on the 5-unit APU and 11-unit ESU solicitations on December 11, 1980, and November 11, 1980, respectively. Contract price negotiations were completed on March 23, 1981, for contract -0715 and November 25, 1980, for contract -0322.

The APU price proposal was subjected to a DCAA evaluation in March 1981 and a TSARCOM price analysis. DCAA accepted the spares formula pricing factor included in the price proposal.

Likewise, the Army contracting officer accepted the factor in the pricing of contract -0715. The ESU price proposal was not subjected to a cost analysis. Instead, the Army contracting officer accepted the proposed price, which included the spares formula pricing factor, on the basis of discussions with the DCAA auditor.

Turbomach submitted price proposals for contract -0716 and modification P00002 on March 12 and June 10, 1981, respectively. Contract price negotiations were completed on March 23 and June 18, 1981, respectively. The price proposals were not subjected to separate cost analysis; however, the results of the DCAA audit made in connection with the pricing of contract -0715 were used by the Army contracting officer to price contract -0716 and modification P00002. As indicated earlier, the pricing factor was included in the price of contract -0715 and was, therefore, in the price of contract -0716 and modification P00002. Since the APU was a complete end item for the reasons discussed earlier in this report, the pricing factor should not have been included in the contract price.

Certificates of Current Cost or Pricing Data

Turbomach submitted Certificates of Current Cost or Pricing Data as provided for in Defense Acquisition Regulation 3-807.6(a) for contract -1806 on September 24, 1981, and for contracts -0715 and -0716 on March 30, 1981. However, we could not locate a certificate for contract -1161, modification P00001, although one was required because the proposed value of the procurement exceeded \$100,000. Army contract file documentation relative to the approval request for contract award stated that a certificate had been requested. A Price Reduction for Defective Cost or Pricing Data clause as prescribed in Defense Acquisition Regulation 7-104.29(a) was included in each of these contracts. The clause permits the contracting officer to reduce the contract price if it was increased by a significant sum because the certified cost or pricing data was not current, complete, or accurate.

Certificates were not submitted for contract -0322 and modification P00002 to contract -0716 because the proposed values did not exceed \$100,000.

CONTRACTOR AND PROCUREMENT OFFICE COMMENTS

Turbomach officials did not agree that the contracts had been overpriced or that the spares formula pricing factor had been misapplied. They stated that the contracts were spare parts orders under the prevailing definition for the derivation and application of the pricing factor. They further stated that the basis had been consistently followed and that application of the pricing factor had been fully disclosed to the Army.

Army procurement officials agreed with the facts presented in this report. They stated that Turbomach had not disclosed that purchasing APUs and ESUs as whole units would cost less than purchasing each separately. Had that been known, the Army would have adjusted the requirement or the pricing factors to obtain the best possible price. Army procurement officials also agreed that Turbomach should have made the Army aware of the definition for "spare" and "complete" engines and how these terms were used for pricing purposes. Further, they stated that although the Army contracts may have been priced strictly in accordance with terms of the Titan Support Pricing Formula which existed at the time, prudent sales procedures would have included advice on product definition and company practices as to pricing formula applications. They also said that the Army relied on DCAA audit reports, which did not question the application of the spares factor.

PURCHASES OF AUXILIARY POWER AND
ELECTRONIC SEQUENCE UNITS FROM TURBOMACH

Army

<u>Item</u>	<u>Contract</u>		<u>Quantity</u>	<u>Price</u>	
	<u>Number</u>	<u>Date</u>		<u>Unit</u>	<u>Total</u>
APU	DAAJ09-81-C-0715	Apr. 17, 1981	5	\$48,000.00	\$ 240,000.00
APU	DAAJ09-81-C-0716	Apr. 17, 1981	4	48,000.00	192,000.00
	Modification P00002	July 8, 1981	2	48,000.00	96,000.00
APU	DAAJ09-81-C-1806	Sept. 25, 1981	<u>60</u>	48,750.00	<u>2,925,000.00</u>
	Subtotal APUs		<u>71</u>		<u>3,453,000.00</u>
ESU	DAAJ09-81-C-0322	Dec. 8, 1980	11	6,091.43	67,005.73
ESU	DAAJ09-81-C-1161	June 30, 1981	23	6,380.00	146,740.00
	Modification P00001	July 31, 1981	60	6,380.00	382,800.00
	Subtotal ESUs		<u>94</u>		<u>596,545.73</u>
	Total		165		\$4,049,545.73

Sikorsky Aircraft

<u>Item</u>	<u>Purchase order</u>		<u>Quantity</u>	<u>Price</u>	
	<u>Number</u>	<u>Date^a</u>		<u>Unit</u>	<u>Total</u>
APU/ESU	384495	May 6, 1980	55	\$33,823	\$1,860,265
APU/ESU	400218	July 13, 1981	<u>114</u>	38,041	<u>4,336,674</u>
			169		\$6,196,939

^aData purchase order prices were definitized.

OVERPRICING OF ARMY CONTRACTS DUE TO
MISAPPLICATION OF SPARES FORMULA PRICING FACTOR

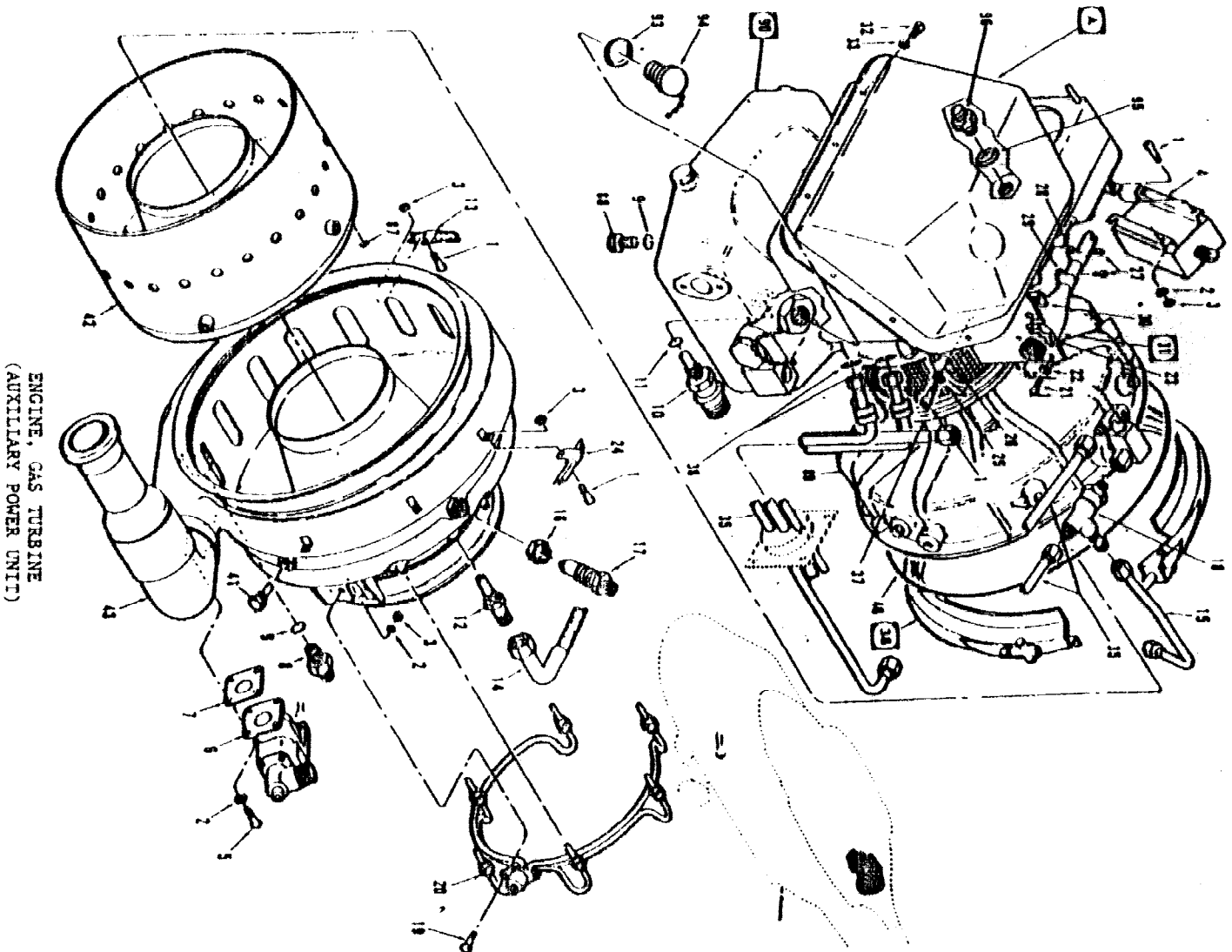
	Contracts DAAJ09-81-C-						Amount overpriced	
	-1806	-1161		-0715	-0716			-0322
		Modif. P00001			Basic	Modif. P00002 ^a		
Negotiated unit prices	\$ 48,750	\$ 6,380	\$48,000	\$48,000	\$48,000	\$6,091		
Proposed unit prices								
Base costs	25,803	3,312	26,450	27,076	24,616	3,124		
Spares formula (95%)	<u>24,512</u>	<u>3,146</u>	<u>25,127</u>	<u>25,723</u>	<u>23,384</u>	<u>2,967</u>		
Total	<u>50,315</u>	<u>6,458</u>	<u>51,577</u>	<u>52,799</u>	<u>48,000</u>	<u>6,091</u>		
Less:								
Formula pricing ^b								
(1) Obsolescence	2,451	314	2,513	2,572	2,339	297		
(2) Packing material	516	66	529	542	492	62		
(3) Spares support	5,135	659	5,263	5,388	4,899	622		
(4) APDM ^c	<u>3,251</u>	<u>417</u>	<u>3,333</u>	<u>3,412</u>	<u>3,101</u>	<u>394</u>		
	<u>11,353</u>	<u>1,456</u>	<u>11,638</u>	<u>11,914</u>	<u>10,831</u>	<u>1,375</u>		
Net	38,962	5,002	39,939	40,885	37,169	4,716		
Less:								
Negotiated reduction ^d	<u>1,208</u>	<u>60</u>	<u>2,756</u>	<u>3,721</u>	-	-		
Net adjusted price	37,754	4,942	37,183	37,164	37,169	4,716		
Unit overpricing	10,996	1,438	10,817	10,836	10,831	1,375		
Quantity	60	60	5	4	2	5		
Total overpricing	<u>\$659,760</u>	<u>\$86,290</u>	<u>\$54,085</u>	<u>\$43,344</u>	<u>\$21,662</u>	<u>\$6,875</u>	<u>\$872,006</u>	

^aBase and spares formula costs estimated on 100- and 95-percent relationship to the negotiated unit price; Turbomach proposed unit price was the amount negotiated for -0716 basic.

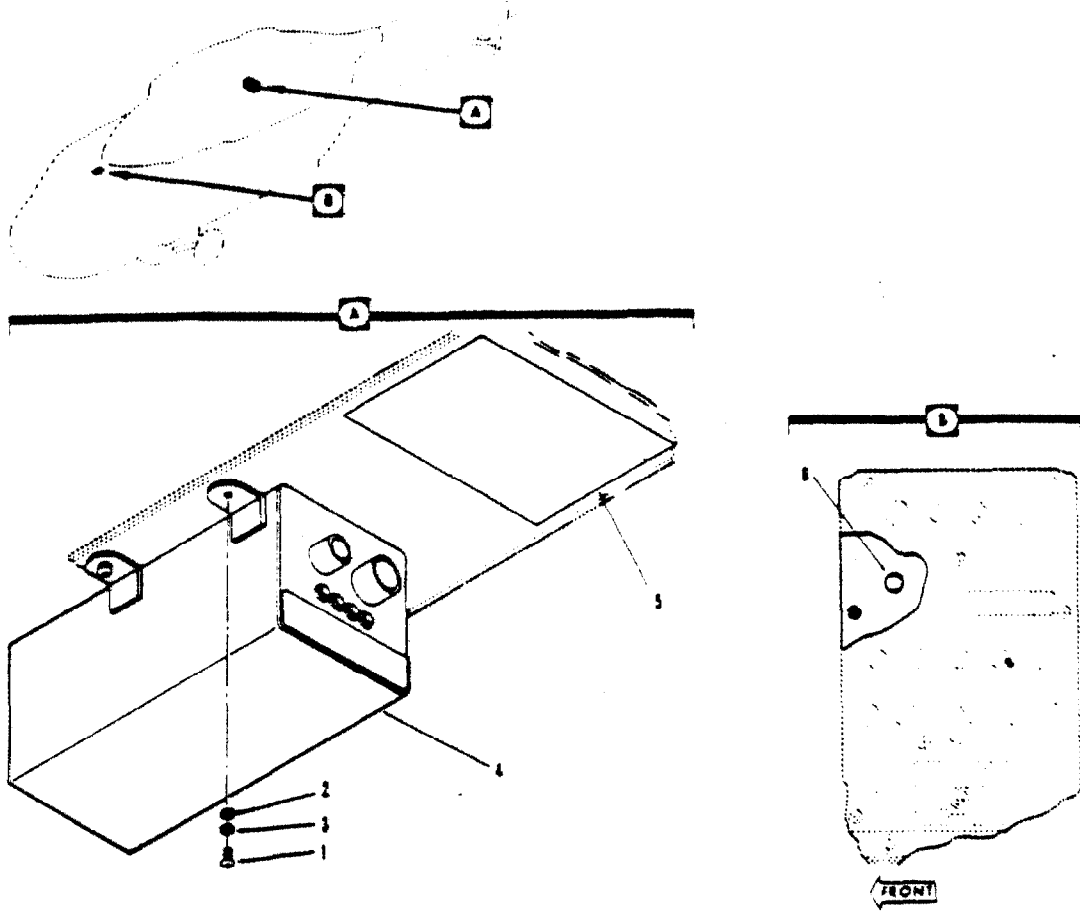
^bCost elements unique to the spares formula factor; does not include general and administrative expenses and profit.

^cIncludes annual product development maintenance engineering applicable to the spares formula; other APDM costs included in the general and administrative expense rate of 30 percent were not excluded.

^dThe negotiated reduction results from the application of percentage reductions achieved during contract negotiations to proposed unit prices exclusive of the formula pricing amounts in note b.



SOURCE: U.S. ARMY AVIATION SYSTEMS COMMAND



CONTROL INSTALLATION, AUXILIARY POWER UNIT
(ELECTRONIC SEQUENCE UNIT - ITEM 4)

SOURCE: U.S. ARMY AVIATION SYSTEMS COMMAND