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Federal Aviation Administration's Long Range Radar System  
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Testimony before the House Committee on Government Operations:  
Government Activities and Transportation Subcommittee; by Jerome  
H. Stolarow, Deputy Director, Procurement and Systems  
Acquisition Div.

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The Federal Aviation Administration's (FAA's) acquisition of long range radar systems, ARSR-3, involved a number of problems. The agency lacked a sound strategy leading to the award of the production contract for the system. It was unclear whether or not a prototype system was really required to demonstrate operational capability of the radar. The prototype contract was prematurely suspended with limited results obtained. Westinghouse submitted a proposal to build a prototype ARSR-3 radar that was clearly priced below its estimated costs. The FAA permitted Westinghouse to buy into this program, in effect limiting competition by other qualified contractors. After accepting Westinghouse's offer to produce a prototype radar at a loss, the FAA awarded a cost-type contract and did not monitor the costs. As a result, Westinghouse overran the estimated costs and did not deliver a prototype system. The FAA did not independently develop a detailed cost estimate of the prototype system it planned to purchase. Although the rough estimates indicated a prototype would cost \$7.8 million, the contract was awarded to Westinghouse at \$3.5 million. Eight months after the contract was awarded, Westinghouse notified FAA that its cost estimate had risen about 100%. To minimize costs, FAA then reduced the scope of the prototype program and instructed Westinghouse to proceed at a reduced level of effort. The total paid to Westinghouse for the prototype program was \$4.4 million. The FAA stated that no major technical risks remained and they had design drawings suitable for final fabrication. After 35 contract modifications, Westinghouse now has a contract to provide 27 radar units at \$51 million. (SW)

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STATEMENT OF  
J. H. STOLAROW  
DEPUTY DIRECTOR  
PROCUREMENT AND SYSTEMS ACQUISITION DIVISION  
BEFORE THE  
SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION  
HOUSE COMMITTEE ON GOVERNMENT OPERATIONS

ON

FEDERAL AVIATION ADMINISTRATION'S  
LONG RANGE RADAR SYSTEM ARSR-3

Mr. Chairman and Members of the Committee:

We appreciate the opportunity to appear at these hearings to discuss the Federal Aviation Administration's acquisition of long range radar systems, ARSR-3 which was the subject of a General Accounting Office report dated August 25, 1976.

In our report we were highly critical of FAA's management of this procurement. We think this is a good case study of how not to buy major equipment because:

--FAA's acquisition strategy was uncertain - they were not sure how they wanted to go about acquiring the new radars

--FAA permitted Westinghouse to buy into this program - in effect limiting competition by other qualified contractors

--After accepting Westinghouse's offer to produce a prototype radar at a loss - FAA awarded a cost type contract and did not monitor the costs. As a result, Westinghouse overran the estimated costs and did not deliver a prototype system.

I would like to discuss, in some detail, the events leading to this program and our evaluation of FAA's procurement.

The need to improve the Nation's air traffic control system became apparent during the mid-50's because the Nation's airspace was overcrowded and the airports, navigational aids and air traffic control system had become outdated. From 1957 through 1964, the FAA had obtained long range radar systems from the Raytheon Company which were designated air route surveillance radar (ARSR) -1 and -2 to improve control of aircraft enroute between terminals. Further studies of enroute air traffic control problems resulted in the appropriation of \$6 million in 1969 for the purchase of five more advanced systems to be designated ARSR-3's. This purchase was postponed, however, because the Bureau of the Budget had concern over possible duplication of the FAA system with the United States Air Force system. A joint FAA-U.S. Air Force group, in October 1970, reaffirmed the need for a 112 unit long range radar system, consisting of existing FAA units, U.S. Air Force systems and some new ARSR-3's.

In February 1971, FAA's airways facilities service prepared performance specifications and a rough cost estimate, and in March of 1972 requested proposals for a firm-fixed-price contract for 29 units one being a preproduction unit to be field tested before the remaining 28 would be produced.

This approach was changed in May 1972 when FAA decided to procure a prototype ARSR-3 under a cost-type contract. The FAA contracting officer believed the proposed new radar entailed considerable technical risk and should be viewed as a developmental effort, even though proven subsystems were to be used. If in fact there was considerable technical risk involved, this method of procurement (a cost-type contract for a prototype) was certainly appropriate. We noted, however, that FAA engineering personnel did not agree with the degree of risk involved.

During the period of May through November 1972, negotiations were conducted with four technically qualified contractors who had submitted proposals ranging from \$4.5 to \$7.1 million (see chart 1). During the negotiations, it became clear that Westinghouse was proposing a price for the prototype that was less than its estimated costs - that is - a loss contract. It not only cut its initial estimated price in half, but stated it would "absorb" \$250,000 in costs. This fact was called to the attention of the Secretary of Transportation on December 27, 1972. (See Chart 3)

In January 1973 a prototype program was initiated by an award of a \$3.5 million cost-plus-incentive fee contract to Westinghouse Electric Corporation.

In August 1973, about 8 months after the contract was awarded, Westinghouse notified FAA that its cost estimate had risen about 100 percent. To minimize cost, FAA then reduced the scope of the prototype program and instructed Westinghouse to proceed at a reduced level of effort to obtain design reports and conduct tests of some experimental component assemblies. System tests, hardware fabrication, onsite installation and operational tests were all deleted from the contract requirements. Of 69 tests areas that were originally contemplated, 11 subsystems tests were performed and some limited component tests were completed.

In February 1974, the FAA recommended to the Department of Transportation abandonment of the prototype program and requested that it be permitted to proceed with the procurement of 26 production ARSR-3's. FAA stated that no major technical risks remained and they had design drawings suitable for final fabrication. In April 1974 the prototype program was formally discontinued. The total paid to Westinghouse was \$4.4 million. Four months later, the FAA issued a request for technical proposals as the first part of a two-step procurement for production radars. The second step, in March 1975, was for bids on a formally advertised contract. Three contractors

submitted acceptable technical proposals (Texas Instruments, Bendix Corporation and Westinghouse) under the first step and subsequently submitted bids. Westinghouse was the low bidder and, in June of 1975, was awarded a contract to deliver and install 16 production systems. Currently, after 35 contract modifications, the price is estimated at about \$51 million for 27 radar units (See Chart 2).

Installation, checkout, field testing and reliability/maintainability demonstrations for the first ARSR-3 radar were originally scheduled for completion in July 1977, but have been delayed until January 1978. The first unit was supposed to go into service in January 1978 but now is expected to go into service in February 1978.

\* \* \* \* \*

GAO found a number of things that were wrong in the way FAA went about acquiring the long range radar system.

UNCLEAR NEED FOR PROTOTYPE

First, the agency lacked a sound strategy leading to the award of the production contract for the system. Initially, it was unclear whether there was a need for a prototype radar. But because of the contracting officer's concern over the technical risks involved, FAA contracted for a single prototype which was never completed.

All major ARSR-3 subsystems had been previously used by the military and others. But a primary purpose of the prototype program was to fabricate and test an operating ARSR-3 because the subsystems had never been combined into an operative system. Thus, integrated system testing was to have been a critical phase of the prototype program.

But the prototype contract was prematurely suspended with limited results obtained. Thus, there was no assurance that FAA would obtain satisfactory equipment with a succeeding production contract, although FAA did state the major concerns were resolved in the prototype's completed design drawings.

There was a difference of opinion among FAA personnel as to the technological risks involved in this program and it was not clear whether or not a prototype system was really required to demonstrate operational capability. The contractor's proposals were based upon detailed specifications prepared by FAA and the contractors were required to produce the prototype based on these specifications. The use of detailed specifications on a prototype, however, appears inconsistent with the objectives of a developmental effort.

Several Transportation officials appeared to favor continuing prototype development. One official stated that the documentation did not show an adequate level of additional information had been acquired during the prototype design to support truly competitive procurement. Another

official cited the attractiveness of continuing the prototype contract and issuing a two-step competitive contract upon its completion because of the availability of a prototype for evaluation.

We believe that it was, and still is unclear whether or not a prototype system was really required to demonstrate operational capability of the radar. Further, in view of the technical risks that may have been involved which FAA contends were resolved in the prototype drawings but not operationally, it is questionable whether a production contract should have been awarded.

We are not technically competent to judge whether or not this was, in fact, a high risk program requiring development of a prototype. What we, in effect, are criticizing, is that FAA never made a clear determination of that risk, and then did not design an acquisition program consistent with the risk involved.

#### BUY-IN

The FAA, in our opinion, also permitted a buy-in by the contractor. While it may be acceptable commercial business strategy to invest in or buy into a program in anticipation of future business, it is incumbent upon the Government to assure that this practice is not used to unfairly eliminate other potential contractors.



In this particular case Westinghouse submitted a proposal to build a prototype ARSR-3 radar that was clearly priced below its estimated costs. The FAA, however, aware of this fact, awarded a cost-type contract, let the costs continue to rise, and then let Westinghouse off the hook after paying \$4.4 million. It is probable that this initial contract also put Westinghouse into a favored position for bidding on the production radars because it was able to do much in the way of the initial design and engineering work.

While we cannot speculate at what price another contractor - in a competitive environment - would have been able to produce acceptable radars for FAA, the series of events leading to this procurement, precluded serious consideration of the other contractors.

LACK OF DETAILED COST ESTIMATE TO  
ADEQUATELY EVALUATE CONTRACTORS PROPOSALS

FAA did not independently develop a detailed cost estimate of the prototype system it planned to purchase. It had a rough estimate made up previously by FAA's airways facilities engineers but it did not have a detailed estimate for the prototype procurement. Lack of such an estimate limited FAA's capability to evaluate the reasonableness of the price proposals it received from the contractors.

Although the rough estimates indicated a prototype would cost \$7.8 million, the FAA negotiated with four qualified contractors in an effort to reduce their bids which ranged from \$4.5 to \$7.1 million (See Chart 1). The negotiations were conducted over several months (May-November 1972) and the contractors reduced their bids several times.

Finally, the contract was awarded to Westinghouse at \$3.5 million.

The Defense Contract Audit Agency examined the proposals and pointed out that Westinghouse's normal pricing policy was not to exclude some of the factors that they did exclude in preparing this proposal. The Audit Agency pointed to the possibility that the voluntary cost reductions might not materialize.

NEED FOR INFORMATION  
ON COST TO COMPLETE

Cost-type contracts are appropriate in many cases for developmental projects. But in administering any cost-type contract, it is essential that the agency maintain a close check over estimated cost to complete the work, especially on a contract where the contractor's initial estimate was reduced by 50 percent and it was proposing to absorb a loss.

Periodic updates of estimated costs to complete the contract are needed to provide early visibility of potential

cost growth so that remedial action may be initiated. This close check was not accomplished on the prototype contract and as a result, about 8 months after contract award, the contractor surprised FAA officials with its estimate that the estimated cost had risen about 100 percent.

FAA received monthly actual and budgeted cost data and required notification from the contractor, under a limitation of costs clause, of significant cost increases. But Westinghouse was reluctant to submit periodic estimates of the cost to complete the prototype contract since it was not required to do so.

FAA people said that the agency really had no prior advance notice of this condition. They said also that during this period they pressed several times for cost to complete estimates but there was no contractual requirement that such estimates be made.

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Mr. Chairman, in summary, we believe this case, at best, indicates a lack of concern on FAA's part for good procurement practices. It is difficult to say how much additional costs were incurred by the elimination of any effective competition. Most important, however is, that at this date, no radar systems have been delivered for operational testing and the Government is not yet assured of obtaining an acceptable product.

In its final comments on our report dated November 19, 1976, the Department of Transportation disagreed with our conclusions. They did not agree that any additional costs were incurred, that they permitted a buy-in, or that there is any question about obtaining acceptable systems from Westinghouse. Our analysis of their comments, however, reveals no new information or rationale which would lead us to change our conclusions.

Mr. Chairman, this concludes my prepared statement. I will be happy to answer any questions you may have.

# TECHNICAL RATINGS, COST PROPOSALS AND NEGOTIATIONS FOR PROTOTYPE

	WESTINGHOUSE	BENDIX	G.E.	RAYTHEON
TECHNICAL RATING	86.13%	86.17%	79.74%	81.66%
INITIAL PROPOSAL	\$7,092,526	\$4,501,184	\$4,553,167	\$6,978,665
NEGOTIATED PRICE	4,291,494	4,029,585	4,902,052	7,174,497
BEST \$ FINAL	3,485,761	3,898,061	4,601,460	6,924,988

**CURRENT ESTIMATE OF COST  
TO COMPLETE CONTRACT WITH  
WESTINGHOUSE ELECTRIC CORPORATION  
FOR 27 ARSR-3'S**

**IN MILLIONS  
\$41.4**

**26 ARSR-3'S, DATA AND SPARE PARTS**

<b>CHANGES</b>	
<b>ONE ADDITIONAL SYSTEM</b>	<b>\$2.5</b>
<b>PRICE ESCALATION</b>	<b>3.5</b>
<b>ADDITIONAL SPARE PARTS FOR DEPOTS</b>	<b>1.6</b>
<b>CHANGE FROM FIBERGLASS TO PREFAB STEEL STRUCTURE</b>	<b>.7</b>
<b>OTHER MODIFICATIONS</b>	<b>1.4</b>
<b>TOTAL ESTIMATED COSTS AS OF NOV. 1977</b>	<b>\$51.7</b>

**EXCERPT FROM MEMO DATED DEC. 27, 1972  
FROM: ASSISTANT SEC. FOR ADMINISTRATION  
TO: THE SECRETARY**

(UNDERSCORING ADDED BY GAO)

"WE DO NOTE, HOWEVER, THAT THE WESTINGHOUSE PRICE WAS INITIALLY PROPOSED AT \$7,092,526, \$ WAS CUT IN HALF DURING NEGOTIATIONS. WHILE THE FAA MEMORANDUM SPEAKS GENERALLY ABOUT THE REASONS FOR THIS DRAMATIC REDUCTION, IT MAY BE THAT WESTINGHOUSE IS "BUYING IN," IN ORDER TO OBTAIN A COMPETITIVE ADVANTAGE ON THE PRODUCTION QUANTITY (ALTHOUGH THE MAXIMUM WESTINGHOUSE PROFIT IS SHOWN TO BE 5%, OR 194,000, WESTINGHOUSE IS ALSO PICKING UP \$250,000 IN COSTS, SO THAT ACTUALLY UNDER THE BEST OF CIRCUMSTANCES THERE CAN BE NO PROFIT UNDER THIS CONTRACT)."