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FAA ELECTRONIC VOICE SWITCHING SYSTEM CONTRACT

GOVERNMENT

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HEARING

BEFORE A

SUBCOMMITTEE OF THE
COMMITTEE ON

GOVERNMENT OPERATIONS
HOUSE OF REPRESENTATIVES

NINETY-THIRD CONGRESS

SECOND SESSION

AUGUST 14, 1974

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FAA ELECTRONIC VOICE SWITCHING SYSTEM CONTRACT

WEDNESDAY, AUGUST 14, 1974

HOUSE OF REPRESENTATIVES,
GOVERNMENT ACTIVITIES SUBCOMMITTEE
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met, pursuant to the consideration of other business, at 10:10 a.m., in room 2203, Rayburn House Office Building, Hon. Jack Brooks (chairman of the subcommittee) presiding.

Present: Representatives Jack Brooks, Cardiss Collins, Robert P. Hanrahan, and Stanford E. Parris.

Also present: William Jones, staff director; William H. Copenhaver, counsel; C. Don Stephens, research analyst; Lynne Higginbotham, clerk; Kathryn Lokos, clerk; and James L. McInerney, minority professional staff, Committee on Government Operations.

Mr. BROOKS. A quorum being present, the subcommittee will come to order.

On several occasions in the past, this subcommittee has had an opportunity to review improper procurement practices of the FAA. Today, we are concerned about the circumstances surrounding the award and performance of a \$78 million contract which, only 19 months later, passed the \$100 million mark and was 36 months behind schedule.

In 1971, following several years of study, FAA sought bids for the procurement of an electronic voice switching system to replace the existing telephone system operated by A.T. & T. The electronic voice switch is a communications network providing speedier voice communication interconnections between air route traffic control towers, flight service stations, control towers, remote controlled air-ground facilities and military bases.

This system required some new designs and some new hardware. Although there was no way at that time that either FAA or the bidders could determine what the production models might cost, FAA elected to procure both the prototype system and 21 production models under a single contract.

In January 1973, the contract was awarded to Philco-Ford for \$78 million for all 22 units. The contract was in two parts: Schedule 1 for the prototype was cost-plus-fixed-fee with a ceiling price of \$12.7 million; schedule 2 for the 21 follow-on production units at a fixed price plus incentive fee with a ceiling of \$65.3 million.

On January 15, 1973, I wrote to former Secretary of Transportation John Volpe questioning whether the contractor had the technical competency and experience to develop the system. In June 1973, the new

Secretary of Transportation, Claude Brinegar, responded, assuring me that Philco-Ford had demonstrated the ability to design and install such a system.

In December 1973, 6 months later, I sought a full report on the severe problems being experienced with this contract from the Administrator of FAA. Mr. Butterfield acknowledged that there would be at least a 1-year delay and a \$16.9 million increase in the contract price for various reasons, including some changes in the specifications.

[Correspondence relative to the above paragraphs follows:]

JANUARY 15, 1973.

HON. JOHN A. VOLPE,
Secretary of Transportation,
Washington, D.C.

DEAR MR. AMBASSADOR: The FAA recently announced the award of a contract to the Philco-Ford Corporation for the development of an electronic voice switching system for the air route traffic control centers.

The timely installation and reliable performance of the system is apparently essential to the success of our air traffic control modernization plans. Some questions have been raised about the technical competency and experience of the contractor in developing and installing systems of this nature.

As Chairman of the Government Activities Subcommittee, I would appreciate a complete report on the evaluation procedures which DOT used in determining the acceptability of the Philco-Ford Corporation proposal. I am particularly interested in the contractor's experience in this field, the benchmarks they had to meet at this time, and your evaluation of their capability to devise a workable software program and to install the needed hardware. In conjunction with this, I would like to know what type of hardware components they intend to use and whether or not these are presently available (with minor modification) or if they have to be developed.

It is of great concern to me that the target date for installation of the electronic voice switching systems in our ARTC centers is some 8 years away. This seems to be an extremely long stretchout period for what appears to be basic communications equipment. Is this delay due primarily to technological problems or budget considerations? I would also be interested in knowing whether this system differs appreciably from those used by the Army and the Air Force.

With every good wish, I am
Sincerely,

JACK BROOKS, *Chairman.*

THE SECRETARY OF TRANSPORTATION,
Washington, D.C., February 21, 1973.

HON. JACK BROOKS,
Chairman, Government Activities Subcommittee of the Committee on Government Operations, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Further reference is made to your letter of January 15, 1973, concerning an award to Philco-Ford Corporation for electronic voice switching systems for the air route traffic control centers.

A report covering the points raised in your letter is currently being prepared and will be forwarded to you at the earliest opportunity.

Sincerely,

CLAUDE S. BRINEGAR.

THE SECRETARY OF TRANSPORTATION,
Washington, D.C., June 1, 1973.

HON. JACK BROOKS,
Chairman, Government Activities Subcommittee of the Committee on Government Operations, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: In accordance with my letter of February 21, I am enclosing the report concerning the award to Philco-Ford Corporation for electronic voice switching (EVS) systems for the air route traffic control centers. As you will note, the report is in two parts—Attachment A (a reply covering

the specific questions raised in your letter) and Attachment B (a group of charts which support and expand upon the information contained in Attachment A).

I trust this documentation will be satisfactory.

Sincerely,

CLAUDE S. BRINEGAR.

ATTACHMENT A

REPORT ON THE ELECTRONIC VOICE SWITCHING (EVS) PROCUREMENT

In accordance with applicable Federal Procurement Regulations (FPR) relative to negotiated procurement, award has been made to the firm whose proposal, both technical and price, has been determined the most advantageous to the Government. The North Electric and Philco-Ford technical proposals were evaluated to be substantially equal. The third proposal, that of Litcom, was evaluated to be technically unacceptable. Award was made to Philco-Ford since their negotiated price was distinctly advantageous to the Government, their best and final offer being approximately 16% lower than that of North Electric.

The EVS system is to be designed to function within the specific environment and particular technical interrelationships inherent in air traffic control communications. Though the EVS uses many conventional switching techniques, including some used in Army and Air Force systems, the major aspects of this switching system must be developed for specialized air traffic control requirements through this procurement. Therefore, no source can really claim specific experience in this precise area.

Philco-Ford's experience, however, demonstrates its ability in design and installation of special purpose switching software and hardware. This experience includes Government programs, both domestic and foreign, and commercial switching lines. Among the Government programs are:

1. Design and installation of an Integrated Mission Control Center for NASA involving similar switching and human interface problems (\$150 million).
2. Development and installation of digital switches for the military world-wide AUTOSEVOCOM which provide the means for circuit switching for global conferencing permitting AUTOVON linkage (\$18 million).
3. Design and installation of AUTODIN under which Philco-Ford successfully developed and installed twelve (12) automatic digital message switching centers (ADMSC) in overseas areas of the world-wide automatic digital network (AUTODIN) (\$70 million).
4. Installation, maintenance of NORAD computer systems including installation and maintenance of automatic switching systems for the Air Force (\$50 million).
5. USAF AIRCOMM Modernization Program by Philco-Ford involving air-to-ground teletype, voice and facsimile communication (\$53 million).
6. For the Iranian Government, built and installed a comprehensive communication network (\$50 million).
7. Designed, built and initially operated integrated wideband communications systems (IWCS) for the U.S. Army in Thailand (\$101 million).

The technical proposals of the competing companies were evaluated under procedures and criteria developed in advance of the issuance of the RFP in which they were set forth. To further assure that all offerors understood the RFP requirements and evaluation criteria, a pre-proposal conference was held for the express purpose of discussing all requirements including the twenty-two (22) criteria.

The Advanced Procurement Plan (APP) of August 16, 1971, specified the procurement method by which the EVS requirements would be met. It included negotiation and contracting objectives and safeguards, scheduling as related to funding, as well as the overall bases under which source selection procedures and criteria would be developed. These included establishment of the levels of source selection boards and authorities which would be charged with developing, applying and reviewing the source selection methods, procedures and criteria.

The proposal evaluation procedures which were accordingly developed established the source selection team consisting of thirty (30) members from the Federal Aviation Administration (FAA) and other Government agencies who

constituted the basic Source Selection Evaluation Board (SSEB) to review proposals. This team was divided into six (6) separate groups to evaluate proposals in respective assigned areas of review, as follows:

- A. Systems Design and Technical Requirements.
- B. Quality Assurance.
- C. Reliability and Maintainability.
- D. Schedule.
- E. Management.
- F. Pricing Data.

Each of the Areas, A through E, were evaluated employing the twenty-two (22) criteria set forth in the RFP in accordance with specified point scoring instructions consistently applied. Technical evaluation and price/costing evaluations were kept distinctly separate, the latter information being kept from the technical evaluation personnel through strict security procedures.

A complete report on the evaluation procedures and the evaluation of Philco-Ford's capability to successfully perform on the EVS contract is contained in the summary employed for the pre-award review at the DOT Secretarial level, Attachment B. This will respond to the specific areas of concern in your letter of inquiry with respect to Philco-Ford's software capability and the intended usage and availability of hardware components. The "DO" code represents Philco-Ford, "CH" North Electric and "MT" Litcom.

With respect to the matter of qualifying benchmark tests the offerors had to meet, the RFP required each offeror to include in his proposal solutions to three (3) related benchmark problems which would permit the Government to assess the processing capability of the processor proposed for use in EVS applications. The problems consisted of demonstrations of the capacity/efficiency of the processor and software in performing three (3) basic switching functions of the EVS system, employing combinations of hardware and mathematical analysis; specifically, the three (3) problems consisted of determining the time required to process: (1) an intraoffice telephone call; (2) an outgoing inter-office line to trunk telephone call; and (3) an inter-office incoming trunk to line telephone call. The timing for these tests starts from the end of dialing by the originator to the first ring at the called position. These benchmarks demonstrated Philco-Ford's capability in fulfilling the EVS call processing performance and timing requirements with available hardware facilities as described in the enclosed aforementioned summary.

The technical risks associated with the development of hardware are minimal and considered normal for procurements of this type of equipment. The risk associated with software is presented in Attachment B in terms of cost associated with time since there is no doubt that technically Philco-Ford has the capability of supplying the software required.

With respect to the relatively extended period for complete implementation of the EVS system, the overriding consideration is the absolute necessity for a complete evaluation of the initial system at NAFEC, prior to manufacture of the operational systems, in order to assure the safety of the airways. The development, testing and evaluation of this prototype system will in itself take approximately three (3) years—a schedule we feel cannot be realistically shortened since there are over 300 unique items of equipment arranged in six (6) major subsystems. At the successful conclusion of evaluation at NAFEC, production and installation of the EVS systems for each of twenty (20) air route traffic control centers is scheduled at the rate of five (5) per year for four (4) years. Though the last of these systems will indeed not be installed and operational for eight (8) years, the systems for some of the busiest ARTC centers will be installed during the fifth and sixth years. The nation's airways communications structure will be increasingly benefited as they become installed. It may be possible that the foregoing production schedule can be accelerated should additional funds become available during the course of the program.

With respect to your final inquiry, though various FAA requirements such as the PABX services are similar to military requirements, foremost among those that are not are:

1. The need for rapid reconfiguration which permits resectoring of air route traffic control centers to accommodate changes in air traffic density;
2. The need to remotely control unattended remote control air/ground (RCAG) facilities which are used exclusively by the FAA; and
3. The need to tailor the system design of position equipment and circuits to accommodate the various categories of duties each air traffic controller must efficiently perform.

DECEMBER 12, 1973.

Hon. ALEXANDER P. BUTTERFIELD,
 Administrator, Federal Aviation Administration,
 Washington, D.C.

DEAR MR. ADMINISTRATOR: Early this year, the FAA entered into a contract with the Philco-Ford Corporation for electronic voice switching systems for the air route traffic control centers. At that time, I addressed a letter to then Secretary John Volpe questioning whether FAA's evaluation procedures had been adequate and whether the contractor who was awarded the contract had exhibited capability to meet the software and hardware requirements. In addition, I expressed concern about the extremely long stretch-out period of eight years before the system would be completely installed and operational.

On June 1, 1973, Secretary Brinegar responded by sending me a report concerning the award of the contract to Philco-Ford Corporation and responding to my specific questions. The attachments to Secretary Brinegar's letter indicate that the technical proposal of Philco-Ford was acceptable to the Government and that their negotiated price was approximately 6 percent lower than that of the only competitor whose proposal was determined to be acceptable.

I have recently obtained information indicating that the FAA may indeed be experiencing severe problems with this contract, that you are facing substantial costs in excess of those negotiated, and that there may be some question as to the ability of the contractor to meet the FAA's requirements within the terms of the contract entered into. I would appreciate a complete report on the status of this contract, including the current estimate of schedule slippage, if any, and how much the estimated cost of both the prototype system and the follow-on system will exceed those negotiated in the contract. I would appreciate it if this information were available to me by the end of next week, Friday, December 21.

Sincerely,

JACK BROOKS, *Chairman.*

DEPARTMENT OF TRANSPORTATION,
 FEDERAL AVIATION ADMINISTRATION,
 Washington, D.C., December 21, 1973.

Hon. JACK BROOKS,
 Chairman, Subcommittee on Government Activities, Committee on Government Operations, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your inquiry of December 12 requesting information with respect to the status of the Federal Aviation Administration contract with the Philco-Ford Corporation for Electronic Voice Switching (EVS) systems.

The progress on the EVS contract by Philco-Ford has been satisfactory except for a 6-month delay that was beyond the control of either the contractor or the Government. This delay was caused by the severe shortage of components supplied by vendors. This shortage is being experienced throughout the entire electronics industry.

There are other schedule extensions that we are anticipating because of more planned changes to the specifications. These changes are being proposed by the operators and are in two categories:

1. Expansion requirements to support air traffic control operations in a manual environment in the event of partial or total failure of the evolutionary automated air traffic control systems.

2. A modified maintenance concept for EVS permitting improved utilization of existing maintenance staff. This change basically amounts to the addition of "state-of-the-art" diagnostic display devices.

The proposed changes will impose at least a 6-month delay in the contract schedule. This will result in more than a 1-year delay in delivery of the pre-production model to the National Aviation Facilities Experimental Center.

It is estimated that the proposed changes (contract modification) will increase the pre-production model and the 21 production model prices by \$6.5 and \$10.4 million, respectively. The net increase resulting from the contract modification and projected overrun will increase the pre-production model price from \$12.7 to \$19.2 million and the 21 production model price from \$65.3 to \$75.7 million, for a total increase in contract price of \$16.9 million. The total contract price will increase from \$78.0 to \$94.9 million. It is noted that the current total

EVS purchase cost (\$94.9 million) is less than 6 percent over the total cost (\$89.8 million) set forth in the original EVS Advance Procurement Plan dated February 9, 1971.

The increase in contract price does not take into consideration the savings or cost avoidance that will be realized from the technical changes. For instance, the need for additional maintenance staff will be avoided and will result in a cost savings (avoidance) of \$2 million/year. In addition, leased telephone circuit costs will be reduced by using "piggy back" techniques, thus permitting one circuit to perform the function of two, resulting in a cost saving (avoidance) of \$1.7 million/year for leased costs and a one-time cost of \$1.5 million for new construction charges. The total savings (cost avoidance) that may be realized will be approximately \$3.7 million/year. Although these savings do not result in a reduction of acquisition costs, it is evident that an overall saving accrues to the Government over the life cycle of the system, while at the same time achieving a more efficient operation.

Should the production option be exercised, delivery of the production systems will be on schedule. However, maintaining this production schedule is contingent upon a satisfactory factory test which will provide sufficient confidence for production release. Should this not be possible, only then will delivery times be adjusted.

Sincerely,

ALEXANDER P. BUTTERFIELD,
Administrator.

Mr. BROOKS. By early summer of this year, I received information that FAA and Philco-Ford were negotiating contract changes which would have pushed the cost to over \$100 million. It further appeared that delivery had slipped approximately 3 years behind schedule, and that the contractor had been paid \$12 million in progress payments though nothing had been delivered.

In the face of these rather serious problems, on Thursday, August 1, I announced a subcommittee hearing into this matter. The following Tuesday, the Administrator of FAA, Mr. Butterfield, called to inform me that he had canceled the contract.

Mr. Butterfield, I want to acknowledge on your behalf, and it is obviously a fact that should be made very clear, you were not at FAA when this contract was awarded, and that you probably took the proper action in canceling it at this time.

However, we are proceeding with the hearing in an effort to determine whether faulty procurement practices in the FAA that have continued for many years got the agency into this predicament and cost the taxpayers several million dollars.

Mr. Butterfield, it is a pleasure to have you here. We understand you have a brief opening statement. We would be pleased to receive it at this time.

Before doing so, would you please introduce your associates to the committee.

STATEMENT OF ALEXANDER P. BUTTERFIELD, ADMINISTRATOR, FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION; ACCOMPANIED BY DAVID R. ISRAEL, DEPUTY ASSOCIATE ADMINISTRATOR, ENGINEERING AND DEVELOPMENT; SPENCER HUNN, DIRECTOR, SYSTEMS RESEARCH AND DEVELOPMENT SERVICE; DAVE HADORN, SYSTEMS RESEARCH AND DEVELOPMENT SERVICE; AND RICHARD CROSS

Mr. BUTTERFIELD. Thank you, sir. I have with me seated on my right, Mr. David Israel, the Deputy Associate Administrator for

Engineering and Development. There are several other FAA staff members in the group behind me.

I would mention a few of them because the members of the subcommittee may wish to call on them. All are experts in their fields and all have had significant roles to play in these negotiations. One is Mr. Spencer Hunn, who is the director of our systems research and development service. Another is Mr. Jack Schroeder, who was a program manager on the EVS program. Mr. Dave Hadorn, also with systems research and development service, is here, and Mr. Steve Fishe and Mr. Jim Chestnut. I have already given those names to the reporter.

Mr. Chairman, I welcome the opportunity to appear before you and your subcommittee members today to set forth pertinent information concerning the FAA contract with Philco-Ford for an electronic voice switch (EVS) system. With me, as I said, is Mr. David R. Israel, Deputy Associate Administrator for Engineering and Development.

My brief presentation will focus on three areas:

(1) My recent decision to terminate this contract; (2) the background of this contract and events which transpired prior to its termination; and (3) steps I have taken to avoid a repetition of what, quite frankly, in my opinion, became an unacceptable contractual situation for the Government.

By wire to Philco-Ford on August 6, this contract (DOT-FA73WA-3202) was terminated immediately and in its entirety for the convenience of the Government. I took this step only after I had carefully reviewed the situation personally, considered alternative courses of action, and consulted with technical experts both within and outside of the FAA.

Now let me tell you precisely why the contract was terminated. It was for these reasons:

When the contract was signed in January 1973, schedule I called for one preproduction system, and its test and evaluation, for an estimated \$12.7 million. There was a schedule II option anticipated and it was for 21 production systems for an additional \$65 million.

By the beginning of this month, August 1974, the estimated cost of the schedule I prototype had risen from the original \$12.7 million to \$26.4 million, and the schedule II option appeared to be approximately \$75.7 million.

The doubling of the cost of the prototype, which really represented the extent of our firm commitment—because as I say, the schedule II production was in fact an option—was of utmost concern to me since it required immediate funding of a rather large amount of money—and from sources not readily identified. And accompanying the cost increases were schedule extensions, which were also of concern.

Another reason: there were unresolved technical problems in key areas which, while not considered insurmountable, represented to me the probability of more schedule delays and further cost escalation. By August I found that as hard as I tried, I could not assure myself that these technical and cost problems could be resolved within a reasonable time period.

A third reason: the primary basis on which the program was initiated related to cost savings—cost savings to be accrued in the future from owning rather than leasing these communications for our air traffic control centers. The system presently installed in the ARTCC's

(air route traffic control centers) is considered acceptable for the immediate future.

Thus—during my considerations—there was neither an immediate operational requirement for such a system in terms of new or improved communication capacity or performance, nor was there involved any direct issue of aviation safety.

Again, our major objective at the outset of these contract negotiations was cost savings—anticipated cost savings.

As we further reviewed the cost-benefit aspects of the EVS program, we found that the expected savings were slipping away as the system costs continued to rise. And it was clear that a great deal of additional detailed work would be required to put the future cost picture on a firmer basis.

Now—when I integrated all of these factors—the lack of an immediate and firm operational need, the lingering technical problems, the cost escalations, and uncertainty of economic benefits—I concluded that we were in an untenable, if not indefensible, situation. I also concluded that further delays, at a cost of several hundred thousand dollars per month, for further studies or assessments, held little, if any, promise of rescuing the situation—of sort of pulling this one out of the fire.

On this basis, I concluded that termination was in the best interest of the Government.

In no way does one make a decision such as this one easily—not in view of a past expenditure of some \$13 million. However—and I want to say this once again—the prospect of an additional expenditure of a like or greater amount of money, of at least another \$13 million, without a better guarantee or assurance of real benefit, was much less attractive. So, on this basis, the contract was terminated for the convenience, as I say, of the Government.

Let me next trace the history of this program, pointing out to you, with benefit of hindsight, what in my opinion went wrong.

As early as 1961, the FAA realized the potential technical and operational advantage of the use of electronic voice switches for voice communications. This gave rise to the concept of electronic voice switching systems for our air route traffic control centers, where a massive amount of interphone, intercenter, and voice radio circuit communications is involved.

In 1970, a major FAA effort went into the preparation and coordination of an EVS specification for the ARTCC's. In 1971, the FAA's Agency Review Board and the incumbent Administrator reviewed and approved the program plan. As I noted earlier, this program was primarily viewed as a means of making rather significant future cost savings.

By September 1971, the procurement was advertised and the request for proposals and specifications was released in November 1971. The procurement, as I mentioned a moment ago, had two parts or schedules: schedule I was for the design, manufacture, test, installation and evaluation of a single preproduction unit. This was to be on a cost-plus-fixed-fee basis.

Schedule II was for the manufacture, delivery, and turnkey installation of 21 systems—20 of them for our 20 centers and the remaining one for the FAA Academy at Oklahoma City. This procurement, to

be exercised by options, was to be on a fixed-price incentive fee basis.

Proposals from contractors were received in March 1972, and source selection consumed the rest of that year. The source selection procedure employed was patterned after the DOD—Department of Defense—technique and used a source selection evaluation board, a Source Selection Advisory Council (SSAC) and a source selection authority (the Under Secretary in this case). The procedure was designed to maximize competition.

Based on original submissions and opportunities for clarification and improvement, the idea was to qualify as many contractors as possible in a competitive range. The final selection from among those in the competitive range is the responsibility of the source selection authority, who acted upon recommendation of the SSAC, the Source Selection Advisory Council.

Three contractors responded to our request for proposals: Litton Systems, North Electric, and Philco-Ford.

Litton was disqualified, and North Electric came out somewhat higher than Philco-Ford on the technical factors, although both were found technically qualified. The final selection and award were made to Philco-Ford on January 2, 1973, on the basis of a cost differential of slightly over \$13 million, which was judged to outweigh the technical difference between the two proposals.

I believe the evaluation and selection was fair and that there was no preconceived choice or favorite candidate. I am aware, of course, that North Electric does not share that view.

After the contract award to Philco-Ford on January 2, 1973, a preliminary design review was conducted in April and May of that year. By that time, a delay was apparent in the schedule, submitted a year earlier, due to an industrywide component shortage.

Of more consequence were additional factors resulting from the review by a new team of FAA operating and maintenance personnel.

On the maintenance side, there was a desire to add new system features to further reduce the required number of maintenance personnel. On the operational side, new features were requested to provide capabilities in the event of failure of the growing automation of ATC functions.

These changes, both operational and maintenance, originally 36 in number, were ultimately reduced to 18 after lengthy discussions lasting through 1973. By December 1973, introduction of these changes increased schedule I from \$12.7 million to \$19.2 million—that is an estimated figure—and schedule II from \$65.3 to \$75.7 million, also estimated.

These extra requirements, added in mid-1973, had the effect of requiring that the capacity of the system be significantly expanded, thereby requiring a change in plans for the computer. At this point, then, the element of technical risk entered the picture.

In retrospect, I believe the number and significance of these operational changes were clear danger signals—but these signals were not well recognized in April and May of 1973. And that may have been the time to terminate.

I think the timing of the actual termination—that is termination of the contract on August 6 of this year, just this month—was more a function of several facts crystallizing almost simultaneously. The

cost and technical problems became increasingly clear, particularly following the change we ordered in June of this year.

As stated previously, the anticipated cost-benefit of the EVS system was deteriorating as the contract costs increased. And, together with these factors, the realization that the EVS program was not based on an immediate need tipped the scale in favor of termination, as I say, in early August.

Having canceled this contract, I intend to have my staff take a detailed look at the future requirements for such a system and at the alternative approaches for achieving such a capability on a timely and economical basis.

In particular, I desire to have both operational requirements and cost-saving aspects of such a system carefully reconsidered. We must try to do a better job in identifying pertinent cost elements and then settle upon a reasonable estimate of each.

I also want the alternative methods for achieving such capabilities carefully restudied and reconsidered.

Mr. Chairman, the expressed purpose of this hearing, I know, is to look at one procurement, the EVS, and to determine whether FAA operations were satisfactory. I am concerned that the EVS contract did not meet our expectations. And I am equally concerned that other projects now underway may not be living up to expectations.

I believe there is a definite need to improve our method of operation in this whole area, and I wish to assure you that this concern is being transformed into action so that we can improve our means of acquiring goods and services and systems.

In January, I ordered a comprehensive review of the entire FAA acquisition process. Pursuant to that order, a team was formed to identify problem areas, to recommend actions which should be taken immediately, and to identify any need for further, more detailed study.

This in-house team submitted a draft report to me in April, describing in detail the acquisition cycle, identifying areas of the cycle where improvement is needed, and making recommendations for both immediate and long-term improvements.

Briefly, the study identified a need for a more effective system for determining National Airspace System (NAS) requirements, for preparing system and equipment specifications, for managing the procurement process and for monitoring and control.

I might add here that the study was surprisingly objective. It was a very good study result.

Following my receipt of that study, a steering group was established. It comprised the associate administrators for administration; operations; policy development and review; engineering and development; and the chief counsel. This steering group has the responsibility now to consider the recommendations and to report to me by September 20 on which of the team's recommendations should be implemented. The steering group is now at work, and I will be kept informed of the progress this group is making.

Not satisfied solely with an in-house study approach to our acquisition problem, because it is never the best idea to merely look at yourself to see how you are doing, we have also contracted with the management consultant firm of Peat, Marwick, Mitchell and Co. to

review major FAA acquisition management procedures, looking at the overall problem from the top down in a systems oriented manner. The consulting firm is in the process of analyzing the data collected so that recommendations can be made based upon their findings.

Mr. Chairman, while reviewing the problems encountered with the EVS program, I became aware of the detailed study undertaken in 1969 and 1970 by this subcommittee of various aspects of FAA operations. I refer specifically to the twenty-ninth report by the Committee on Government Operations, published in July 1970, entitled "Problems Confronting the Federal Aviation Administration in the Development of an Air Traffic Control System for the 1970's."

That excellent report, containing six major recommendations, has been very useful to the agency. I am hopeful that as a result of today's hearing, we can expect to receive the same type of constructive analysis with regard to FAA acquisition management. We are open to any and all suggestions along that line.

To reiterate, Mr. Chairman, I welcome the opportunity to appear before the subcommittee today. Hearings such as this serve a very useful purpose for all.

I am optimistic that as a result of this hearing, as well as the in-house and Peat, Marwick, Mitchell and Co. studies, the FAA can get a better handle on its acquisition process and become more effective and efficient in acquiring those systems needed to keep the National Airspace System the most advanced and safest in the world.

I am available to answer any questions you may have, as is Mr. Israel.

Mr. Brooks. Thank you, Mr. Administrator. I do have several questions regarding the Administration's award and performance on this contract.

Mr. Administrator, in 1971, the FAA decided to make this procurement by negotiation, rather than by formal advertising, because there were some unique technical and operational requirements.

[Exhibit No. 1 follows:]

EXHIBIT No. 1

Advance Procurement Plan

No. 4400.1 - 14-71

19 February 1971
Revised 16 August 1971

ELECTRONIC VOICE SWITCHING SYSTEM (EVS)

Distribution List

GC-1	AD-1
NS-110	ED-1
NS-310	OP-1
AT-1	
RD-1	
RD-222	
LG-100	
LG-200	
LG-300	
LG-400	
SM-1	

Approval

LG-1	<u><i>M. P. Comafata</i></u> M. P. Comafata Director, Logistics Service Date: <u>8/25/71</u>
NS-1	<u><i>Spencer S. Mann</i></u> Spencer S. Mann Director, NASPO Date: <u>8/23/71</u>
DA-1	<u><i>Kenneth M. Smith</i></u> Kenneth M. Smith Deputy Administrator Date: <u>9/13/71</u>

Prepared by J. Abernathy and A. C. Grosvenor, Jr. (LG-120)
Room 440 Ext. 53148

1. Advance Procurement Plan No. 14-71 transmitted herewith in accordance with Order 4400.25, Advance Procurement Techniques, covers the procurement of a preproduction Electronic Voice Switching (EVS) System with option to purchase up to 21 production EVS Systems. The Plan reflects the latest management approval of funding and production equipment as follows:

<u>FY</u>	<u>No. Systems</u>	<u>\$M</u>		
72	1	5.5*		
73	- - -	8.4*		
74	5	21.0	production option	
75	5	17.0	"	"
76	5	17.0	"	"
77	6	20.0	"	"
		<u>\$ 89.8</u>		

*Funds have been authorized for the preproduction system.

2. Responsible Individuals and Offices

a. Program Office:

NASPO

R. Pringle, Chief, Engineering Branch, NS-110
Room 754, Ext. 63105

G. Hadorn, Electronic Engineer, NS-114
Room 733, Ext. 68290

b. Other Offices:

The MITRE Corporation

R. G. Nystrom

Communications Systems Subdepartment

McLean, Virginia

Phone: 893-3500, Ext. 2432

LGS

J. Abernathy, General Supply Specialist, LG-120
Room 440, Ext. 63143

J. Chestnut, Contract Specialist, LG-300
Room 404, Ext. 63105

P. Clark, General Supply Specialist, LG-200
Room 401, Ext. 63140

SMS

S. White, Chief, Program Support and Liaison Branch, SM-212
Room 612E, Ext. 63336

3. Function of the EVS

The EVS System will replace the present voice communications systems (WECO No. 200 System, FAA Radio control equipment, and TELCO PBX). The new system will provide for reduced costs, improved reliability and maintainability, greater flexibility, greater expansion capability and will require less space. Basically, it will provide interconnections for voice communications between air traffic control personnel in Air Route Traffic Control Centers (ARTCC's), Flight Service Stations, Towers/TRACONS, Remote Controlled Air/Ground (RCAG) facilities and with other facilities such as military bases and airline offices. It will also provide access to the commercial telephone network, the Federal Telecommunications Service (FTS,) and to AUTOVON.

The EVS will operate in a semi-automated environment. Certain functions already programmed for implementation in the NAS En Route Stage A and Terminal automation programs will be processed automatically between ATC computers through data communication channels. However, voice communications capability is required to supplement data communications, and to back up the automated communications channels in the event of their failure. Communications requirements change with changes in the density of air traffic. Also, an air traffic controller can safely handle a relatively fixed number of aircraft. This means that the size of the geographic area (sector) that can be managed by a controller varies with the variation in traffic density. Since peak traffic periods usually occur in early morning and late afternoon, efficiency and safety demand a change in sector size during these periods. Changes in the size of the geographic area assigned to a controller are accomplished by combining or decombining sectors. This in turn means a corresponding change in the communications facilities that must be available to the controller. EVS is designed to meet these requirements with maximum convenience and economy.

4. Background

A flexible voice communications switching system for the En Route Air Traffic Control Center is required to be more compatible with, and take full advantage of, the automation now being installed in the centers. The NAS En Route Stage A system will accommodate combining and decombining of sectors as traffic fluctuates, by automatically rerouting data so that it is presented to the appropriate sector or controller. The present voice communications system is rather inflexible and can be used effectively in the flexible air traffic control environment only through the use of redundant equipment at the controller positions.

In addition to the technical and operational advantages of a replacement system, there is also a significant economic advantage. This was first pointed out in MITRE Report M69-21, Joint MITRE/SRDS Voice Communications Study, July 1969, which compared interphone/intercom costs only. That is, it compared the cost of continuing operation with the leased WECO No. 300 System and the cost of replacing the WECO No. 300 System with an EVS System for interphone/intercom. An economic comparison of the total voice communications (interphone/intercom, radio, and PABX) has been completed by MITRE and published. The study shows that addition of radio in the economic comparison gives a greater cost advantage of replacing the total system than to replacing interphone/intercom only. The time at which an EVS System should replace the present system, on an economic basis only, will already be past by the time a system can be put into most centers.

5. Logistics Support

- a. The contract will provide for provisioning technical documentation and item identification in accordance with specification FAA-G-1210* and spare parts -- peculiar in accordance with specification FAA-G-1375*.
- b. The major requirements of specifications FAA-G-1210* and 1375* will be detailed in the EVS contract as individually deliverable items.
- c. The provisions of Orders 4560.1 and 4630.1B will apply to coordination procedures, deployment of spares, initial and follow on supply support.

*These specifications are undergoing revisions; LG-220 will provide advance copies if printed copies are not available when required.

6. Procurement Method

- a. Although the technology and, perhaps, much of the hardware is available, the system has not been produced that will satisfy the agency's unique technical and operational requirements. It is necessary, therefore, that the preproduction system (first system) provided be subjected to special interface tests and operational evaluation at NAFEC to determine system compliance with the EVS specification and acceptability for use in the NAS automated environment. These conditions render it impracticable to prepare adequate specifications to obtain competition by formal advertising. Therefore, procurement will be made in accordance with 41 USC 252(c) (10).

- b. A study has been conducted as prescribed in agency Order 4400.18 to determine whether lease or purchase of these systems would best serve the interests of the Government. This, and a relevant MITRE/SRDS study, support an estimated saving to the Government over a 15 year period of \$238 million if the systems are purchased rather than leased. Other significant technical and operational advantages supporting purchase were also identified. The procurement plan is, therefore, directed towards purchase rather than lease.
- c. A single competitive combination contract will be negotiated. The first phase will be CPFF, the second a fixed price type. The first phase will provide for part or all of the effort required for development of the first system and delivery to NAPEC for final testing. The contract will contain the following features:
- (1) If offeror's proposals exceed available funding, a level of effort contract for the maximum possible portion will be awarded, and the remainder will be procured as funds become available.
 - (2) Upon acceptance of the preproduction system, the contract will become a "turnkey" contract of a Fixed Price type for the production systems. If a Fixed Price Incentive or a Fixed Price Incentive-Successive-target type is selected the incentive, in either case, will be based on cost.
 - (3) The contract will contain four option Line Items to provide five systems each for FY-1974, 1975 and 1976 procurements and six systems for 1977 procurement.
 - (4) Basis for award will be evaluation of proposals for the full 22 systems.
 - (5) Due to the fact that award will be made on the basis of proposed prices for equipment to be delivered as late as calendar 1978, the contract will provide for economic adjustment factors and will provide for negotiation of price adjustments to cover such things as higher taxes and other Government induced financial effects to keep contingency costs to a minimum. (See e below)
 - (6) A Request for Proposals, (RFP) will be issued based upon agency performance specifications. The RFP will require the submission of technical proposals within 90 calendar days and price proposals within 110 days of the RFP issue date.

- (7) A pre-bid conference will be held within calendar days after the RFP issue date. Bidders will be required to submit questions in writing at least 15 days prior to the pre-bid conference. Prepared answers will be coordinated and used as hand-outs at the conference. The conference will provide a forum for the interchange of information and presentation of any points that may need clarification. Any necessary changes or clarifications of the specifications will be issued as an amendment to the RFP within 15 calendar days of the conference.
- (8) Source Selection and negotiation of a contract will be effected in accordance with evaluation criteria developed for evaluation of the technical proposals and other requirements of the RFP such as delivery, installation and acceptance schedules. Negotiation will be conducted with all bidders within a technical and cost competitive range as determined by the contracting officer.
- * The definition of "turnkey contract" as used will require the contractor to deliver, install, conduct site acceptance tests and provide maintenance of the EVS System at the ARTCC and associated RCAG sites until the system is accepted by the Government. The equipment will be installed by the contractor in specified areas in the Center and RCAG buildings. The contractor will submit, six months prior to scheduled equipment delivery, equipment and site installation plans for review and approval. This will permit sufficient time for the agency to provide facilities at the installation site such as power outlets, cable trays and lighting.
- d. This method of procurement promises advantages to the Government in terms of time, quality of product and money resulting from the following features:
- (1) Competition is retained both in technical proposals and in price down to the point of contract award. The pre-bid technical specification review provides the bidder more time and information to prepare his technical proposal.
 - (2) The deferral of price quotations until after submittal of technical proposals provides the bidder more time to calculate prices. At the same time the agency will be evaluating the technical proposal submittals and can inform bidders of any required changes before completion and submittal of price quotations. Further the confidential nature of price submittals provides a more favorable environment for negotiation of a contract at which time only the award price is disclosed.

- (3) Contract award time is reduced by including the request for price in the request for technical proposals instead of making these requests time sequential actions. Deferral of price quotations until after submittal of technical proposals also gives the agency time to initiate the evaluation of the technical proposals before the price quotations are received.

These procedures promote better prices, better technical proposals, a better end product and optimum utilization of procurement lead time.

- e. Essentially, it is proposed to structure a contract based on a competitive award such that upon successful development of the first system the contract will become a Fixed Price type, possibly FPI, (Cost only) and successive production options can be exercised up to a total of 22 systems. The production options and the fixed price type of contract will assure that the production equipment price will be based upon competitive procurement and that, in the best interests of the Government, the production units will be manufactured by the contractor providing the preproduction model. The solicitation will contain a provision, covering the production options, for four fiscal years, in accordance with ASPR 1-1501, which states in part under section 1-1504(d); "In firm fixed price contracts the option quantity may be considered in the evaluation for award if, before issuance of the solicitation, it has been determined at a level higher than the contracting officer that; there is a known requirement which exceeds the basic quantity to be awarded, but the basic quantity is a learning or testing quantity and there is some uncertainty as to contractor or equipment performance, and hence Multi-Year procurement is not appropriate."

The FAPR option clause 12A-1.71 is not considered appropriate for this procurement and the contracting officer may require a waiver of the FAPR clause and approval to use the ASPR clause cited above.

- (1) In view of the extended period of production to be covered under this contract, and in order to reduce contingencies and projected costs to a minimum it is contemplated to include in the contract economic and contingency clauses, based upon indices provided by the Labor and Commerce Departments. This clause will be discussed with contractors and their response and requirements will be utilized as an

of the factors to determine the contractor's confidence in its production costs. These clauses will permit an upward or downward revision of the contract price contingent upon industry wide changes in labor rates and material prices that are beyond the control of the contractor.

7. Significant Milestones. Occurrence of events are projected in numbers of days or months from date PR is received, estimated as 16 August 1971.

<u>Milestone</u>	<u>Time Elapsed</u>
1. PR to LG complete	0 days
2. Synopsise in Commerce Daily	10 days
3. RFP Issued	30 days
4. Receive Pre-bid Conference Comments	45 days
5. Pre-bid Conference Comments	60 days
6. Amendments, if any, to RFP Issued	75 days
7. Receive Proposals, start technical evaluation	120 days
8. Receive Prices on Complete RFP and start price analysis	140 days
9. Identify Bidders within Competitive Range	150 days
10. Complete Technical and Price Evaluation	200 days
11. Select Source and Complete Audit if necessary	210 days
12. Complete Negotiation	240 days
13. Award Contract	255 days
14. Preproduction Factory Tests Completed	26 months
15. Field Installation of Preproduction System Complete at NAFEC	28 months
16. Preproduction Critical Design Tests Complete	31 months
17. Preproduction system evaluation complete	37 months

18. Complete Preproduction cutover and system acceptance tests	39
19. Production Option Exercised (5 Systems), Lot 1	40
20. Production Option Exercised (5 Systems), Lot 2	52
21. Production Option Exercised (5 Systems), Lot 3	64
22. Production Option Exercised (6 Systems), Lot 4	76

8. Source Selection

There are several contractors that are either known or expected to be interested in bidding on this RFP.

Among them are:

- Astrodata
- Collins Radio
- IBM
- IT&T
- LITCOM Division of Litton Industries
- North American Phillips
- North Electric
- Philco Ford
- RCA
- Sylvania Electric

The RFP will contain qualification and technical evaluation criteria listing evaluative elements in an order of importance to the Government. These criteria will provide a base for the comprehensive evaluation of the technical proposals and for discussing, prior to bidders price submittals, clarifications or improvements in bidder technical responses.

Selection of the EVS contractor will be based on the requirements of the EVS Proposal Evaluation and Source Selection Plan (see Attachment).

9. Additional Information

- a. The size, complexity and specialty nature of the EVS limits competition to a relatively few large companies that have extensive experience in this field. No small business is expected to be a prime although several may appear on teams of larger companies.
- b. Quality control inspection and testing will be performed at the factory for all systems.

- c. The preproduction system will be subjected to acceptance tests at NAFEC which involve critical design areas and operational performance of the EVS System when interfaced with other systems under actual and simulated conditions.
- d. Final test and acceptance of the operating systems will be performed at each site.
- e. A synopsis of the RFP will be published in the Commerce Business Daily.
- f. Maintenance training is under consideration by SM and a course at the academy will be initiated. Operational training will also be available at the academy and in addition ATC personnel will have an opportunity to utilize the new system during the integration phase at each center.
- g. The contractor will provide personnel, supply support and necessary test equipment for installing, checkout, cutover and conducting system acceptance tests at each site.

EVS Proposal Evaluation and Source Selection Plan

Reason -In major programs contractor proposal evaluation and source selection is a difficult and time consuming process that demands cautious attention to organization and evaluation, planning, and intelligent and diligent proposal review. In addition, this program encompasses requirements for approximately six years and an equitable discipline to determine sources qualified to meet the general requirement is vital to the program.

Purpose -The prime objective of proposal evaluation and source selection, based upon negotiation with those companies within a competitive range, is to assure impartial, equitable and comprehensive evaluation of contractors' proposals and to assure selection of that source whose proposal offers optimum satisfaction of the Government's objectives; cost, schedule, performance and all other factors considered.

Reference -FAA Order 4400.6 covers technical proposal evaluation only. Although its general guidelines will be followed, the procedure set forth in this document will encompass financial, management and other factors in addition to technical.

Implementation

- A. Development of the proposal evaluation criteria will be the responsibility of the National Airspace System Program Office for the EVS System.
- B. The evaluation and source selection will be accomplished by the following functional units;
 - (1) The Source Selection Authority (SSA);
 - (2) The Source Selection Advisory Council (SSAC); and
 - (3) The Source Selection Evaluation Board (SSEB)

Operation

- A. The Source Selection Authority (SSA) will be the Deputy Administrator, DA-1, or an assigned alternate.

The SSA will:

- (1) Approve the selection of the chairman and membership of the SSAC and the chairman of the SSEB based upon the recommendation of this proposed Selection Plan. (Refer to B(2) below.)
- (2) Make the decision as to the source after review of written reports and consideration of all information and data available from the Source Selection Advisory Council and the Source Selection Evaluation Board.

B. The Source Selection Advisory Council (SSAC) approved by the SSA should consist of at least seven members from the agency elements that are identified in Figure 1. The chairman will be the Director, NASPO, or an assigned alternate. Membership should be at the Service Director level and designated alternates should not be lower than Division level. The Chief, En Route System Division, NASPO will also be a member of the Council. The chairman shall select one member as recording secretary and all decisions, orders and advisories will be documented.

The SSAC will:

- (1) Review evaluation criteria and weighting factors prepared by En Route System Division, NASPO.
- (2) Will prepare for the SSA approval a document specifying the members of the SSAC in accordance with this plan. When signed by the SSA the document and this plan will be the official agency position relative to source selection for the EVS System.
- (3) Establish the composition and certify the chairman of the SSEB utilizing the recommendation of this Selection Plan.
- (4) Review the SSEB findings and the price analysis and formulate recommendations to be submitted to the SSA.
- (5) Prepare the Proposal Analysis and submit to the SSA recommendation as to the source to be selected.
- (6) Document for the SSA's signature the justification for the Authority's selection.

C. The Source Selection Evaluation Board (SSEB) should be chaired by the EVS Program Manager and should be comprised of representatives from the agency elements with expertise as identified in Figure 1.

- (1) Contractor personnel are not eligible for board membership, however, they may be utilized as consultants. Board membership should be restricted to the minimum number required to assure a valid evaluation.
- (2) Alternates, consultants and subcommittees may be designated by the Board when and as required. Such designations shall be held to a minimum.
- (3) Legal counsel should be available to provide such consultation and advise as is necessary or desirable.
- (4) Duties of Board membership shall take precedence over normal job assignment. Accordingly, members will be detailed to the Board until completion of the proposal evaluation activity. This group will be fully responsible for performing the evaluation and submitting a written report to the Chairman of the SSAC.
- (5) The LG member assigned to this Board will be fully responsible for the safe keeping of the financial information and for the preparation of the price analysis. Any request to LG for pricing information must be in writing signed by the chairman of the SSEB.

Source Selection

A. Source Selection Evaluation Report

The SSEB shall prepare a report for the SSAC setting forth pertinent specific facts derived from the SSEB evaluation of the offerors proposals.

- (1) This report should list the prospective contractors in the order of the desirability of their proposals, and other factors considered. This list should have two major categories: satisfactory and unsatisfactory. The latter category would designate those proposals that the SSEB determines would not result in satisfying the Government requirements as spelled out in the RFP.
- (2) Back-up data describing the good and bad points of each proposal and their effect on the total proposal, should be provided for the Council to use in their review of the SSEB evaluation reports. Information presented in numerical form should be accompanied with suitable narrative to fully explain ratings.

- (3) The SSEB report should be signed by all members of the Board, unless there is not unanimous approval, in which event, a minority report(s) will be submitted.
- (4) The SSEB shall give presentations substantiating their evaluations if requested by the SSAC or the SSA. Presentations should not be elaborate or require expensive visual aid materials. (Simple flip charts should suffice.)
- (5) The SSEB will prepare debriefing reports for all unsuccessful offerors to be used when appropriate.

B. Source Selection Advisory Council Proposal Analysis

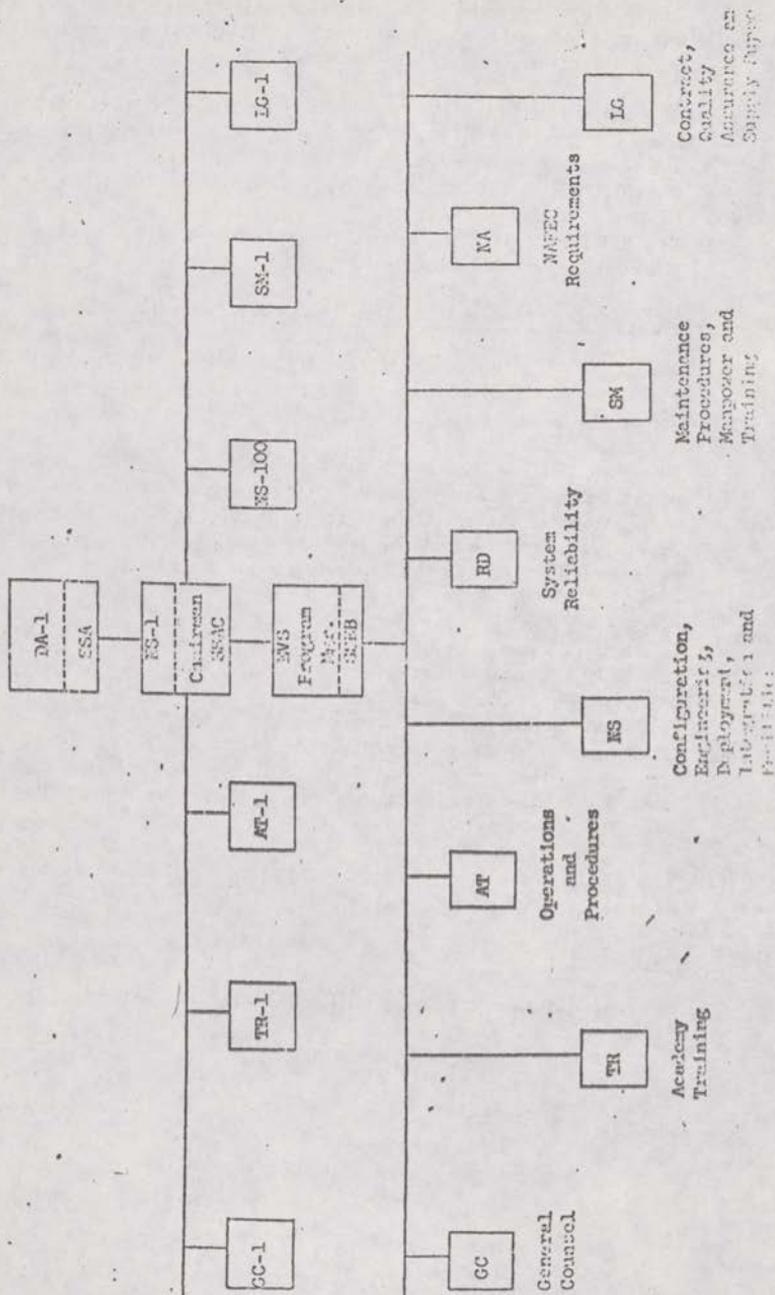
Based on the SSEB report and discussions of the evaluation with its members, the SSAC will prepare the Proposal Analysis report for submission to the SSA.

- (1) The Proposal Analysis will contain a summary of the findings of the SSEB, the results of the price Analysis, and the recommendations of the SSAC as to the source(s) to be selected. All members of the Council who concur shall sign the report. The report should include the following basic items:
 - (a) Procurement objectives
 - (b) Sources considered
 - (c) Criteria for evaluation
 - (d) Results of the evaluation
 - (e) Responsiveness of offerors
 - (f) Judgment of responsibility of offerors
- (2) Irreconcilable differences may be the subject of a minority report.
- (3) The SSAC should be prepared to present additional information as may be requested by the SSA.

C. Source Selection

The Source Selection Authority will make the final selection decision.

EVS PROPOSAL EVALUATION AND SOURCE SELECTION PLAN



Mr. BROOKS. In such circumstances, is it sound procedure for FAA to contract for both the prototype and the production models under the same contract?

Mr. BUTTERFIELD. I would say under normal circumstances, Mr. Chairman, that it is not the best procedure. It is, of course, preferable to have a preproduction model, to look at it, to examine it, to test it for reliability, to see that it works and to be able to say to yourself, I want some more of those.

Mr. BROOKS. Is it correct that in November 1971, more than a year before this contract was awarded, both the FAA's general counsel's office and the DOT's office of installations and logistics voiced serious reservations about this method of procurement on this contract?

Of course, you may not have looked at those, but we have documents which indicate that and we will place the documents in the record.

[Exhibits Nos. 2 and 3 follow.]

EXHIBIT NO. 2

CORRESPONDENCE BETWEEN THE OFFICE OF GENERAL COUNSEL, FAA, AND THE CONTRACTS DIVISION, FAA, CONCERNING THE LEGALITY OF THE EVS PROCUREMENT

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., November 1, 1971.

To: LG-300.

Subject: Request for proposal WA4M-2-0207; Electronic Voice Switching (EVS) System.

Subject Request For Proposal, Determination and Findings, and Request For Waiver of FAPR 12A-1.7103 were forwarded by LG-380 to the Procurement Legal Division for review and concurrence. This review has identified several serious deficiencies arising from the use of options, in accordance with the applicable Advanced Procurement Plan (APP) (No. 4400.1-14.71, dated 19 February 1971, as revised 16 August 1971, "Electronic Voice Switching System (EVS)"). This APP was *not* submitted to General Counsel's office for review. The options are for 21 EVS systems and support items, at firm fixed prices, following development of a prototype system and certain support items on a cost plus fixed-fee basis. (Approximate value \$13.8 million.) The options have an estimated value of \$74,000,000 out of a total EVS program of \$89,800,000 and are exercisable from FY 1974 through FY 1977. Performance extends into FY 1979.

The undefined nature of the EVS system and the cost risks inherent in its development are clearly demonstrated by use of a cost plus fixed-fee contract for the prototype system, and Paragraph 6a of the APP which states:

"Although the technology and, perhaps, much of the hardware is available, *the system has not been produced that will satisfy the agency's unique technical and operational requirements.* It is necessary, therefore, that the preproduction system (first system) provided be subjected to special interface tests and operational evaluation at NAFEC to determine system compliance with the EVS specification and acceptability for use in the NAS Automated environment. These conditions render it impracticable to prepare adequate specifications to obtain competition by formal advertising. Therefore, procurement will be made in accordance with 41 U.S.C. 252 (c) (10)." (Emphasis added)

Under these circumstances, any proposed "prices" for option systems developed prior to acceptance of the prototype unit would be little more than a guess. Further, were actual costs of performance to vary from the option price, there could be a problem holding the contractor to the option prices.

Thus, in a real sense, any resulting option would likely be illusory; enforceable if the contractor chose to accept an option exercise and unenforceable if he chose not.

Although options are to be exercised in FY 1974 through FY 1977 and equipment and support items are deliverable through FY 1979, the proposed RFP

secures competition only prior to award of the prototype system. For this reason, it may fail to meet legal requirements for securing competition.

The Comptroller General in discussing acceptability of options has stated: "As a practical matter, it seems to us that the additional quantities to be procured through the exercise of an option should be limited to 25 percent of the basic quantity being purchased save in exceptional circumstances. We further believe that, so far as supplies to be specially manufactured are concerned, options shall not be extended much more than 90 days beyond the date of initial award." (41 Comp. Gen. 687, 689)

The EVS RFP, with options for 2,100 percent of the systems initially procured and certain support items and expansion plug-in modules which are not to be procured at the time of the initial award and which may be exercised from FY 1974 through FY 1977, clearly does not meet the cited criteria. We have serious reservations whether the Comptroller General would find the proposed procurement acceptable.

In view of the significant legal questions concerning the proposed options and importance of the EVS program, it is recommended that the RFP and supporting file be forwarded formally to the Comptroller General, together with a request for his opinion regarding the propriety of use of the proposed options and this method of procurement.

The enclosed documents are returned without further comment pending resolution of the foregoing, at which time they should be returned to GC-53 for review and comment.

OWEN BIRNBAUM,
Associate General Counsel, GC-50.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., November 2, 1971.

To: File.

Subject: APP for EVS.

It is noted that GC-50 in its 1971 memorandum alleged on the Electronic Voice Switching (EVS) APP plan "APP 14-71 now in process and being developed with no GC contribution whatsoever". It is further noted that GC-50 in its 1 November 1971 memorandum states "this APP was not submitted to General Counsel's office for review".

The first statement is factually erroneous. GC-50 personnel were consulted on several problems during the development of the APP. As a matter of fact, input from GC-50 personnel substantially aided the development progress of the APP.

Meetings were held with GC-50 personnel on March 4, 5, 24 and April 5 and 22, 1971. Further, GC-50 personnel accompanied the planners and the engineers to two meetings involving FCC and AT&T personnel, relative to FAA usage of EVS in relation to the Carter phone decision. GC-50 personnel were specifically consulted on the use of long range options as included in the APP. On 5 April two draft APP's were presented to GC-50 personnel containing two approaches towards solving the same problem—the EVS proposing the long range option route (ASPR-1-1504(d)(v)(a) and (b)—and UPS/APP) which contained an alternate method involving a limited T/D article through prototype development. On 22 April GC-50 personnel advised "forget the limited TD" and recommend use of long range production item for both APP's.

Between the two meetings, LG-100 personnel spoke to Mr. Philip G. Reed of GSA, Director, Federal Procurement Regulations Division, who advised his organization supported the long range production option approach, and only the usual administrative lag of six (6) months to one (1) year stood between incorporation into the FPR of ASPR-1-1504.

Thus, despite the GC-50 statement in its 1 November 1971 memorandum, actually as early as 5 April 1971, GC-50 personnel had received a copy of the APP draft containing the same method of procurement as appeared in the final approved version approved by DA-1 on 13 September 1971, and to which GC-50 now objects.

It is also noted that GC-1 is on the "as approved" distribution list; yet it is not until 1 November 1971, objection is taken.

R. T. GOLRICK,
Chief, Policy and Plans Division, LG-10.

NOVEMBER 5, 1971.

Request for proposal WA4M-2-0207; Electronic Voice Switching (EVS) System.
GC-50.

Reference your letter of 1 November 1971, subject as above.

Inasmuch as there is no finding to the effect that the manner in which this procurement is being effected is illegal, the discussion which follows is based upon the presumption that legality is not an issue.

Before commenting upon the specific issues you raised as to the advisability of the method of procurement, I would like to briefly comment on certain peripheral matters which are raised.

In the development of the Advance Procurement Plan (APP) the Logistics Service did consult with, and obtain input from, the Office of General Counsel. It is not the policy of the Logistics Service to obtain legal opinions from the Comptroller General, or any other branch of the Government, other than the Office of General Counsel, FAA.

Your letter does not offer any assistance as to suggesting other procurement techniques which can be utilized to obtain the basic requirement objective, but rather confines itself to commenting on the approach set forth in the APP. It would be appreciated if, after obtaining a complete understanding of the purpose and objectives of the procurement, you would offer suggestions at the time the APP is being developed.

Utilization of a cost plus fixed fee for the prototype system is not based upon "the undefined nature of the EVS system." Rather, a cost reimbursement contract for the first unit was selected to afford the Government a greater voice in the technical approach initially, and to permit technical direction as necessary throughout the preproduction phase, a matter of major importance in view of the nature of the item. Because the extent to which the EVS has been defined, and in view of the fact that the required technology is well within the State-of-the-Art, it is not anticipated that drastic and substantial changes will occur in the preproduction unit which could result in changing the inherent and basic nature of the option items. Rather, the initial technical approach will be further refined during the preproduction phase.

Naturally, since it is recognized that any Government ordered changes during the preproduction phase may have some effect on the pricing in the options, there will be incorporated in the RFP a provision which will permit price adjustments for this reason as well as for escalation in labor and material costs over the period of the options. It is not accurate that competition is secured only as to the preproduction unit. The solicitation clearly states that in determining the low offeror, the cost/price competition will be based upon cost/price data submitted for the preproduction system and all options for production systems.

Since FAPR, DOPTR, and FPR are silent on this form of contract option, both the Office of General Counsel of FAA, and the Director of Federal Procurement Regulations, GSA, were consulted during the planning regarding the use of production options in accordance with ASPR 1-1500(d)(v)(a) & (b). Both responses affirmed the use of this technique in procurement planning and therefore development of the procurement method in APP 4400.1-17.71 proceeded accordingly.

The meeting held this date with you and members of your staff did not result in agreement on the proposed method to achieve the objectives of the procurement. In view of this office's position that the method of procurement is appropriate, we are proceeding to issue the solicitation.

SAMUEL RABINOWITZ,
Chief, Contracts Division, LG-300.

NOVEMBER 8, 1971.

GC-50

Electronic Voice Switching (EVS) System procurement.

NS-1

On November 2, 1971 at a meeting of the Source Selection Advisory Council for the EVS system procurement, you requested that Logistics Service and Office of the General Counsel consult with respect to the pending Request For Proposals. Accordingly, a meeting was held on Friday, November 5, 1971, with LG personnel. It was apparent at the meeting that no resolution of the differences had been effected; and, shortly after returning to my office from that meeting, I received the enclosed memorandum from LG-300 on this matter.

Notwithstanding what I believe to be certain inaccuracies and errors in that memorandum, I see no purpose in prolonging this particular matter by responding point by point to that document. I do note, however, that the LG memorandum indicates that that office is "proceeding to issue the solicitation." Since the solicitation (RFP) is, I believe, an item pending before the Source Selection Advisory Council, I am bringing this matter to your attention in this manner. The opinion of the Office of the General Counsel remains as stated in our memorandum of November 1, 1971 (a copy thereof is enclosed for your convenience).

OWEN BIRNBAUM,
Associate General Counsel, Procurement,
Legal Division, GC-50.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., November 8, 1971.

To: LG-1

Subject: Request for waiver of FAPR 12A-1.7103 (option quantity not to exceed 25% of base quantity, option exercise period not to exceed 90 days, and option quantity not to be included in award evaluation).

Procurement Request WA4M-2-0207 covers the fabrication, site cut over, installation, and acceptance testing of 22 Electronic Voice Switching Systems (EVS).

The necessary software, documentation, spares and contractor maintenance support and special tools and test equipment will be provided for each system. Additionally, certain sub-system boxes and training of FAA personnel will be included in the procurement.

The proposed contract structure will be as follows:

1. The first system and related supplies and services will be under a cost-plus-fixed fee arrangement. This effort is estimated at \$13,900,000 and will have a performance period of 34 months. Because of funds limitation, only \$5,500,000 will be funded at time of award.

2. The 21 additional systems, sub-system boxes and related items will be under a firm fixed price arrangement. These supplies and services will be subject to option provisions and will not be procured until exercise of the options. It is anticipated that the options will be exercised during the period extending from FY 74 through FY 77. This effort is estimated at \$79,630,000, with the last system acceptance tested 48 months after initial option exercise date.

FAPR 12A-1.7103(a) (1) states that the option quantity should not exceed 25% of the base quantity. Option exercise of at least one of the 21 additional systems would exceed the 25% limitation. FAPR 12A-1.7103(a) (2) states that the option exercise should not be made in excess of 90 calendar days from date of contract. In this case the initial option exercise cannot be made until after the acceptance of the first system or 31 months after date of contract, the last option may be exercised as late as 67 months after date of contract. FAPR 12A-1.7103(a) (5) states that options exercised after date of award will not be included in the award evaluation. In this case it would be inimical to the Government's best interests to exclude the option items in award evaluation. The bulk of the total contract dollars are for the option items and it would be impractical not to consider them in award evaluation. Also, it could result in unrealistic proposals. For example, the first system might purposely be proposed at a very low figure and the option items proposed at an inflated figure on the basis of the proposer knowing that he is being evaluated only on the first system.

FAPR 12A-1.7106 states that in unusual cases the limitations set forth in FAPR Subpart 12A-1.71 may be exceeded if warranted and if authorization is given by the head of the procuring activity.

It is requested that waiver of FAPR 12A-1.7103(a) (1), (2) and (5) be given since (a) the option quantities exceed 25%, (b) the option exercise(s) must be made after 90 days from contract date and (c) the exclusion of the option effort in award evaluation would seriously prejudice the Government's interests. It is anticipated that option exercise for additional systems will be made starting 31 months after date of contract.

SAMUEL RABINOWITZ,
Chief Contracts Division, LG-300.

Approved:
M. P. COMULADA,
Director, Logistics Service, LG-1,
November 9, 1971.

DETERMINATION AND FINDINGS—DECISION TO NEGOTIATE CONTRACT UNDER
41 U.S.C. 252(c) (10)

FINDINGS

This procurement covers the fabrication, installation, site cut over and acceptance testing at various Air Route Traffic Control Centers, National Aviation Facilities Experimental Center (NAFEC) and the Aeronautical Center of 22 Electronic Voice Switching Systems (EVS). The procurement includes the necessary software, documentation, spares, contractor maintenance support and special tools and test equipment for each of the 22 systems. Additionally, certain sub-system boxes, engineering services and training of FAA personnel will be included in the procurement. The proposed contract structure will be as follows:

1. The first system and related supplies and services will be under a cost-plus-fixed fee arrangement. This effort is estimated at \$13,900,000 and will have a performance period of 34 months. Because of funds limitation, only \$5,500,000 will be funded at time of award.

2. The 21 additional systems, sub-system boxes and related items will be under a fixed price arrangement. These supplies and services will be subject to option provisions and will not be procured until exercise of the options. It is anticipated that the options will be exercised during the period extending from FY 74 through FY 77. This effort is estimated at \$79,630,000, with the last system acceptance tested 48 months after initial option exercise date.

It is impossible to draft detailed specifications for the purpose of formal advertising.

Proposals will be solicited from all known sources in addition to publicizing in the Commerce Business Daily.

DETERMINATION

Based on these findings, I hereby determine, pursuant to the authority of 41 U.S.C. 252(c) (10), that the proposed procurement may be negotiated without formal advertising.

SAMUEL RABINOWITZ,
Contracting Officer,
November 8, 1971.

Approved:
M. P. COMULADA,
Director, Logistics Service, LG-1,
November 8, 1971.

EXHIBIT NO. 3

REPORT PREPARED BY THE OFFICE OF INSTALLATIONS AND LOGISTICS, DOT, ON
FAA PROCUREMENT MANAGEMENT

I. APPROACH

This study was conducted in the period September 27–November 15, 1971 in support of a DOT team headed by Mr. Nathan Cutler, which was chartered to: "Conduct an audit and review of R&D and procurement activities to determine; Whether suitable controls exist; Whether functions are being performed in a satisfactory manner; Whether organizational relationships provide efficiency and control".

This part of that audit and review—the FAA Procurement Management Study—was conducted by a team under the direction of the Office of Installations and Logistics (TAD-60), Office of the Secretary of Transportation. It was limited to a consideration of major headquarters procurements handled by FAA Logistics Service (LG) (No evaluation was made of FAA field procurement activities).

The study was very capably supported by Raymond M. Staley, on detail from NASA, who prepared all the case studies in Appendix C, and who, with the assistance of William A. Wagner of the FAA Office of Audit, compiled the statistics on workload and other subjects in Appendices A, B, and F, as well as the analyses in Appendices G and H. William P. Risso, also from NASA, prepared the analysis of the MLS procedure in Appendix E-1, and Mr. Frank

Godsey, a consultant with industry background compiled the information which furnished the basis for Appendix I.

The study included efforts to analyze the processing of a selected sample of new procurements, collect statistical data on total procurement workload trends, analyze a recent source selection and a major current request for proposals, review policies and controls over procurement, and collect a sampling of industry views on the efficiency, fairness, and integrity of the process. An attempt was also made to assess some recently introduced procedural changes aimed at improving the FAA procurement process, but which were not yet reflected in the cases reviewed. The data resulting from these reviews, analyses, and assessments are set forth in the Appendices and form the basis of the report. Authorship of the several appendices is shown in the table of contents, and on the face page of each appendix. Appendices A through H were distributed to the FAA Logistics Service for verification.

In addition, investigatory reports in a current conflict of interest case were considered.

The sample of new procurements selected for analysis consisted of all procurements over \$100,000 awarded in FY 1971 which still were active on June 30, 1971 (44 contracts). Of these, case studies were prepared on 19 of the 20 awards over \$250,000 and on 4 of the 24 awards \$100,000-\$250,000 within the sample—in all, 23 studies. Selected for review of the current source selection process for major procurements was the Microwave Landing System (MLS) currently in evaluation. The major current request for proposals selected for review was the Electronic Voice Switching System (EVS).

II. GENERAL DISCUSSION

Any assessment of a procurement function must be kept in perspective with the character of the procurement mission. The procurement of many high value, complex systems involving research and development calls for different organization, procedures, and techniques than the procurement of "nuts and bolts". We have attempted in the Appendices to describe the character of FAA Headquarters Procurement.

Statistically, FAA Headquarters procurement has these characteristics:

(1) Modifications of existing contracts accounted for approximately 75% of the procurement actions in FY-71 and represented well over 50% of the dollars obligated (the team believes as much as 75%). FAA Headquarters obligations in FY-71 were approximately \$230 million. See Appendix F for workload data.

(2) New contract awards account for approximately 25% of the procurement actions. Of these, the dollar distribution is:

	Percent of dollars	Percent of actions
\$2,500 to \$250,000.....	20	88
Over \$250,000.....	80	12

The significance of \$250,000 is that procurements below that level are within the contracting officer's authority while procurements above that level are subject to approval at higher management levels (see Appendix G—Controls).

(3) Forty-four (44) new contracts were included in the sample cases. Of these, source selection was accomplished as follows:

	Percent	Number
Competitive negotiations.....	27	12
Sole source negotiations.....	46	20
Formal advertising.....	27	12
Total.....	100	44

Competition of some sort was involved in 54% of the awards. Approximately 60% of the negotiated procurements were awarded by sole source determinations. See Appendix E for Source Selection procedures.

(4) The growth in new procurement actions between FY-69 and FY-71 is primarily attributed to Systems Research and Development Service. The overall growth has been 12% in terms of actions and 110% in terms of dollars. In FY-71, there were 377 actions initiated with an estimated value of \$120.7 million (this excludes modifications). This growth is expected to continue and perhaps accelerate. See Appendix A-3 for growth data.

(5) In FY-71 there was \$231.8 million obligated on contracts. Of this, \$220.8 million was negotiated procurement and \$8.3 million was by formal advertising (this includes modifications).

(6) Approximately 75% of the awards made in the 44 contracts sampled were on Firm Fixed Price (FFP) contracts. The significance of this is that FFP contracting implies a sound pricing basis; either strong competition or detailed price negotiation, based on definitive requirements. See Appendix B for statistics on the sample.

(7) The average time for processing a procurement over \$250,000 was 175 days (the range was 50 to 391 days). The average time for processing a procurement between \$100,000 and \$250,000 was 236 days (the range was 34 to 829 days). This was processing time from receipt of the Procurement Request (PR) to contract award and is based on the 44 contract sample. See Appendix B-4 for details of processing time.

In summary, the procurement function in FAA Headquarters has relatively few large new procurements (51 in FY-71), and a sizeable number of smaller new procurements (326 in FY-71). The primary workload in terms of volume of actions and dollars is in modifications to existing contracts (estimated over 900 in FY-71). The workload is growing, primarily in the area of research and development. There is a significant growth in modifications in FY-71 that is unexplained. It is believed to be caused by the transfer of NASPO procurement to LG in the Fall of 1969.

FAA has centralized the procurement function within the Logistics Service (LG). The Director, Logistics Service, is the chief procurement manager and he has been given authority and status not universally accorded procurement managers in government. Under administrative and procedural changes proposed by FAA, the LG role would be strengthened. See Appendix G—Controls.

Within LG, there is a Policy and Plans Division (LG-100) which has responsibility for FAA Procurement Regulations and Advance Procurement Planning for major new acquisitions, a Contracts Division (LG-300) which has responsibility for all Headquarters FAA contract awards and most administration, and an Industrial Division which has responsibility for quality control, inspection, and any FAA in-plant administration. See Appendix A-1, A-2 for organization.

The Contracts Division has 72 people against an authorized strength of 85. Fourteen of the people on board are clerical and 58 are professional (including supervision). This is approximately a four to one ratio. There are two buying branches, the Systems Purchase Branch (LG-340) with 7 professionals and the Equipment Purchase Branch with 20 professionals, or a total of 27 professionals assigned to buying. In the Contract Administration Branch (LG-360), there are an additional 21 professionals assigned to administer contracts let by the Equipment Purchase Branch. The Systems Purchase Branch does its own administration. The remaining 10 professionals include the Division chief and his staff, pricing, transportation and other support activities assigned to the Contracts Division.

It should be noted that only one professional is assigned to the Pricing Staff (LG-320).

The Policy and Plans Division (LG-100) has 20 people against an authorized strength of 27. Of the 20 people on board, 3 are clerical and 17 are professional. There are 8 positions (9 authorized) in the Policy Branch (LG-110) and 10 positions (15 authorized) in the Plans Branch (LG-120). The remaining 2 positions (3 authorized) are the Division Chief and his Deputy.

In all there are 92 people (112 authorized) directly engaged in headquarters procurement activities in FAA, not including the Logistics Service Director and his staff. There are 13 positions at grade GS-15 and above (one GS-16, 12 GS-15s) in the two essentially procurement divisions—LG-100 and LG-300. In addition, the Director of the Logistics Service is a "special" GS-18 equivalent and his Deputy is a GS-17. At least half their duties are concerned with procurement.

New procurements for systems, such as the Microwave Landing System or the Central Computer Complex, are processed by LG-340. These almost always involve some measure of development. LG-340 has responsibility for the contract from "the cradle to the grave." The majority of their effort is involved in contract administration including the processing of modifications (See Appendix F). Under the procedures detailed in Appendix D-3 almost all of their new procurements would be subject to Advance Procurement Plans processed by LG-100.

New procurements for equipments and many other items are processed by LG-350. These procurements can be large in dollar value, for example, simulators and tower equipments, and may or may not involve applied research and development. In some cases, such as the ATC Training Simulator, the procurements will be controlled by Advance Procurement Plans processed by LG-100. However, this is an exception and, for most procurements in LG-350, planning is accomplished by the contracting officer with his technical counterpart in the requiring service. As a general rule, LG-350 makes the initial contract and passes it to LG-360 for administration. However, major changes or major additions to existing contracts would be passed back to LG-350 for negotiation.

Pricing support for new procurements (and significant modifications) is provided by LG-320. Negotiated procurements generally require an audit report if their estimated value is over \$100,000. Current regulations require all requests for audit assistance to be processed through the FAA Auditor even though the field audit is accomplished, in most cases, by the Defense Contract Audit Agency (DCAA). In the cases observed, there were very few complete audits. The auditor was usually asked to comment on overhead rates and factors, direct labor rates, and, in some cases, material costs. The cost proposal was usually sent to the requiring service for an analysis of the direct costs (labor, materials, etc.). LG-320 prepared the cost analysis memorandum to be used in the negotiation and often actively participated in negotiations in large procurements. The negotiation memorandum supporting the agreed upon price is usually prepared by the contracting officer. Due to the shortage of personnel in LG-320, some of the functions performed normally by that office are now being done by the contracting officer.

To assess the quality of the procurement actions, and the effectiveness of FAA procedures the reader should review the procurement case studies set forth in Appendix C, and the summaries and analyses contained in Appendices E, H, I and J. The listings which follow are specific deficiencies which should be noted. Citations of examples in Appendix C are accompanied by page reference. In reading these case summaries, comments which begin with "NOTE"—are the opinions of the reviewer. Otherwise the case summaries are factual.

Only 4 of the 23 contract awards examined could be considered to have been made without some evidence of a problem or deficiency, and 2 of those 4 took considerably longer to award than the circumstances would seem to justify. Several types of deficiencies showed a pattern, recurring in more than one case.

Patterns of deficiencies as shown by the case studies were:

Excessive time to make an award after receipt of a procurement request. Considering the complexities of the cases and the urgencies involved, 12 of the 23 awards appear to have taken an excessive period of time. In one instance, RBDE Horizontal Displays were needed on an urgent basis, commencing in December 1970, to fill an operational need. Award took 6 months and deliveries finally commenced 9 months after they were required. (C-1:1) In another instance, on a sole source procurement for Teletype equipment that took more than 7 months to award, the company raised the price \$26,800 during the processing period. If award had been made on a timely basis this price increase could have been avoided. (C-2:4) In two instances FAA Counsel considered the time between solicitation and award to be too long, and advised against award. The advice of Counsel was not followed. (C-2; 1, 3). (Other cases were C-1:3, 6, 11, 16, 21, 25, 32, 35).

In 6 of the cases, the FAA's requirements changed significantly during the procurement process. In one instance the procurement request initially called for 154 equipments, the requirements then changed to 287 and eventually FAA procured 200 (C-1:1). In another instance the initial procurement request was for 11 units, raised to 16 units, raised again to 22 units and raised finally to 24 units with an option for an additional 5 units (C-1:35). (Other cases were C-1:11, 19, 26 and C-2:5).

In 4 of the files it was clear that technical personnel were conducting the procurements and procurement personnel were merely ratifying the actions taken. (C-1:16, 23, 33, 37).

In 4 of the files the pricing decisions are questionable. (C-1:14, 19, 29, 30).

In 5 of the files, competition was improperly reduced or eliminated. (C-1:11, 29 and C-2:1, 3, 5).

Some of the defects found which did not form a recurring pattern were:

Issuance of an "Authorization to Proceed" pending award of a competitively solicited contract. (C-1:3). Actually two such documents, each in the amount of \$24,500, were issued, presumably to stay within some \$25,000 limit on someone's authority. The "Authorization to Proceed" is not an authorized form of contract. It cannot be considered, as required, to definitize to the fullest extent feasible, the obligations of the parties. The prescribed form is the "letter contract". A competent procurement expert could issue one in a matter of hours.

Failure to exercise or extend a critically important option under an A/E contract. (C-1:6).

Award to a firm which appeared to be not responsible. (C-1:27).

Highly questionable sole source justification in 2 instances. (C-1:30 and C-2:5).

Industry comments on FAA procurement include the following (Appendix I) criticisms:

Buying development under fixed price contracts.

Overly hard-nosed negotiations and nit-picking technical administration.

Too much detailed constraint in technical specifications.

Analysis of a recent RFP under one of the new advanced procurement plans shows an intention by FAA to purchase a development effort on cost-plus-a-fixed-fee basis, coupled with fixed price options to buy production quantities of the equipment to be developed—a highly questionable practice considering, especially, that the options will run for over 6 years (Appendix J).

Our conclusions, based on the facts accumulated during the seven weeks devoted to this study, are presented in the following section of this report, divided into the general subject areas described in the DOT team's mission:

- A. Suitability of Controls.
- B. Performance of Functions.
- C. Organizational Relationships.

III. CONCLUSIONS

A. Suitability of Controls

In aiming at an assessment of the effectiveness of controls over FAA procurement we have been confronted with a moving target: the practice followed in the cases examined are being replaced by new procedures in at least some procurements now planned or in process. To the extent that these new procedures represent a recognition of the problems that exist, and a willingness to solve them, the effort is commendable. The question remains, however, *as to whether the new procedures will do the job, and whether they represent the best, the most complete and the most efficient way to correct the noted efficiencies.*

Under the circumstances, we present, first, our conclusions as to the system in effect during the period in which the contract reviewed were [sic] awarded (Fiscal Year 1971) and, second, our reactions to the proposed new procedures and other pending proposed procedural changes.

1. Fiscal Year 71 System

Regulations.—Overall FAA procurement policy and procedure are governed by the Federal Procurement Regulations, amplified by some DOT Procurement Regulations, and further implemented by FAA Procurement Regulations and an FAA Procurement Manual. These issuances provide adequate guidance; inadequacies in the FPR in coverage of subjects like cost-plus-fixed-fee contracting have been provided, essentially, through adopting commonly understood Armed Services Procurement Regulations provisions. There is some apparent inefficiency in having these separate sets of regulations applicable to FAA procurement, but we found no evidence of confusion resulting from this system.

Procurement Planning.—Although there has been a requirement for advance procurement planning in existence for some time, both in the Federal Aviation Procurement Regulations (Sec. 12A-1.77) (Appendix D-2) and an FAA Agency Order (4400.28) (Appendix D-1), this procedure was not followed in any of the

awarded contracts studied and summarized in Appendix C. This lack of a firm plan was responsible for many uncertainties, delays, false starts, funding problems, and emergency-generated questionable practices noted in the case study summaries.

Source Selection.—Our case studies and our review of FAA procedures indicate deficiencies in the source selection process (Appendix E-2).

Excessive use of sole source is suggested by the high proportion (46%) of such actions in the sample examined. On the other hand there was one case of a failure to use sole source where it was clearly indicated. Sole Source justifications, prepared in program offices, were normally accepted without critical review.

There had been no effective, prescribed, detailed procedure for source evaluation and selection in competitive negotiated procurements. Control of the process of technical evaluations used in these competitive negotiated procurements has been left to the program offices. The program office also made a major input to the cost analysis in major technical and R&D procurements. Under these procedures, the potential has existed for the requiring program office to substantially influence selection of source. Although there has been a nominal control of source selection by the contracting officer, this control could not be effectively exercised because of the strong program office control of the inputs on which any decision could be based.

The failure to prescribe detailed procedures for source evaluation and selection, and leaving the details of the procedure for evaluation of technical proposals to program offices presented a serious potential for improper source selection. In one pending conflict-of-interest case, now under investigation, it was noted that almost all of the members of the technical evaluation group on a particular procurement had been (in some cases, several times) luncheon or dinner guests of a representative of the company that won the award, and that these incidents occurred during the period when the proposals were being evaluated. Also one management official, in a position to influence project selection, the evaluation group members, and their procedures, was apparently accepting substantial favors from the company.

Procurement Requests.—Procurement Requests (PRs) are the basic document authorizing a procurement. Instances were noted where the PR was issued after the procurement action had been initiated. The PR is issued by the requiring service. In an effort to be responsive to the requiring service, procurement has completed many steps in a procurement before the PR was issued. While this is laudable it places procurement in the position of acting on informal advice without the formal authorizing document. While procedures outside the Logistics Service were not a subject of this part of the study, we note that orderly processing of procurements was prejudiced by the requiring service's failure to determine its needs (items, specifications, quantity, etc.) and verify funds availability. It is only when this information is available in definitive form that a valid, well-planned PR can be issued before the procurement process is activated. Otherwise there is waste through redoing and delays in the procurement process. There will always be some expedited requirements where this is not practical but they should be the exception.

Administrative Reviews.—Aside from supervisory desk reviews, there has been no organization or individual that made an effective final review of the total procurement package before award. This was done at one time by a Contract Awards Board (CAB). Under an FAA order, all negotiated awards over \$250,000, all advertised awards over \$1 million, and all sole source solicitations over \$2,500 are required to be reviewed by this Board and then approved by the Administrator or, more usually, his Deputy. (Appendix G-2). Since the membership of the Board is at the Associate Administrator and FAA General Counsel level, the press of other duties has, in the recent past, prevented the Board members from giving these award reviews any detailed personal attention. Consequently, the Board's actions have been routinely accomplished through a simple sign-off by the members without any presentation and without any focus on the details. At the present time, therefore, the system is ineffective.

There has been some focus on awards by the Office of the Secretary since August 1, 1971, as a result of a memorandum from the Under Secretary requiring additional details in the notifications to the Secretary of proposed awards, previously considered to be purely "publicity releases". The Office of Installations and Logistics, OST, has been reviewing the notifications. The information furnished in the award notification is meager, but where some sensitive or questionable circumstance is indicated on the two page form, additional details are requested

and the matter is discussed with the procuring office. Although none of the files of the cases reviewed reflected this activity, it has occurred, and in two proposed FAA awards, changes were made in the proposed contracts, before they were awarded, as a result of suggestions made. This, however, cannot be considered an effective system of award reviews or a substitute for an effective FAA award review system.

The present system thus provides no complete, effective procedure for award reviews outside the FAA Logistics Service. To protect the quality and the integrity of the award process, an independent, effective award review procedure by higher echelons should have been used.

2. Proposed New Procedures

Regulations.—The present regulatory system presents a practical problem for the FAA, because it has a fairly complete set of regulations and manual material (with few notable exceptions, such as source selection procedures). The imminent adoption of the new DOT Procurement Regulations will thus not have any substantial effect on the FAA procurement system. Primary impact of the new regulations will be on the other administrations which did not have equivalent regulatory coverage. The anomaly of different sets of regulations applying to FAA procurement will be removed: when the DOTPR is issued, the codified FAAPR will be completely superseded and there will be only the FPR and the DOTPR. An FAA Procurement Manual will remain, at least on an interim basis, for instructional material and some matters peculiar to FAA.

Procurement Planning.—The Logistics Service has drafted but not yet issued, a new directive on procurement and planning (Appendix D-3) replacing the existing directive (Appendix D-1). Although not yet an officially prescribed procedure, it has been implemented with respect to all anticipated major procurements. It did not however, apply to any of the procurements reviewed in Appendix C case studies. The plan for one program—Electronic Voice Switching System (EVS)—is presented in Appendix D-4, and an analysis of another plan—Microwave Landing System (MLS)—is presented in Appendix D-3.

The procedure provides a focal point for advance coordination of all FAA activities that could impact the procurement process and thus presents the potential for solving many of the problems, previously noted, stemming from the absence of a plan.

The plan specifies a schedule of significant milestones and a funding schedule, and it identifies key officials with responsibility for meeting the prescribed dates. Planning begins very early in the cycle in the budget stage. The plan also selects the specific types and methods of procurement and sets up a formal source evaluation and selection procedure. Under the proposed procedures, the plan itself is approved by the requirements service director and by the Logistics Service Director; and all other FAA elements that will be involved participate in the planning process. The plan is ultimately distributed to all those elements after approval. Under the proposed procedure, the plan need not be approved by higher authority unless it involves more than \$5 million. If it involves more, it must be approved by the Associate Administrator for Administration unless a source selection procedure is specified. In that case it is approved by the Deputy Administrator or the Administrator. The procedure calls for updating and for coordination and high-level approval of all major changes.

Without detracting from the value of the new procedures—and we believe it to be considerable—we have these observations:

The procedures apply only to major procurements; there is no indication that equivalent advanced planning will be applied to other procurements.

Considering the importance of the plans that are now required, a higher level of approval and involvement of other major officials would appear to be in order.

The plan should be distributed to counterpart offices in DOT, such as TST and TAD, to provide visibility of significant programs and to provide a basis for decisions as to OST entry into particular program decisions.

The FAA advanced procurement plan provides normally for top management focus only once—the date it is approved at the start of the program. It would appear desirable (as is done under DOD major systems acquisition review procedures) to have other top management reviews at other decision points. (The DOD review is made at the beginning of the program definition phase, prior to contracting for development and, after completion of development, just before release for production.)

Source Selection.—As discussed in Appendix E, the full-scale source selection procedure now presented under some of the advance procurement plans for particular procurements is basically sound. Minor defects in the procedures, identified in the appendix¹, could be very simply corrected.

We see no reason, however, why formal, sound source evaluation procedures should be reserved for only a very select, few procurements; they should apply to all negotiated procurements. Under the present regulations, all of the potential for questionable selections still remain in all but major procurements. Also, none of the present procedures provide for OST visibility or participation in the process, even in the highest dollar value and most sensitive procurements.

Since sound source selection procedures could be made applicable to a wide variety of procurements, it would appear feasible and more efficient for OST to promulgate such procedures for all appropriate procurements on a Department-wide basis.

No new procedures are proposed or seem necessary to curb the noted tendency to excessive use of sole source procurements. Existing directives are adequate. Performance under those directives should be carefully monitored.

Procurement Requests.—The advance procurement plan procedures should obviate the procurement request difficulties, noted earlier, but only in the few major procurements covered by such plans. It is possible that the discipline developed in connection with that procedure will carry over into other procurements. The present procedural issuances are adequate. Practice should be improved.

Administrative Reviews.—No changes have been proposed by FAA in this area, other than elimination of the presently ineffective Contract Awards Board. We concur in that proposed action. We feel, however, that some effective review procedure should be adopted to provide the system of checks and balances essential to ensure the integrity and professional excellence of the awards being processed. We feel that this procedure should go beyond the present system of supervisory reviews.

While the present reviews of award notifications by the Office of Installations & Logistics are inadequate, experience with that system indicates that some form of award review is necessary, not only in FAA but, even more, in the other administrations. Thus we conclude not only that the FAA review system needs strengthening, but that OST could profitably prepare Department-wide procedures for pre-award review of contracts. A DOT-wide procedure should be adopted providing for approval of awards by higher echelons in each administration. The designated approval official should be provided staff advice. In order to ensure objectivity this advice should be supplied by a board of operating-level procurement, technical, legal, and audit experts, within each administration, but selected from outside the organizational elements responsible for the particular procurement.

Followup.—Many of the deficiencies noted stemmed from a failure to use existing FAA procedure specified by regulations and orders. Some new procedures have been proposed, and to some extent, introduced and strict adherence to them could produce improvement. We must note, however, as a practical matter, the non-effectiveness of procedural safeguards, as attention to the problems which they address begins to wane. Witness, in FAA, the moribund Contract Awards Board and the absence of any attention to the existing directive on "Advance Procurement Techniques." Not only must good procedures be formulated, they must be followed. This requires a follow-up procedure supervisory attention, internal audit, evaluation, appraisal, etc.—to ensure that existing control directives are effectively practiced. Our study leads us to the conclusion that there is no such effective follow-up in FAA, and that no flurry of reactive reforms can have any lasting effect without it.

3. Summary (Controls)

In assessing the system of controls over FAA procurement actions, and the procedures being adopted or proposed to improve them, we find with respect to each of the control mechanisms usually employed:

(1) *Regulations* were adequate and will remain so under the about-to-be issued DOT Procurement Regulations;

¹ In only one instance do we have a disagreement with the conclusions of the reviewer who prepared Appendix E-1; we believe that cost and price evaluation process should be kept separate and secret from the technical evaluation process, and if his proposal (Paragraph e, p. 7) would compromise that principal we are against it.

(2) *Procurement Planning* was inadequate, but could be substantially improved under the advanced procurement planning procedures now being used for some FAA procurements. These procedures could be further improved to provide for simplified, comparable advanced planning of other than major procurements; higher level of reviews and involvement of a broader spectrum of top management; further distribution to OST and/or a system of Departmental major system acquisition reviews; and additional top management focus at major program decision points.

(3) *Source Selection* procedures were unacceptable, but have been very much improved for the few major procurements covered by advanced procurement plans. Sound source evaluation procedures should be extended to all other negotiated procurements through issuance of Departmental regulations. A tendency to excessive use of sole source procurements should be curbed by stricter adherence to existing directives.

(4) *Procurement Requests*, or rather their absence at critical times in the procurement cycle have prejudiced progress and orderly processing. This could be improved for major procurements under the advanced procurement planning procedure, but some arrangement to provide equivalent improvement for all other procurements is required.

(5) *Administrative Reviews* are not adequate and will continue to be inadequate unless a procedure is prescribed, preferably by OST, requiring approvals of awards by higher echelons in FAA, based upon objective, independent professional reviews.

* * * * *

(7) *Followup* on control procedures is inadequate. Better procedures are required.

B. Performance of Function.

1. *External Factors*.—The quality of the performance of preprocurement function in FAA is influenced by a number of factors some internal to the Logistics Service (which is the primary subject of this report) and some external to the Logistics Service in other organizational elements of FAA (which are treated in the more general report on the total audit and review). For the purposes of this report we note, from the analyses in Appendix C, that the quality of the Logistics Service's performance is too often prejudiced by other organizational elements through:

* * * * *

(b) *Insisting, unnecessarily, on a contract in a time frame that does not permit sufficient time for competition or quality work*. In one case, a contract was ready for award 49 days after receipt of an urgent procurement request. There was, under the circumstances, more limited competition than the procurement justified. Because the program office did not have the funds to commit, it was not possible for the contractor to begin work until over one month after the award was possible. Even then, only limited funds were provided under two highly questionable "authorizations to proceed". Three months later adequate funds were made available, and a valid contract executed. Work was, thus, under way for three months under an effort ultimately funded at \$600,000 before the Secretary was notified of the award.

And, in a number of cases involving fiscal-year-end hurry up awards the requirements should have been known long before the urgent procurement requests were used.

2. *Internal Characteristics*.—There are also a number of matters, internal to the Logistics Service, that affect or are characteristic of the quality of its performance, which we find worthy of note in this report:

Integrity.—We found no evidence in the case studies, the industry interviews, the investigatory reports, or any other source that would lead us, even remotely, to question the integrity of anyone in the Logistics Service.

Documentation.—Files, although sometimes poorly organized, are complete and honestly documented. Sometimes documents, particularly Determinations and Findings (D&F's) required by regulations, are not prepared when they are supposed to be prepared, before the action to which they relate is undertaken, but they are ultimately supplied and support the action taken. These D&F's were designed to be, and should be used administratively as control documents. They are not so used now.

Responsiveness.—Procurement is not an end in itself; it is a service to the other organizational elements which have requirements that must be satisfied through purchase. A procurement office must, first of all, be responsive to the needs of the requiring office. The Logistics Service has been sensitive to the needs of the requiring activities.

We find, on the other hand, their zeal in this respect produced violations of good procurement practices far beyond what was justified by the real operational needs that were being satisfied. Time constraints were uncritically accepted. Typically, competition was limited or eliminated and sound pricing made impossible because of some stated urgency. Yet the requiring office had proceeded at a leisurely pace from the time of identification of the requirement to the point requesting procurement action; and, later, no notable speed was displayed in providing the further inputs necessary to move the "urgent" procurement along.

Pricing.—Cost or price analysis is required by regulation on all negotiated procurement over \$100,000 and all modifications over \$100,000 to formally advertised procurements. To support that analysis, cost or pricing data is required, and there must be a field audit unless the case falls under a legal exception (audit can be waived in some cases.) There is a laxity in this area which was reflected in the files reviewed. This, coupled with a preference for Firm Fixed Price contracting, could lead to excessive prices.

There is only one professional now assigned to Pricing in the Logistics Service. Earlier in FY-71 there were four. In the last half of FY-72, approximately 225 initial requests for pricing assistance were received. It would appear that for four people to adequately price 225 cases in 6 months would be a significant accomplishment. It is as impossible for the one professional assigned. While in some procurement offices the contract negotiators are trained to do, and do their own pricing, this is not the case in the FAA Logistics Service.

There is an urgent need to improve pricing of LG contracts. The absence of adequate price and cost analysis could explain what appears to be conflicting findings by the reviewer who wrote the case summaries in Appendix C and the industry reaction summarized in Appendix I. The case reviewer was concerned that the Government was paying too much; industry feels it is being arbitrarily pressured to make cost reductions. Negotiations without adequate price preparation—in essence, demanding price reductions without clearly justified reasons—could produce that kind of reaction on both sides.

Procurement Methods.—The most frequent criticism from industry is that FAA insists on buying developmental effort through fixed price contracts. (Appendix I). This usually is accomplished through purchasing under a performance specification that requires better performance than the previously purchased model of the same equipment. Historically, a number of companies have suffered substantial, in some cases disastrous, losses on this type of contract—for precision approach radars, TACAN equipment, radar bright display equipment, instrument landing systems, and others. As a judge in the Court of Claims once said—a contract to do useful work for the Government should not be turned into a gambling transaction. And many of these fixed-price development contracts are just that. This FAA practice should be stopped. Yet in our interview with senior program officials in FAA, we noted that the tendency to write that kind of specification for production contracts still persists. This seems to be confirmed in the recent fixed-price procurement of the new model Bright Radar Indicator Tower Equipment (BRITE).

Instructions on multi-year and two-step procurement are adequate. They should be more scrupulously followed.

3. Personnel.—Quality and efficiency in the performance of the procurement function depends, ultimately, on the people who do the work. If they are improperly qualified or inadequately trained, quality suffers; if they are not sensibly organized and managed, efficiency is reduced. In this connection, we note:

Professional Qualifications.—While it was beyond the scope of this study to assess the qualifications of particular procurement personnel in the Logistics Service, the results, as shown in the case summaries of the most significant procurements, do not reflect the quality we would expect from a staff which includes 13 top-graded professionals.

A recent reorganization set up the separate Plans Branch (LG-120) outside the operating Contracts Division (LG-300). That Branch, through its responsibility for formulating advance procurement plans, now does the scheduling,

formulation of procurement strategy, selection of type of contract, and source selection procedures for all major procurements. All of these functions are normally considered to be included in the duties of senior operating procurement officials. The fact that the Logistics Service management found it necessary to set up a separate organization to perform these functions is itself an indication (confirmed in our case reviews) that performance of these management functions by the Contracts Division left something to be desired. But there has been no adjustment in grade levels or staffing in the Contracts Division to reflect this transfer of these major management responsibilities. Under the circumstances there should be a thorough revalidation of the higher grade position descriptions in the Contracts Division and a critical reappraisal of the qualifications of the incumbents to fill those positions.

Staffing Levels.—A detailed workload/staffing analysis to determine whether there is over/or under-staffing of this function was not possible with the time and resources available for this study. We do note, however, that no such study has been performed in recent years, and that no detailed workload statistics had in fact been compiled by the Logistics Service to measure its own productivity. (The workload statistics in Appendix A-3 had to be compiled by the team with some considerable effort.) There are 112 authorized positions directly engaged in procurement related activities in FAA headquarters. Increases in workload are expected, and additional staffing will be requested. The present level of staffing is higher in proportion to workload than the staffing in other procurement offices of the Department. We cannot at this point say whether the FAA levels are right, too high or too low. A major detailed staffing workload study is required so that it may be applied to assess present staffing levels in FAA, requests for staffing increases, and levels in other DOT procurement offices.

Although we have no basis for assessing overall staffing levels, some gross imbalances in staffing were noted. There is the previously identified substantial understaffing of the pricing function. We note also that the overall professional/clerical ratio is about four to one. However, in the two buying branches, there are 5 clerical positions supporting 27 professionals, over five to one. This means that the professionals are burdened with a great deal of their own filing and other clerical effort. This same comment applies to the Contract Administration Branch. The ratio of the working groups which have such a significant volume of documentation should be much lower, perhaps three to one or less, if the function is to receive the full benefit of the professionals. The poor organization of the contract files reviewed generally reflected the effects of this.

Training.—The Logistics Service has not sponsored much training; it has not been active in exposing its contracting personnel to inter-agency and industry seminars and training courses (See Appendix H). In an environment in which the autonomy of the contracting officer demands the highest level of professionalism, a continuing upgrading and training program would be desirable.

4. *Summary (Performance).*—In our study of performance of the FAA headquarters procurement function we note:

- (1) *External factors* inhibit satisfactory performance through indecision as to quantities to be procured and unreasonable time pressures.
- (2) *Integrity* does not appear to be a problem within the Logistics Service.
- (3) *Documentation* is complete but poorly organized and not timely.
- (4) *Responsiveness* to program requirements is good but too often the Logistics Service sacrifices good procurement practices because of unjustified program office pressures.
- (5) *Pricing* is lax and inadequate.
- (6) *Procurement Methods* selected are questionable; a current practice of coupling a CPFF development phase with a fixed price production phase should be reexamined.
- (7) *Personnel Qualification* of the senior professionals, although not specifically studied, appear, from the work products examined, not to be up to expected standards.
- (8) *Staffing levels* were not studied but should be.
- (9) *Training* opportunities have not been provided to a sufficient number of professional procurement officials.

C. *Organizational Relations*

The consolidated report on the total audit and review will cover the impact of interrelationship of all FAA organizational elements. For the purposes of this report, however, limited to a study of the Logistics Service, we note again that

what happens outside the Logistics Service in furnishing timely program decisions has an important impact on its ability to do its job.

We note again that, within the Logistics Service, a separate Plans Branch (LG-120) has been set up to plan the work that will be performed almost exclusively by the Systems Purchase Branch (LG-340) that handles all major systems purchases. The question naturally arises as to whether these two branches could not be consolidated to preclude friction and provide closer working relationships. Their placement in two separate Divisions does present the possibility of inefficiency through the need to communicate through an additional supervisory layer.

IV. RECOMMENDATIONS

In the course of this report we have made some recommendations; others inherent in the comments we have made. Principal among these are:

- (1) The Advance Procurement Planning procedure, modified as suggested in this report, should be formally implemented as quickly as possible.
- (2) The Contract Awards Board should be eliminated as soon as practicable. A DOT-wide procedure for preaward review of contracts should be prepared by the Office of Installations and Logistics.
- (3) A DOT-wide procedure for source selection under negotiated procurements should be prepared by the Office of Installations and Logistics.
- (4) The newly-devised procurement technique of CPFF development coupled with fixed price-production, should be reconsidered and an alternative strategy selected. In general, the practice of contracting for development work on a fixed price basis should be discontinued.
- (5) The tendency to excessive use of sole source procurements should be curbed by stricter adherence to existing directives.
- (6) The use of options, multi-year procurement and two-step formal advertising should be reviewed to insure that each technique is used only where appropriate, and in strict adherence to existing regulations.
- (7) Attention should be given to procurement leadtime to assure that procurement processing time is the minimum consistent with sound procurement practices.
- (8) All Services should review their controls to insure that unsolicited proposals are not being "solicited" for specific objectives or that a given company is not being given an unfair competitive advantage by advance knowledge of requirements.
- (9) All Services issuing Procurement Requests (PRs) should review their internal processes to insure that procurement specifications are properly described, quantity determinations have been made, and funds availability has been established before the PR is issued. Procurement should not be expected to initiate action, other than planning assistance, until these critical items are resolved and an approved PR is issued. Industry should not be solicited in advance of the PR, either formally or informally. Exceptions to this rule should be carefully limited.
- (10) The FAA Auditor should be the sole focal point for FAA interface with Defense Contract Audit Agency (DCAA) or any inter-agency relationships. However, the requirement for the Contracting Officer to seek audit assistance for his day-to-day work through the FAA Auditor should be reviewed. The Contracting Officer should contact the field auditor directly unless he needs assistance from the FAA Auditor. See Appendix G, page 6.
- (11) Immediate action should be taken to provide adequate pricing support for the contracting officers.
- (12) An in-depth analysis of procurement workload in relation to professional manpower should be made to insure that staffing is appropriate for existing and expected workload.
- (13) The Logistics Service should review the allocation of resources in LG-300 to insure that the balance between professional and clerical support is the best to provide maximum utilization of professional talent. See Appendix A-5.
- (14) Logistics Service should initiate a career progression training program for Contracting Officers to provide periodic updating and professional exposure both to government and industry groups. The FAA Contracting Officer has one of the highest levels of authority observed and should manifest a comparable level of professionalism. See Appendix H.
- (15) Logistics Service should consider consolidating the planning function in LG-100 with the procurement function in LG-340. This would place the planning, procurement and administration of major acquisitions in a single organization.

(16) Follow-up procedures are required—through supervisory attention, internal audit, evaluation, appraisal, etc.—to ensure that control directives are effectively followed.

APPENDIX J—FAA PROCUREMENT MANAGEMENT

SOLICITATION FOR ELECTRONIC VOICE SWITCHING SYSTEMS

(W. Wayne Wilson, Office of Installations and Logistics, DOT (TAD-60))

By letter of November 9, 1971, FAA solicited proposals for Electronic Voice Switching Systems for which an Advance Procurement Plan (Appendix D-4) had been prepared. Technical proposals must be received by FAA by February 8, 1972, and price proposals by March 1, 1972. The total estimated cost for this procurement is in excess of \$90 million.

FAA has structured the procurement into two "Schedules", which are in effect a developmental phase and a production phase. Under the first Schedule, for which FAA proposes a cost-plus-fixed-fee pricing arrangement, the contractor would manufacture and furnish one Electronic Voice Switching System, and would install and checkout the system at NAFEC, would conduct systems tests and would furnish a variety of ancillary items such as spare parts, training, and support services. The equipment under Schedule I is to be delivered 17 months after date of award, and installation and testing work would be essentially completed 30 months after award. The estimated cost of Schedule I is approximately \$14 million.

Schedule II consists of production quantities of the Electronic Voice Switching System provided under Schedule I, in the form of fixed price options. Under Schedule II, options could be exercised for the following quantities of equipments:

- 5 in FY 1974 (31 months after date of contract).
- 5 in FY 1975 (43 months after date of contract).
- 5 in FY 1976 (55 months after date of contract).
- 6 in FY 1977 (67 months after date of contract).

In addition to the equipment items, there are numerous support items included in each option quantity. If all options are exercised, deliveries of the systems would commence 43 months after date of contract and would continue at the rate of one every 10 weeks for approximately the next 4 years. The estimated cost of all option items is in the neighborhood of \$80 million.

ANALYSIS

Under this solicitation FAA appears to be asking for the impossible—an \$80 million fixed price quotation for systems not yet developed, for delivery years in the future.

That there is significant development involved is suggested by (1) the \$14 million estimate for the first system. (2) the request for a cost-plus-fixed-fee pricing arrangement for the first system and (3) the estimated 2½ years before the system is fully tested. FAA has specified no price escalation clause for the extended production period, although it has stated that it may do so in the resulting contract.

At first glance this procurement would seem to be reminiscent of the C5A, with the necessity to offer a competitively low price to get the contract award without the knowledge of the ultimate cost of the systems.

A contractor conscientiously developing the system under Schedule I which performs properly and meets or exceeds the requirements of the Government could find himself facing financial disaster on the fixed price portion.

There is an important variation between this procurement and that for the C5A, however, which results in some interesting possibilities.

Here we are anticipating a CPEFF pricing arrangement for the first article.¹

¹ Although, technically, under the contract terms, the Government has the option of ordering production quantities of equipment meeting the specifications under Schedule II even if there is a failure to develop satisfactory equipment under Schedule I, this right is illusory. It is obviously the intent of the parties that Schedule II should not come into play unless there is an acceptable product of Schedule I. Since the program is structured as a development effort, no court would let us get away with that kind of action.

If our contractor is not quite so conscientious as to drive himself to the edge of bankruptcy to fulfill the terms of the contract, he has an "out". If, during the performance of Schedule I under the CPFF provisions, it becomes evident to the contractor that he has underbid the fixed price option quantities, he can defeat the options by never producing an acceptable equipment. The Government must exercise the first option 31 months after date of award, and if it does not exercise the first option it cannot, by the proposed contract terms, exercise any of the subsequent options. The Government would thus find itself in the uncomfortable position of having to exercise options for systems that apparently cannot be produced, or of terminating the contract for default with no resulting liability on the part of the defaulted contractor. The Government would in all likelihood not exercise the options.

Another variation on the above would be for the contractor to spend massive amounts of our R&D funds under this cost-reimbursable Schedule I to perfect a system that (1) performed in accordance with the specifications and (2) could be produced in quantity within the quoted cost. If this Government-funded value engineering effort failed to produce a system within the fixed price parameters, then we would never see a system that worked. With unlimited Government funding during this first phase of the contract, the Government would be hard-pressed to control a rampant cost overrun, short of terminating the contract.

All in all, I believe that I like industry's chances under this proposed contract better than I like the Government's, but it does seem likely that one party or the other will be hurt if FAA insists on impossible contract terms. This is not effective price competition.

Alternatives for requirements such as these are never very satisfactory, but in lieu of the proposed arrangement I would favor the traditional development contract followed by one or more production contracts. Even if FAA is unable to break out of a sole source posture for the production contracts, I believe that the development contractor who wants the follow-on production contracts has more incentive to perform well than the contractor who already has the follow-on.

A better alternative would be parallel development followed by a competitive procurement for the production quantity.

Parallel development in this instance need not be the complete development and testing contemplated in Schedule I and estimated at \$14,000,000. The initial development could be considerably less than that, to a breadboard stage, for instance, where feasibility could be proven and program risks minimized. At this stage we could conduct a competitive procurement for the production quantity. With proper structuring of the work statement, a parallel effort would likely produce a lower overall cost to the Government with a greater assurance of timely deliveries. It would also afford industry an opportunity to propose prices with a reasonable certainty as to risk.

Mr. Brooks. I will read into the record part of this document.

The Department of Transportation's comment was that:

A new type of contract has been devised by the logistics service. In the electronic voice switching system request for proposals (a \$100 million program) analyzed in appendix J, FAA is requesting simultaneous proposals for a cost-plus-fixed-fee development phase, followed by fixed-price production runs covered by options to extend over more than 6 years. The bidders are being asked to quote an estimate on the development phase, and a firm price on the production phase. As noted in appendix J, this type of contract raises very serious problems. A conscientious contractor could design himself into 6 years of substantial losses, just like under the fixed-price-development contract; the more self-oriented contractor could bid very low on the production run ceilings and then have the Government finance an extensive value engineering effort under the open-ended development phase of the contract.

As I say, I will submit these documents for the record, and I think that they will be self-evident and copies will be interesting to you.

Mr. Israel, did you have a comment on those?

Mr. ISRAEL. Yes, sir.

Mr. BROOKS. You may be familiar with them, having more tenure down there.

Mr. ISRAEL. I would like to state that there is a very difficult choice to make in deciding how to proceed in a contractual manner like this, where it is a fairly sophisticated and specialized piece of equipment. One option would be, of course, to go out on a development contract, selected on a competitive basis, and then one has a prototype or a pre-production unit and one tries it, assesses it and decides whether or not to go into production.

Generally speaking, one is then locked into procuring the production equipment from the same company that produced the prototype. The drawings you get from such a contract for such a specialized piece of equipment cannot be used to go out and compete for the production contractor.

So, we were very concerned to have an element of competition from the beginning. Furthermore, we thought at that time we had met two requirements: one that we knew exactly what the operators of the system wanted and, second, that the contractors would not be involved in technical matters beyond the state of the art. Our assessment was that there was some engineering effort, but no development, involved.

So, it would be very appropriate to proceed with a contract of two parts: a cost-plus contract, to accommodate the engineering, and a fixed-price contract for the production. That would have worked, except as Mr. Butterfield spelled out, two unforeseen things happened: the specifications were changed and once that happened, it threw this entire arrangement out of kilter.

This was not an unreasonable selection of this type of contract if the specifications had remained unchanged.

Mr. BROOKS. Your own counsel, on November 1, 1971, pointed out that: "The undefined nature of the EVS system and the cost risks inherent in its development are clearly demonstrated by use of a cost-plus-fixed-fee contract for the prototype system"—and that is document 2, which I submitted.

He also pointed out—and I am not taking this out of context and this is what he said and this is what he felt like—that:

Under these circumstances, any proposed "prices" for option systems developed prior to acceptance of the prototype unit would be little more than a guess.

And he pointed out that:

We have serious reservations whether the Comptroller General would find the proposed procurement acceptable.

At any rate, it did turn out to be about \$13 million down the tube and we haven't got anything. Now, our new Administrator had to cancel it. So, I think it is going to be a probably difficult thing to defend as a good system of operations, facing a very candid \$13 million loss, plus the time, plus the lack of better service for our flying public.

Now, Mr. Administrator, it is my understanding that in March 1972, one of the potential bidders, RCA, dropped out of the competition because it felt it would be subject to severe technical and cost risks under this type of procurement.

Is that essentially correct?

Mr. BUTTERFIELD. In March of 1972?

Mr. BROOKS. Yes.

Mr. BUTTERFIELD. That is right.

Mr. BROOKS. We will insert, as document 4, that letter for the withdrawal, which you are familiar with.
[Exhibit No. 4 follows:]

EXHIBIT NO. 4

RCA GOVERNMENT AND COMMERCIAL SYSTEMS,
COMMUNICATIONS SYSTEMS DIVISION,
Camden, N.J., March 6, 1972.

Subject: Federal Aviation Administration Request for Proposal Number WA4M-2-0207 for Electronic Voice Switches (EVS)

HON. JOHN A. VOLPE,
Secretary of Transportation,
Washington, D.C.

DEAR MR. SECRETARY: RCA feels impelled to inform you that it is reluctantly withdrawing from the competition for the Federal Aviation Administration Electronic Voice Switch procurement initiated by the subject RFP.

We have been following this procurement action for over a year and had expended substantial effort to become familiar with the FAA's technical requirements even prior to the issuance of the RFP. Following receipt of the RFP, RCA assigned a team of technical and proposal specialists to carefully review and analyze the details of the solicitation, including particularly the FAA technical specifications. A sizeable RCA team also attended the Bidders' Briefing and Facility Tour in early December in Atlantic City.

Having now completed a thorough evaluation of the requirements of the solicitation, it is our considered judgment that submission of a proposal would be seriously detrimental to the interests of RCA. Our major concern pertains to the severe technical and cost risks involved in the program and the fact that the contractor must assume these risks under a fixed price type of contractual arrangement.

Some word of explanation for our concern is in order. It is true that the solicitation contemplates a CPFF arrangement for the pre-production phase and a fixed price arrangement only for the production phase. However, the contractor is required to quote and to be committed to the production phase (which involves 21 switching centers)—on a fixed price basis—before any of the pre-production R&D effort has been performed.

It is our firm conviction that successful completion of the pre-production R&D effort may and probably will result in significant design changes for the production phase which could have significant cost impact. Until the R&D effort has been completed, it is simply not possible to accurately assess the inherent technical risks and uncertainties in a program of this nature. Additionally, it should be noted that the fixed prices relate to production options involving deliveries that would extend for almost six years after date of contract award. Disregarding the potential cost impact of the technical risks and uncertainties, it is obviously impossible to predict in any meaningful way the effect of future economic inflation. In our opinion, neither the interest of the Government nor of the contractor are served by the pricing arrangement contemplated in this solicitation.

It is significant that the Department of Defense Directive No. 5000.1 on "Acquisition of Major Defense Systems", dated July 13, 1971, gives express recognition to the problems we cite. Paragraph 7 of the Directive states in part:

Contract type shall be consistent with all program characteristics including risk. It is not possible to determine the precise production cost of a new complex defense system before it is developed; therefore, such systems will not be procured using the total package procurement concept or production options that are contractually priced in the development contract. Cost type prime and sub-contracts are preferred where substantial development effort is involved.

We also continue to be seriously disturbed by the contract clauses utilized by FAA dealing with patent rights, patent indemnity, data rights and guarantees. We consider these clauses unnecessarily harsh and actually adverse to the interests of FAA in fostering competition for award of its contracts. Our views on the matters covered in several of these clauses are set out in a letter of May 13, 1971, to your Department commenting on Part 12-9, "Patents, Data, Copyrights,

and Recovery of Development Costs" of the Department's proposed revision of its procurement regulations, published in the Federal Register of March 17, 1971.

Although RCA has an active interest and an established capability in the technology involved in this procurement and would like very much to participate in the competition, I regret to inform you that we have decided not to for the reasons set out above. I would be pleased, if you wish, to discuss this matter further with you at your convenience.

Very truly yours,

J. M. OSBORNE.

Mr. BROOKS. I might point out the concerns expressed in 1971 and 1972 were not the first warnings received by FAA about bad procurement practices. In 1963 this subcommittee issued a report (House Report No. 457, 88th Congress, first session) admonishing FAA on procurement practices which permit contractors to undertake developmental efforts under production type contracts.

So, you can see, we are not confronting you with a new problem. You inherited a beautiful big bag of worms. They have been doing this a long time and it is a real challenge to dig down into that Administration and get them to do what will make for better procurement practices for this country.

Mr. BUTTERFIELD. Mr. Chairman, you are making me sound all wise and I am sure that I am probably making—

Mr. BROOKS. No, we will get to you later. After you have been here a couple of years, we will see how you have done.

Mr. BUTTERFIELD. I am sure I am making my share of mistakes as I go along. But I want to comment on what you said there and supplement what Mr. Israel said.

There is an obligation on the part of the Administration to encourage competition and to promote greater numbers of competitive manufacturers who can compete for these highly complex systems which we must procure.

Mr. BROOKS. Just be sure they have a distinction between competition and just participation. Participation means they just get the \$12 million generally taking up our time and effort and spinning our wheels and theirs, and we pay for the ride. Competition, in my judgment, means an effort between people with the capacity to produce.

Now that is what we are trying to get. In the name of giving everybody an opportunity to participate, I don't want FAA to go and give me a contract to develop an EVS system, for instance. I have no technical expertise in that. It would be great participation for me, but I wouldn't produce anything. I would just be participating away over there, and hire a bunch of engineers and people and get some overhead and fly around the country and look smart for a couple of years until they finally found me out and dumped me off and cut off my money. That would be great participation, but it wouldn't be what I consider real competition.

So, if they are not going to be able to do the job, there is no use giving it to them. I don't care how nice they are.

Mr. BUTTERFIELD. Well, there was the technical evaluation.

Mr. BROOKS. Yes, I know. Either the problem is much more complex than they envisioned it, or they misjudged the competency of the people that they let have it, and it is sad.

I am glad you looked at the 1970 report which was prepared by this subcommittee (House Report No. 623, 91st Congress, second session).

Now, in your current review of FAA procurement practices, have you considered the recommendations in these reports?

I know you have in the 1970 report, but did you get a copy of the 1963 report? Do you recall that? If not we will make it available to you.

Mr. BUTTERFIELD. No, I have not. I have looked carefully at the 1970 report, but not the others.

Mr. BROOKS. Now, turning to the negotiations and award of this contract, is it correct that the winning proposal was found by FAA technical experts to offer greater technical risks than that of another proposal?

Mr. ISRAEL. It scored lower in some respects, but both proposals on the second go-around were satisfactory from a technical point of view, after extremely careful review by the best technical people we could put on the job.

There was certainly no reason to believe that there was a major technical risk with either contract.

Mr. BROOKS. But I think the technical evaluation of one of the competitors was higher than that of Philco-Ford.

Mr. BUTTERFIELD. That is correct, as I said in my statement.

Mr. ISRAEL. Yes, both were acceptable but—

Mr. BROOKS. Mr. Israel, I understand both were acceptable. We are both living right now, but one of us might live a lot longer. What I am pointing out is surely they were both acceptable. They both met the minimal. But did not one of the competitors exceed substantially Philco-Ford's score on this technical evaluation?

Mr. BUTTERFIELD. I think I testified to that in my statement, Mr. Chairman.

Mr. BROOKS. If you did, of course, you are right. We will submit this document to make that very clear.

[Exhibit No. 5 follows:]

EXHIBIT NO. 5

REPORT AND REVIEW BY SOURCE SELECTION EVALUATION BOARD

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., June 1, 1972.

Subject: Minutes of SSEB Meeting, May 31, 1972

To: SSEB Members and Consultants

The SSEB and MITRE consultants met on May 31, 1972 to report final team scores for the three (3) proposals and to score the alternate proposals and the design options. MITRE presented their scores and highlights of their evaluation of Checklists #3 and #4 for Proposal CH. Each team leader then presented the team score for his element. The score presented was an average score, obtained by summing the scores of all checklists scored by the team and dividing the sum by the number of checklists scored. The team scores are shown

on Table 1. Each team presented some comments on each proposal. All the comments will be submitted to the SSEB Chairman in a written final report.

There was agreement that proposal MT is not acceptable for negotiations. A discussion arose concerning the acceptability of Proposal DO, since three (3) of the scores submitted were below 500, the lower end of the MS scale. The following definition of unacceptability was submitted:

Unacceptable Proposal.—A proposal is unacceptable when compromises to the specification are so great that the impact on FAA maintenance techniques and operations are judged to be unacceptable or when the changes required in system design by the proposer are judged to be technologically out of date or the estimated cost would be out of line or the estimated time required to bring the design in line with the technical competition is unreasonable.

The SSEB agreed that proposal DO can be accepted if the weak points can be negotiated out to their satisfaction. The evaluation procedures may have to be abridged slightly in order to do this. The procedures were written with the intent of having 90 days for technical evaluation, providing ample time to resolve problem areas, if they could be resolved, so that a final score less than MS from any evaluation element would automatically disqualify that proposer from further consideration. The SSAC will make the final decision concerning negotiations.

The scores for the alternate proposals and the two required design options are presented in Tables 2 through 4 (refer to memo from SSEB Chairman on May 31, 1972 for summary of each alternate and design option). In all cases, an acceptable score simply means that the SSEB recommends discussion of the item with the proposer, with a view toward negotiating it into the contract if after weighing all the pros and cons it still appears to be advantageous to the Government. A score higher than MS indicates a stronger inclination to negotiate the item into the contract, but still subject to clarification and assessment of all the pertinent factors. A score of less than MS means that the SSEB does not wish to consider the item for further discussion or negotiations.

G. D. HADORN,
Chairman, SSEB.

CONCUR :

C. BEAM,
Leader, Group A.
E. KAPUTA,
Leader, Group B.
E. BOLDEN,
Leader, Group C.
G. CAMPBELL,
Leader, Group D.
T. EDWARDS,
Leader, Group E.

Enclosures.

TABLE 1.—PROPOSAL SCORES BY SSEB EVALUATION ELEMENTS

Evaluation element	Proposal (North Electric)	Proposal (Philco Ford)	Proposal (MT)
(A) Design.....	577	543	389
(B) Quality assurance.....	559	493	360
(C) Reliability.....	503	471	484
(D) Schedule.....	603	422	496
(E) Management.....	582	575	392
(F) Price.....	(¹)	(¹)	(¹)
Proposal total.....	2,824	2,504	2,121
Proposal average.....	565	501	424

¹ To be supplied.

TABLE 2.—SCORES FOR ALTERNATE PROPOSALS AND DESIGN OPTIONS—PROPOSER CH

	Score	Comment
Alternate proposals:		
1. Larger printed circuit boards.....	600.....	RD-650 may file a minority report. Commercial item but proven design. Order-wire is independent of data channel.
2. Code switch for radio matrix.....	800.....	
3. Ringdown supervision signaling of maintenance order-wire subset.....	1,000.....	
4. Distributed radio matrix.....	100.....	Additional hardware in position consoles. The special conditions at NAFEC should be brought to the proposers attention.
5. Digital encoding for position dialer.....	600.....	
Design options:		
1. DA pushbutton/radio channel module indicator options.....	LED-1,000..... 2-lamp-400..... 1-lamp-100.....	Complete flexibility. Compromise flexibility. Insufficient flexibility.
2. EVS to EVS signaling options.....	CCITT No. 6 and MF (Mix)-1,000. CCITT No. 6-800..... MF-500.	Tailor to trunk group size. Future compatibility.

TABLE 3.—SCORES FOR ALTERNATE PROPOSALS AND DESIGN OPTIONS—PROPOSER DO

	Score	Comment
Alternate proposals:		
1. Larger printed wiring boards.....	100.....	Boards too large, and boards under development. Non-MIL and under development.
2. Non-MIL printed wiring board connectors.....	100.....	
3. Commercial common control sub-system.....	100.....	Non-MIL.
4. Interchangeable pushbutton modules.....	1,000.....	Tailor to need—Mix to be determined (NAFEC needs all LED's).
Design options:		
1. DA pushbutton/radio channel module indicator options.....	LED-1,000..... 2-lamp-400..... 1-lamp-100.....	Complete flexibility. Compromise flexibility. Insufficient flexibility.
2. EVS to EVS signaling options.....	CCITT No. 6 and MF (Mix)-1,000. CCITT No. 6-800..... MF-500.	Tailor to trunk group size. Future compatibility.

TABLE 4.—SCORES FOR ALTERNATE PROPOSALS AND DESIGN OPTIONS—PROPOSER MT

	Score	Comment
Alternate proposals:		
1. Commercial common control sub-system.....	100.....	Non-MIL.
2. Commercial PABX.....	100.....	Non-MIL and source not provided. This should have been the prime proposal.
3. Militarized line conditioning equipment for radio trunks.....	600.....	
4. Single output static uninterruptable power source.....	600.....	This option is contingent on converting L-3050 processor from 60/400 Hz to 60 Hz only.
Design options:		
1. DA pushbutton/radio channel module indicator options.....	LED-1,000..... 2-lamp-400..... 1-lamp-100.....	Complete flexibility. Compromise flexibility. Insufficient flexibility.
2. EVS to EVS signaling option.....	CCITT No. 6 and MF (Mix)-1,000. CCITT No. 6-800..... MF-500.	Tailor to trunk group size. Future compatibility.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 30, 1972.

To: Chairman, Source Selection and Evaluation Board (SSEB)

Subject: Review, Evaluation, and Scoring of EVS Proposals—Phase II

During the period 24 April-31 May 1972, Team "A" of the SSEB conducted a review, evaluation, and scoring of the proposals offered in response to RFP No. WA4M-2-0207 for EVS systems.

Enclosed is the Phase II report of the Team "A" findings which contains scoring results and comments relative to each system design, and to each check-

list. The Team "A" scores are as follows (These scores represent the raw total of checklists 1, 2, 5 thru 14, 21, and 22) :

	Total	Average
CH (North Electric).....	8,083	577
DO (Philco-Ford).....	7,605	543
MT (Litcom).....	5,447	389

The technical evaluation of Team "A" showed the CH proposal was acceptable with some problems which could be resolved through negotiation; the DO proposal was marginally acceptable with major risk due to the large amount of hardware and software remaining to be developed; the MT proposal was not acceptable because of major deficiencies and specification violations throughout the proposed system and major risks due to the amount of hardware and software remaining to be developed.

Team "A" believes that the proposal submitted by CH represents the most logical and sound system design approach and bears the lowest overall risk to the Government, and we therefore recommend that CH be selected for negotiation.

C. J. BEAM,
Team "A" Leader.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., August 25, 1972.

SYSTEM DESIGN AND TECHNICAL REQUIREMENTS

Team A Amendment to Final Scores SSEB Chairman

As a result of additional information from the offerors, the following changes to the Team "A" checklist scores are submitted :

Checklist	Adjusted score	Original score
DO (Philco-Ford):		
8.....	547	506
13.....	530	498
21.....	533	508
CH (North Electric):		
7.....	641	600
21.....	565	545

C. J. BEAM,
Leader, Team A.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 30, 1972.

Phase II "B" Team Report Chairman, SSEB

During the period 24 April-22 May 1972, Team "B" of the Source Selection Evaluation Board, conducted a detailed review, evaluation and scoring of the three (3) proposals offered in response to RFP No. WA4M-2-0207, Electronic Voice Switching (EVS) System.

Enclosed you will find a detailed report of "B" Team concerning Quality Assurance. Gross "B" Team scores are as follows: MT: 360, CH: 559, DO: 493.

All three (3) proposals have items that are unacceptable as they presently stand. Items which do not comply with the FAA specifications are to be resolved at contract negotiations prior to award.

The gross score of MT places them in an unacceptable position. There are seventy-two (72) problem items. Twenty-eight (28) of these items can be classi-

fied as "non-compliance" while forty-three (43) items are classified as "require verification by offeror".

The gross score of CH places them in an acceptable position. There are twenty-four (24) problem items. Seven (7) are classified as "non-compliance" and seventeen (17) items are classified as "require verification by offeror".

The gross score of DO places them in an acceptable position. There are twenty-five (25) problem items. Fourteen (14) are classified as "non-compliance" and eleven (11) items are classified as "require verification by offeror".

If further explanation or discussion is needed, feel free to call upon us.

E. J. KAPUTA,
RD-653.
E. HUMSTON,
LG-431.
J. JARRETT,
NS-142.
G. KNIGHT,
NA-140.
G. W. WEBB,
LG-410.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., August 28, 1972.

Final Team "B" Report of EVS Proposal Review
Chairman, Source Selection Evaluation Board

This update of the initially submitted "Phase II B Team Report", dated 30 May 1972 and the subsequently submitted memo, "Review of EVS Proposal Addendums—3 August 1972", dated 11 August 1972, constitutes the final report for the QUALITY ASSURANCE—TEAM B review and scoring of all material submitted by the offerors, CH and DO, in response to RFP No. WA4M-2-0207, Electronic Voice Switching (EVS) System.

The gross team scores listed in the 30 May 1972 report have been re-scored as shown below:

Checklist No.	DO (Philco- Ford)	CH (North Electric)
1	500	645
12	552	621
13	553	613
22	564	624
Total	2,169	2,503
Gross average (+4)	542	625

The re-scoring was based upon a detailed review of the submitted addendum responses, and a reassignment of scores, where appropriate, for each item in the Team B checklists, as required by *Proposal Evaluation Procedures for EVS System*, dated 14 March 1972.

The raw checklist scores of each Team B evaluator were not changed to arrive at the new scoring. However, since each evaluator was originally within 10% of the group's average score for the associated checklist, integrity of revised scoring was maintained by revising the raw scores on a single Team B members checklists.

In addition to the revised score submitted herein, there is also attached a listing for which no resolution has been found. They are therefore submitted for your attention and usage.

E. HUMSTON,
E. KAPUTA,
Leader, Team B.

CH: 1. Reference addendum resulting from meeting with FAA on 21 July 1972, Item 4, Paragraph 5: CH has requested a GFE ARTCC Console be furnished for testing. This is not in accordance with the RFP Article IV.

2. Reference Part I, Book 2 of 4, Section I of Technical Proposal, Paragraph 1.3.1.1, and Team "B" report on Phase II 30 May 1972, Comments on CH Page 18 Item 10: CH has indicated a delivery impact if LED option is exercised. (Amount of delay not indicated.)

DO: 1. Reference Team "B" Phase II evaluation report dated 30 May 1972, Pages 23-24. Items 13, 14, 21, 25, 26, and 27. DO has indicated GFE in excess of that required of the RFP Article IV.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., June 2, 1972.

RELIABILITY AND MAINTAINABILITY

To: Chairman, SSEB

Subject: Review and Scoring of EVS Proposals—Phase II

During the period 24 April to 26 May 1972, Team "C" of the Source Selection Evaluation Board conducted a detailed review, evaluation, and scoring of the proposals offered in response to RFP No. WA4M-2-0207, Electronic Voice Switching (EVS) System.

A summary report of the Team "C" findings are attached for your consideration and information. Contained in this report are scoring results and comments relative to each area of deficiency or non-compliance.

In addition, the following suggestions are highlighted for your attention and consideration as recommendations to be forwarded to the contract negotiations organization:

1. Each of the Proposers has serious deficiencies or non-compliance in certain areas. These are noted in the respective checklists.

2. The successful proposer should be required to be compliant in his proposal, otherwise there is no assurance that he will not adequately meet FAA requirements. Negotiations will be required toward accomplishing objectives, and to fully satisfy the needs as delineated in FAA-E-2479.

3. Greater definition of contractor deficiencies is highlighted in the sections following the scoring.

As indicated by the gross team average, the proposals are ranked in order of preference as follows: CH (503), DO (487), and MT (471). Only one proposer was above the MS score of 500 but it felt that DO can be negotiated within an acceptable range within an acceptable time period whereas MT, although it appears within negotiation, would require extensive time and effort to negotiate upward to a minimum MS score of 500.

E. L. BOLDEN,
Team "C" Leader.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D. C., August 28, 1972.

RELIABILITY AND MAINTAINABILITY

To: Chairman, SSEB

Subject: Adjustments of EVS Proposal Scores

During the period from August 8, 1972 to August 25, 1972, the results of the July 21 meetings with OH and EO were reviewed. These reviews considered the responses submitted by DO and CH and the resulting impact, if any, on the checklist scoring submitted at the end of the Phase II EVS Proposal effort.

For team "C," the average scores resulting from the clarifications submitted were altered as follows:

Bidder	Checklist averages						Overall average	
	1	2	10	12	14	15		16
CH (North Electric):								
End of phase II.....	603	628	560	331	590	474	403	513
As of Aug. 25, 1972.....	603	628	560	400	590	474	450	529
DO (Philco-Ford):								
End of phase II.....	444	443	560	487	440	491	432	471
As of Aug. 25, 1972.....	444	443	560	505	565	575	450	503

The changes in CH's average in checklists 12 and 16 are a result of the following:

The information submitted by CH in their August 3, 1972 clarifications increased the ratings in the two checklists by their responses given in items 4 and 5 and for checklist #12 and item 9 for checklist #12.

The changes in DO's average in checklists 12, 14, 15 and 16 were a result of the responses given in their addendum 5 items, 3, 6, and 15J.

E. L. BOLDEN,
Team "C" Leader.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 30, 1972.

To: Chairman, SSEB
Subject: Phase II "D" Team Report

During the period 24 April-22 May 1972, Team "D" of the Source Selection Evaluation Board, conducted a detailed review, evaluation and scoring of the three proposals offered in response to RFP No. WA4M-2-0207 Electronic Voice Switching (EVS) system.

Enclosed you will find detailed report of "D" Team concerning schedules. Gross "D" Team scores are as follows: CH-603, DO-422, MT-496.

MT will not be discussed in this cover letter as we consider them out of competition which other team scores should indicate along with these. Although DO's score is a below standard score, it is our opinion that they could successfully be brought up to standard on Checklists #3 and 4 through negotiation. In view of this the following comments are provided.

These scores plus the detailed scores, findings and comments in the report will substantiate a strong "D" Team feeling that CH can best provide the FAA with a deliverable cutover plan. The information contained herein will show that the other bidder which is DO, did not present a workable cutover plan, primarily due to lack of understanding of the #300 System. This is not to say that after the further study of the #300 System, DO's engineers could not have provided a workable cutover plan. However, in either case it is the opinion of the team that the DO proposal would have to be considered as high technical schedule risk with regard to Checklists #3 and #4. Other serious negative factors concerning DO's cutover plan can be found under TAB 2.

In CH's favor concerning the cutover plan is the fact that their technical approach to cutting over EVS into a non-sterile environment appears sound as presented in the proposal. This is based on their expertise in the telecommunications field and their very clear understanding of the #300 System. Also their recognition of the magnitude of the interconnect agreement problem with the 22 different telephone companies indicates a thorough understanding of the cutover problem.

With regard to schedule the DO proposal was considered to be a high risk due to the fact that an estimated 80% of DO's design requires additional development. On the other hand, the schedule presented in the CH proposal was considered low risk because the remaining development required by CH is estimated at only 20%.

No other deficiencies surfaced on either proposal which the team felt would have a major schedule impact. However there are minor problems (TAB 3 negotiable items) which if favorable solutions are not found, schedule problems undoubtedly will arise.

In summary, the undersigned request that the SSAC be made aware that the team feels that the total CH system design and expertise provides a very low risk factor with regard to cutover. High confidence exists in this judgement.

If further explanation or discussion is needed, feel free to call upon us.

G. CAMPBELL,
AT-332.
S. DAWSON,
AT-510.
T. EDWARDS,
NA-140.
C. FEYEN,
AT-31.
P. HINELY,
NA-132.
E. HUMSTON,
LG-430.
G. KNIGHT,
NA-514.
A. TEGELER,
RD-223.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., August 25, 1972.

To: SSEB Chairman

Subject: Team "D" Amendment to Final Report

As a result of DO's Addendum #5, Team "D's" final report is amended as follows: Checklist #3—Team Score 600, Checklist #4—Team Score 600.

G. CAMPBELL,
Leader, Team D.
S. DAWSON,
Review Team Leader.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 30, 1972.

MANAGEMENT

To: Chairman, SSEB

Subject: Review and Scoring of EVS Proposals—Phase II

During the period April 24—May 22, 1972, Team "E" of the Source Selection Evaluation Board conducted a detailed review, evaluation, and scoring of the proposals offered in response to RFP No. WA4M-2-0207 Electronic Voice Switching (EVS) System.

A summary report of the Team "E" findings are attached for your awareness and information. Contained in this report are scoring results and comments relative to each checklist.

In addition, the following suggestions are highlighted for your attention and consideration as recommendations to be forwarded to the contract negotiations organization:

1. The SEMP's proposed should be modified to satisfy all keypoints listed in Checklist #18 and then incorporated as a contractual item.
2. The successful proposer should be advised that his training course, as proposed, will not adequately meet FAA requirements. Further negotiations are required on course objectives, content, and duration to fully satisfy the need for a comprehensive training program.
3. Greater definition of contractor intent is required regarding Technical Engineering Services and Support per Items 25, 44 and Attachment Q of the RFP.

As indicated by the gross team average the proposals are ranked in order of preference as follows: CH (582), DO (575) and MT (392). MT's proposal was found to rank, "below specification" as it was related to the Team "E's" Area of evaluation.

T. F. EDWARDS,
Team "E" Leader.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., August 11, 1972.

MANAGEMENT

To: Chairman, Source Selection Evaluation Board

Subject: Review of EVS Proposal Addendums—3 August 1972

A review of the 3 August 1972 Addendums has been completed, (DO Items 12 and 15, CH Items 11 and 13).

Items that applied to Team E's area of evaluation were found acceptable as presented; however, it was felt that the following statement, relative to training, should be incorporated within the contract document:

DO: In addition to the training courses specified as options in RFP schedule, Items 38 a, b, and c, the Government wishes to procure one additional training course, as an option under RFP schedule Item 38d. This course shall be known

as the "Advanced Program Training Course" and be subject to the general administrative controls and provisions of the RFP schedule and Attachment E.

Item 38d, Advanced Program Training Course, shall be for 3 separate classes of approximately 12 students each. These classes will consist of students who are graduates of the "System Theory and Hands-On Equipment Training" and should be developed and scheduled accordingly. Each class shall be a minimum of five (5) weeks in duration.

As a result of this training, the EVS Maintenance Technician shall be capable of complete utilization and on-site support of all software, including operational, diagnostic, and utility programs. This includes the ability to debug programs, perform edits, and read and interpret diagnostic listings. In addition, a working knowledge of the symbolic and machine language instruction repertoire is required to perform corrective maintenance of hardware/software interface problems.

CH: The "System Theory and Hands-On Equipment Training" course for maintenance personnel shall include, in addition to the training material referenced in the RFP Attachment E and the offeror's technical proposal, instruction on the software system. As a result of this training, the maintenance technician shall be capable of complete utilization and on-site support of all software, including operational, diagnostic, and utility programs. This includes the ability to debug programs, perform edits, and read and interpret diagnostic listings. In addition, a working knowledge of the symbolic and machine language instruction repertoire is required to perform corrective maintenance of hardware/software interface problems.

It is anticipated that an adequate maintenance training program would require a course length of at least twenty (20) weeks duration, at a minimum.

T. F. EDWARDS,
Team "E" Leader.

SUMMARY OF CHECKLIST AND EVALUATION ELEMENT SCORES, CH (NORTH ELECTRIC) PROPOSAL—
JUNE 2, 1972

Checklist number and title	Evaluation element scores—					
	A	B	C	D	E	F
1 Overall functional approach	632		603			
2 Design-development status	686	645	628	640	NA	
3 Cutover plan				619		
4 Special cutover hardware-software				607		
5 Functions and position equipment	562					
6 Interfaces and functions	519					
7 RCAG equipment	600					
8 Interconnection network	532					
9 Common control and RTOC	605					
10 System maintenance	605		560			
11 System performance	559					
12 Quality assurance	550	461	331			
13 Preproduction system	598	613		600		
14 Cabling and power distribution	540		590			
15 Site spares and nonstandard parts			474			
16 Reliability and maintainability			403			
17 Schedule risk				550	617	
18 SEMP and documentation					577	
19 Training and maintenance plans					577	
20 Engineering and evaluation support services					558	
21 Flexibility and modularity	545					
22 Standardization and form factor	550	516				
23 Cost analysis						390
Total evaluation element raw scores	8,083	2,235	3,589	3,016	2,329	390
Average evaluation element scores	577	559	513	603	582	390

Note: Checklists are listed in descending order in the same manner as described in the RFP (WA 4M-2-0207). The "average evaluation element" score is the quotient of the "total evaluation element" raw score divided by the number of checklists applicable to each specific evaluation element.

SUMMARY OF CHECKLIST AND EVALUATION ELEMENT SCORES, CH (NORTH ELECTRIC) PROPOSAL—
SEPT. 1, 1972

Checklist number and title	Evaluation element scores—					
	A	B	C	D	E	F
1 Overall functional approach.....	632	645	603			
2 Design-development status.....	686		628	640	NA	
3 Cutover plan.....				619		
4 Special cutover hardware-software.....				607		
5 Functions and position equipment.....	562					
6 Interfaces and functions.....	519					
7 RCAG equipment.....	641					
8 Interconnection network.....	532					
9 Common control and RTOC.....	605					
10 System maintenance.....	605		560			
11 System performance.....	559					
12 Quality assurance.....	550	621	400			
13 Preproduction system.....	598	613		600		
14 Cabling and power distribution.....	540		590			
15 Site spares and nonstandard parts.....			474			
16 Reliability and maintainability.....			450			
17 Schedule risk.....				550	617	
18 SEMP and documentation.....					577	
19 Training and maintenance plans.....					558	
20 Engineering and evaluation support services.....						
21 Flexibility and modularity.....	565					
22 Standardization and form factor.....	550	624				
23 Cost analysis.....						390
Total evaluation element raw scores.....	8,144	2,503	3,705	3,016	2,329	390
Average evaluation element scores.....	582	625	529	603	582	390

Note: Checklists are listed in descending order in the same manner as described in the RFP (WA 4M-2-0207). The "average evaluation element" score is the quotient of the "total evaluation element" raw score divided by the number of checklists applicable to each specific evaluation element.

SUMMARY OF MINOR TECHNICAL DEFICIENCIES (CH PROPOSAL)

1. *Lost Call/Capacity Test.*—The bidder's response did not discuss the method of testing or how traffic is to be generated for this test. This matter should be clarified prior to a contract award.

2. *Reliability Analysis.*—The single thread models for each of the EVS functions have been provided and show in some detail the total elements, end-to-end for each. However, the model development to demonstrate compliance with requirements to meet the 0.9999 availability for the ATC to RCAG, Intercom, Interphone and trunk-to-trunk functions, and the 0.999 for support communications are not complete.

3. *GFE.*—The bidder has requested a GFE ARTCC console be furnished for testing. This is not in accordance with the RFP Article IV.

SUMMARY OF CHECKLIST AND EVALUATION ELEMENT SCORES, DO (PHILCO-FORD) PROPOSAL—
JUNE 2, 1972

Checklist number and title	Evaluation element scores—					
	A	B	C	D	E	F
1 Overall functional approach.....	510	468	444			
2 Design-development status.....	396		443	630	NA	
3 Cutover plan.....				276		
4 Special cutover hardware-software.....				203		
5 Functions and position equipment.....	602					
6 Interfaces and functions.....	598					
7 RCAG equipment.....	594					
8 Interconnection network.....	506					
9 Common control and RTOC.....	574					
10 System maintenance.....	600		560			
11 System performance.....	563					
12 Quality assurance.....	558	554	487			
13 Preproduction system.....	498	487		500		
14 Cabling and power distribution.....	564		440			
15 Site spares and nonstandard parts.....			491			
16 Reliability and maintainability.....			432			
17 Schedule risk.....				500	589	
18 SEMP and documentation.....					573	
19 Training and maintenance plans.....					590	
20 Engineering and evaluation support services.....					547	
21 Flexibility and modularity.....	508					
22 Standardization and form factor.....	534	462				
23 Cost analysis.....						595
Total evaluation element raw scores.....	7,605	1,971	3,297	2,109	2,299	595
Average evaluation element scores.....	543	493	471	422	575	595

Note: Checklists are listed in descending order in the same manner as described in the RFP (WA 4M-2-0207). The "average evaluation element" score is the quotient of the "total evaluation element" raw score divided by the number of checklists applicable to each specific evaluation element.

SUMMARY OF CHECKLIST AND EVALUATION ELEMENT SCORES, DO (PHILCO-FORD) PROPOSAL—
SEPT. 1, 1972

Checklist number and title	Evaluation element scores—					
	A	B	C	D	E	F
1 Overall functional approach.....	510	500	416			
2 Design-development status.....	396		443	630	NA	
3 Cutover plan.....				600		
4 Special cutover hardware-software.....				600		
5 Functions and position equipment.....	602					
6 Interfaces and functions.....	598					
7 RCAG equipment.....	594					
8 Interconnection network.....	547					
9 Common control and RTOC.....	574					
10 System maintenance.....	600		560			
11 System performance.....	563					
12 Quality assurance.....	558	552	525			
13 Preproduction system.....	530	553		500		
14 Cabling and power distribution.....	564		525			
15 Site spares and nonstandard parts.....			575			
16 Reliability and maintainability.....			450			
17 Schedule risk.....				500	589	
18 SEMP and documentation.....					573	
19 Training and maintenance plans.....					590	
20 Engineering and evaluation support services.....					547	
21 Flexibility and modularity.....	533					
22 Standardization and form factor.....	534	564				
23 Cost analysis.....						595
Total evaluation element raw scores.....	7,703	2,169	3,522	2,830	2,299	595
Average evaluation element scores.....	550	542	503	566	575	595

Note: Checklists are listed in descending order in the same manner as described in the RFP (WA 4M-2-0207). The "average evaluation element" score is the quotient of the "total evaluation element" raw score divided by the number of checklists applicable to each specific evaluation element.

SUMMARY OF MINOR TECHNICAL DEFICIENCIES (DO PROPOSAL)

1. *Headset Specification in Error.*—Headset specification change from FAA-E-2179 to FAA-E-2486 was not picked up by DO. This should be clarified prior to a contract award.

2. *Design Reviews.*—The degree of FAA participation in the PDRs and CDRs has not been delineated.

3. *RFI Solution Responsibility.*—It is not clear whether or not the bidder will assume responsibility for the solution of RFI problems, if a problem develops with ARTCC equipment after installation.

CHECKLIST SCORES SUPPORTING ELEMENT SCORES

OFFEROR-ELEMENT	CHECKLIST #											TOTAL RAW SCORE (AVERAGE)													
	1	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16	17	18	19	20	21	22	23	
CH	A	622	616																						8144/582
	B	664				562	510	641	532	605	695	579	550	578	510							565	500		2503/625
	C	693	628							560		(6110)	621	613	500								624		3705/529
	D																								3015/422
	E																								2377/432
	F																								3707/500
OO	A	510	(510)																					7703/550	
	B	500																						2169/542	
	C	(511)	(512)																					3522/503	
	D	639	600	600																				2830/566	
	E																							2277/375	
	F																							597/595	
MT	A	(513)	(514)																					5447/399	
	B	(515)	(516)																					1440/560	
	C	(517)	(518)																					3377/632	
	D	(519)	(520)																					2478/496	
	E	(521)	(522)																					1962/292	
	F	(523)	(524)																					3427/342	

NOTES:

- ELEMENTS:
- CHECKLISTS ARE LISTED IN DESCENDING ORDER IN THE SAME MANNER AS DESCRIBED IN THE RFP (UAM 2 007).
- THE "AVERAGE" RAW SCORE IS THE QUOTIENT OF THE "TOTAL RAW SCORE" DIVIDED BY THE NUMBER OF CHECK LISTS APPLICABLE TO A SPECIFIC ELEMENT.
- DESIGN AND TECHNICAL REQUIREMENTS
- QUALITY ASSURANCE
- RELIABILITY/MAINTAINABILITY
- SCHEDULE
- MANAGEMENT
- COST ANALYSIS

4. *GFE*.—There is an excess of *GFE* requested by the bidder over that specified in RFP Article IV. Equipment in excess of that specified is as follows: (a) Fork lift, dolly, hand truck and Johnson bar at each site. (b) Station wiring lists, Western Electric SD drawings, T drawings and circuit description sheets (CDs) and some WECO "J" specifications on the 300 system for cutover purposes. (c) It is not clear as to whether the government or the bidder supplies the GPI/GPO 9020 interface adapters. (RFP and Specification requires this to be contractor furnished.) (d) Spare *GFE* ATC consoles are implied for backroom testing. In addition "DO" requests one of each type trunk (interphone, etc.) will be made available for testing during light traffic hours. (e) "DO" indicates the standard tools and test equipment indicated in Tables 8-1 through 8-4 of their proposal will be furnished by the Government to "DO" for maintenance and evaluation of the NAFEC system and for use at the operational ARTCCs. (f) "DO" proposes that *GFE* test equipment be invoiced to them until completion of on-site installation.

EXHIBIT C

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 26, 1972.

To: Pricing Team Leader

Subject: Price Analysis of Proposal for Electronic Voice Switching (EVS) System

Enclosure 1 contains a tabulation of the prices for the three EVS proposals. The prospective contractors have been designated DO, CH, and MT and the tabulation of prices have been broken down into Schedule I item prices, Schedule II item prices and design options prices. The Schedule I prices for the DO, CH, and MT prospective contractors are 8.9, 20.2, and 12.2 million dollars respectively. There are several reasons for the wide disparity in prices:

1. The equipment designs and configurations differ greatly for the three contractors. For example, the EVS system will be housed in 90 equipment cabinets for contractor CH, while contractors DO and MT will require only 70 and 34 cabinets respectively. As another example, the interconnect networks are considerably different for the three contractors. CH will employ time-division multiplexing techniques, MT will utilize coaxial cables and DO will use twisted multipair cables.

2. The "make" versus "buy" percentages vary with the three prospective contractors. CH is subcontracting the major portion of its Schedule I effort, hence their costs are inflated by G&A and fee to the subcontractors. On the other hand, DO and MT are making a much greater percentage of the equipments which is reflected in their Schedule I costs being substantially lower.

In the subcontracting costs of CH, there is an item titled "Engineering and other" associated with the R controller position equipment, which is priced out at 4.7 million dollars and appears, on the surface, to be considerably out of line with the prices proposed by DO and MT. An explanation for this cost was not provided in the price proposals.

3. The prices for certain Schedule I items vary because they are available to one contractor as off-the-shelf equipment, while the second contractor must devote design effort to them. Several of the RFP Table A and B line items differ in the three proposals because some of them were combined and priced together by the prospective contractors. A breakdown of the individual costs or a description of what is included in the combined costs is not available.

Also, for certain items on Table A and B, no prices are given and it can only be assumed that the prices for these items are included in other item prices.

4. CH's Schedule I prices are also inflated due to the inclusion of the Schedule II Instruction Book prices into Schedule I. Recommend that these costs be removed from Schedule I and placed in the fixed price portion (Schedule II) of the prospective contract. The effort involved with the preparation of instruction books should not be paid for under a cost type contract.

The Schedule II prices for prospective contractors DO, CH, and MT are 53.0, 83.9, and 99.7 million dollars respectively. The reasons for the disparity in prices among the three, are as follows:

1. Differences in equipment designs and configurations as previously indicated.

2. The different percentages of "make" versus "buy" among the three prospective contractors.

3. Off-the-shelf versus new design equipment.

4. Two factors should be taken into consideration in relation to the price for prospective contractor MT. First, the figure of 99.7 million dollars is inflated because it includes the price for two design options; the single button incandescent lamps and the MF confirmation. The Schedule II prices for DO and CH do not include these design options. It was not possible, from the information provided by MT, to extract the design option prices from the Schedule II prices. Secondly, MT has included the price for contract line item 39, special tools and test equipment in Schedule I price. Recommend that this item be included in the Schedule II price and be excluded from the cost type portion of the prospective contract.

5. During the review of the CH proposal, a \$100,000 mathematical error in favor of the government was noted in the price of contract line item number 9, the Indianapolis site. However, since CH made an across the board reduction of 3.5 million dollars before submission of the final Schedule II price, it is not known whether the price of 83.9 million dollars should be adjusted for this error.

The design option prices for LEDS and CCITT #6, as shown on enclosure 1, are 28.0, 17.5, and .7 million dollars for prospective contractors DO, CH, and MT respectively. A price analysis for the three companies could not be accomplished because the .7 million dollar figure for MT does not include the design option prices for Schedule II items. It only includes the design options for Schedule I. As previously stated, the design option costs for Schedule II are included in the Schedule II basic price for prospective contractor MT (99.7 million dollars). They could not be broken out and separately identified. It should be noted, however, that no matter which of the design options are selected for this prospective contract, the Schedule II basic price for MT will not change. The figure of 99.7 million dollars includes the design option prices in any combination.

The last line of enclosure 1 is the total program price for the three prospective contractors. The prices for DO, CH, and MT are 90.0, 121.6, and 112.5 million dollars respectively. This price includes the prices for LEDS and CCITT #6 design options but does not include the prices for contract options such as contract maintenance or technical professional engineering services. It also does not include the prices of item identifications or EVS systems training.

Enclosures 2, 3, and 4 provide a more detailed breakdown of the prices for the design options shown on enclosure 1. Enclosure 5 provides an indication of the overall program prices for the three prospective contractors, by fiscal years. The prices on enclosure 5, however, do not include the prices of any of the design options or contract options.

THOMAS BURNS, JR.
Supervisory Industrial Specialist.
EDWARD C. HUNTZINGER,
Industrial Engineer.

Schedule I plus II	Electronic voice switching system		
	DO	CH	MT
1. Schedule I price (basic).....	8,921,833	20,167,856	12,243,882
2. Schedule II price (basic).....	53,017,681	83,906,029	99,650,261
3. Design options (LEDS plus CCITT).....	28,038,936	17,545,453	650,958
Total system price (1 plus 2 plus 3).....	89,978,845	121,619,338	112,545,101
Schedule I (NAFEC):			
(A) Basic.....	8,921,833	20,167,856	12,243,882
(B) Design options:			
1. DA buttons:			
(a) LedS.....	2,860,340	1,292,017	303,206
(b) Single.....	725,112	263,943	55,093
(c) Split.....	803,044	307,461	167,860
2. Radio channel:			
(a) LedS.....	309,497	314,790	335,215
(b) Single.....	142,145	63,165	60,907
(c) Split.....	146,724	63,710	185,599
3. EVS-EVS signalling:			
(a) MF.....	11,274	25,015	12,537
(b) CCITT No. 6.....	92,734	138,568	12,537
Total basic price (Leds plus CCIT No. 6).....	12,184,404	21,913,231	12,894,840

	EVS		MT
	DO	CH	
Schedule II (2-22):			
(A) Basic.....	53,017,681	83,906,029	99,650,261
(B) Design options:			
1. DA buttons:			
(a) Leds.....	22,739,072	11,628,156	(1)
(b) Single.....	7,119,076	2,375,486	
(c) Split.....	7,405,756	2,767,150	
2. Radio channel:			
(a) Leds.....	1,493,592	2,924,807	
(b) Single.....	997,157	568,489	
(c) Split.....	1,043,932	573,396	
3. EVS-EVS signalling:			
(a) MF.....	465,462	225,134	
(b) CCITT No. 6.....	543,701	1,247,115	
Total basic price (Leds plus CCITT No. 6).....	77,794,046	99,706,107	99,650,261
Design options (totals):			
1. Leds.....	24,232,664	14,552,963	638,421
2. Single button.....	8,116,233	2,943,975	116,000
3. Split button.....	8,449,688	3,340,546	353,459
4. MF.....	465,462	225,134	18,537
5. CCITT No. 6.....	543,701	1,247,115	12,537
Option prices (totals):			
A. Leds plus CCITT No. 6.....	24,776,365	15,800,078	650,958
B. Single button plus CCITT No. 6.....	8,659,934	4,191,090	128,537
C. Split button plus CCITT No. 6.....	8,993,389	4,587,661	365,996
D. Single button plus MF.....	8,581,695	3,169,109	128,537
E. Split button plus MF.....	8,915,150	3,565,680	365,996
F. Leds plus MF.....	24,698,126	14,778,097	650,958

¹ Allocation of design option costs are distributed within schedule II line items.

PROJECTED EVS FUNDING REQUIREMENTS (MILLIONS) CONTRACT LINE ITEMS ONLY

	DO	CH	MT
Schedule I.....	8.9	20.2	12.2
Schedule II:			
Fiscal year 1974.....	13.2	20.7	29.2
Fiscal year 1975.....	12.8	21.0	25.9
Fiscal year 1976.....	12.4	19.9	21.6
Fiscal year 1977.....	14.6	22.3	23.0
Subtotal.....	53.0	83.9	99.7
Total program.....	61.9	104.1	111.9

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., June 16, 1972.

To: Chairman, Source Selection and Evaluation Board (SSEB)
Subject: Report on Review and Evaluation of EVS Cost Proposals

The Group "F" Team, assigned to review, analyze and evaluate the cost proposals submitted by three bidders, commenced its task on 24 April 1972, in accordance with the requirements of WA4M-2-0207 for Electronic Voice Switching Systems (EVS).

The attached Team "F" report supports the scores of each bidder, in accordance with checklist item 23, Cost/Price Analysis:

Bidder:	Average raw score
CH.....	390
DO.....	595
MT.....	342

The EVS basic system cost as proposed by each bidder, excluding all optional contract line items, design options, and alternates, is as follows: (\$ millions)

	CH	DO	MT
Preproduction system (prototype).....	\$20.2	\$8.9	\$12.2
Production system (21 systems).....	83.9	53.0	99.7

The cost proposals, as submitted, were difficult to evaluate and to compare contract line item costs because each bidder proposed a different type of system to meet the EVS specifications which resulted in a significant range in the total proposed price for each proposal.

Without the benefit of a detailed technical evaluation to the proposed cost for each bidder's EVS system, Team "F" cannot determine if any bidder is unacceptable from a cost standpoint.

It is the conclusion of Team "F" that DO's cost proposal is the most realistic, the most readily understood and provides the best trackability; less difficulty was encountered with DO in obtaining supporting documentation for any proposed contract line item cost. CH ranks a second most logical and realistic cost proposal, with MT a close third.

Prior to award of the contract, it will be necessary to obtain from the selected contractor, the following additional cost details: 1. A selling price breakdown by contract line item for equipment quantities listed in Tables A and B per site, as required by the RFP. 2. A selling price breakdown for the contract options, design options, and alternates, per contract line item.

HOLLIS J. STEVENS,
SSEB Team "F" Leader.

Mr. Brooks. The contractor in this case has apparently gone through several different computer systems in an effort to meet the contract requirements. It is my understanding that during the technical evaluation by FAA, the computer reviewed was not the one the contractor intended to incorporate into the system if he won the award.

While the contractor was proposing to use a Univac 1616—and it was this system that the award to Philco-Ford was based on—a somewhat different system was actually reviewed during technical evaluation. Sometime later, however, after award was made, Philco-Ford changed to a much cheaper system based on the Univac UYK-15 computer.

Several months later, that proposal was apparently terminated and, at last report, FAA was planning to fund the redevelopment of Philco's own computer, the Autodin 102, which was last produced in 1965.

Could you explain how the award was made under these circumstances, and what FAA did to assure that the contractor could meet the contract specifications after making the changes following the award?

Maybe Mr. Israel can handle that for you? I am interested in tracking it. Since you have already canceled it, Mr. Israel, I am interested in whether we tracked these basic changes in the specifications, in the use of type of computer systems and so forth? Did we track these variations?

Mr. ISRAEL. Yes, sir. We knew the computer he was proposing. There were certain benchmark tests which he had to pass. If the specifications had never been changed, we had every reason to believe that that computer, as originally proposed, would have handled the job.

Our own factory representatives found extensive noncompliance by Univac in producing the AN UYK-15, both in the areas of quality control and performance. This raised strong concerns in our minds

about this computer, since reliability was a major issue in this procurement. The noncompliance was used by Philco-Ford in December as a basis for terminating that computer contract.

Then there proceeded to be an extensive review by Philco-Ford on which computer could satisfy the job. To meet the reliability requirements and the capacity which, by that time—as I pointed out due to the changes in the specifications—had gone up, Philco-Ford decided in April and May to go with what is known as a repackaging of their 102-M computer.

Mr. BROOKS. Why didn't they stay with the one they proposed, the Univac 1616?

Mr. ISRAEL. I will have to check on that.

Mr. BUTTERFIELD. General Hunn can answer that, perhaps.

Mr. HUNN. The Univac 1616 was initially proposed for the EVS. Philco was continuing with that computer through the first phase of the program against the specifications that were given to them. As it developed, and as Mr. Israel has indicated, Univac was behind schedule on delivery of the computer. Additionally, there were some problems as far as the kind of components that Univac was using that didn't meet the specifications.

The Univac 1616 was being developed using military specifications.

Mr. BROOKS. Pardon me, but perhaps you misunderstood the question. I was inquiring about why they didn't use the one they originally proposed, which was already developed, according to my understanding, the 1616 and not the question of delay in the development and manufacture and production of the UYK-15.

Mr. ISRAEL. The UYK-15 is the military version of that computer.

Mr. HUNN. I am trying to get to that.

Mr. BROOKS. You are going to get into that? All right, the question is: Why they didn't use the 1616 that was available then?

Mr. HUNN. We needed to have a more reliable computer than the 1616 and that is why we went to the AN UYK-15, which is a militarized version of that computer, to give us the reliability that we really needed in order to reduce the maintenance costs of the system, once it got into being.

Mr. ISRAEL. The UYK-15 was a fully developed computer.

Mr. BROOKS. But they didn't use the 1616, which was also fully developed and available, and that is what they said they were going to use.

Mr. HUNN. No, they proposed the militarized version of the 1616.

Mr. BROOKS. They said they would use that? They proposed it?

Mr. HUNN. Yes, sir, but the reliability improvements to the 1616 would result in the computer that they proposed; the one that we were going to use and—

Mr. BROOKS. How about the cost on that? The 1616 is less expensive than the 15, or is it the other way around?

Mr. HADORN. The 15 is more expensive.

Mr. BROOKS. The 15 or the 16?

Mr. HADORN. The 15 is more expensive than the 1616.

Mr. ISRAEL. To meet the military specifications, which are more stringent.

Mr. BROOKS. I understand Univac presented numerous substantive proposals in response to Philco-Ford changes in attempting to reduce costs and to comply to certain parts of the FAA specifications. These

proposals resulted in changes of computers from the 1616 to UYK-15; a change to lower performance peripherals and a \$6.9 million proposed price.

There was, however, no detailed statement of work at this time.

Now, is that your understanding that it was cheaper or more expensive?

And what is your name, first?

Mr. HADORN. It is Dave Hadorn, and I was chairman on the evaluation group.

The 1616 is a commercial machine and the AN UYK-15 design really is a 1616 with militarized components. There is basically no design changes per se. When I use the term "design" it refers to change of parts; however, there was change in packaging.

The design exists. We evaluated the proposal based upon Philco-Ford proposing to use the UYK-15 processor which would be a militarized version of the 1616 commercial equipment.

Now, the cost that you spoke about on this, the \$6½ million, as I recall, we are talking about tape transports. Originally, the request for proposals required a militarized tape transport. Such a transport exists in very few quantities and it was agreed that both proposals—that is both Philco-Ford and North—could use a commercial-type tape transport, since these were used as off-line equipment. They were not the so-called on-line devices; that is, in the event of a failure of a transport, it would impact on availability, or the time that the system was up.

That is why we mutually agreed that both proposals could use a commercial type of transport, and therefore, the price went down. It did not relate to the processor per se. It was a peripheral of the processor.

I think I have answered your question.

Mr. BROOKS. Well, Mr. Administrator, in contract situations such as this, there is often much suspicion that a contractor might bid an unreasonably low price in order to buy the contract and then make up the losses in changes and add-ons.

Do you have any evidence that that was the case in this instance?

Mr. BUTTERFIELD. No, sir, I don't.

Mr. BROOKS. I would like to put into the record a letter dated March 15, 1972. Jim Mollenauer of the FAA wrote the following to Gus Lundquist:

Mr. Hockheimer (Philco-Ford) and General Hipps (Philco-Ford) have advised me that in order to be fully compliant with the EVS specification their costs look like up to twice the budgetary figure. They particularly referred to part of the specifications of the boiler-plate such as quality control, reliability, component selection, etc. They say they will submit a completely compliant bid but they will also submit alternatives which will be cost effective and responsive to all performance and reliability requirements. I suggest you discuss this with Spence (Hunn) because of the very serious implications.

I would ask that be put in the record as exhibit No. 6.

[Exhibit No. 6 follows:]

EXHIBIT NO. 6

Gus: Mr. Hockheimer and General Hipps have advised me that in order to be fully compliant with the EVS specification their costs look like up to twice the budgetary figure. They particularly referred to part of the specification of the "boiler plate" such as quality control, reliability, component selection, etc. They say they will submit a completely compliant bid but they will also submit

alternatives which would be cost effective and responsive to all performance and reliability requirements. I suggest you discuss this with Spence because of the very serious implications.

Spence: Please give me a complete story on this.

JIM.

Gus.

Mr. BROOKS. Then on December 7, 1972, Mr. Dan Alperin, the contracting officer, wrote a memo to the files containing the following:

Basically, the Government representatives attempted to discover the rationale for the lowering of the contractor's price proposal from \$93,044,720 to \$74,994,366, between the original submission in April and the revised proposal in August. About \$7.6 million of the reduction was attributable to reductions in two key subcontract quotes and to a reduction in the monies requested for potential price escalation. About \$10.4 million is left unaccounted for.

He goes on to say:

One of the objects of the negotiation was to assure the Government that the contractor had no discernible intention to recoup the \$10.4 million through add-ons or change orders. No evidence was obtained that such add-ons or change orders were to be sought.

And that is exhibit No. 7.
[Exhibit No. 7 follows:]

EXHIBIT NO. 7

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., December 7, 1972.

To: File

Subject: Negotiation Summary, RFP WA4M-2-0207

PR WA4M-2-0207, in the amount of \$93,530,000, covers the fabrication, installation, site cutover and acceptance testing at various Air Route Traffic Control Centers, National Aviation Facilities Experimental Center (NAFEC) and the Aeronautical Center of 22 Electronic Voice Switching Systems (EVS). The requesting office was NS-114. The Request for Proposals (RFP) was based on Advance Procurement Plan No. 4400.1-14-71 dated 19 February 1971, revised 16 August 1971, and approved by the Deputy Administrator on 13 September 1971. A determination and findings to negotiate was approved on 9 November 1971. The RFP requires that the first system and related services and supplies be under a cost-plus-fixed-fee arrangement; and the 21 additional systems, subsystem boxes and related items, all of which are subject to option provisions, be under a fixed price arrangement. The RFP set forth 22 evaluation criteria which were to be used in determining technical acceptability of the proposal. RFP WA4M-2-0207, which was issued on 9 November 1971, was sent to 167 prospective offerors. A preproposal conference was held in Atlantic City, New Jersey, on 8 & 9 December 1971. In attendance were approximately 125 persons. Eight amendments to the RFP were issued.

In a memorandum dated 9 November 1971, approval was given to a request to waive portions of FAPR 12A-1.7103 in order that (a) the option quantities be permitted to exceed 25%, (b) the option exercise(s) be permitted to be made after 90 days from contract date and (c) the option portion be permitted to be included in the award evaluation. All three of the above conditions were reflected in the RFP. Additionally, the RFP further states that, "Schedule I, Items 25, 35, 42, and 44, and Schedule II, Items 43 and 44 will not be considered for award. Estimated amounts will be reflected in any resultant contract for these items."

Three technical proposals were received on 23 March 1972; three cost proposals were received on 24 April 1972. The three contractors are: Philco-Ford Corp. (DO); North Electric Co. (CH); Litcom. Div. of Litton Industries (MT).

The letters in parenthesis were the code identification for the contractors and have been used for security reasons during the evaluation period.

A comparison of the prices submitted are set forth below. Prices shown for the basic system generally include comparable items. In order to reflect possible total program costs, each contractor's proposed design option prices for LEDS

and CCITT #6, together with estimates for support services, such as, one year maintenance and training, are also included.

	North Electric	Philco-Ford	Litcom
SCHEDULE I (CPFF)			
Basic system.....	\$20,167,856	\$8,921,833	\$12,243,882
Design option.....	1,745,375	3,262,571	650,958
Support, maintenance, etc.....	415,579	374,035	386,954
Total prototype.....	22,328,810	12,558,439	13,281,794
SCHEDULE II (FPI)			
Basic system.....	83,906,029	53,017,681	99,650,261
Design option.....	15,574,944	24,776,365	10
Support, maintenance, etc.....	2,985,550	2,692,235	2,994,034
Total production.....	102,466,523	80,486,281	102,644,295
Total contract.....	124,795,333	93,044,720	115,926,089

¹ Litcom included LEDS in basic system price.

In response to technical changes set forth in FAA letters dated August 21, 1972, North Electric and Philco-Ford submitted revised prices (Litcom's original technical proposal was clearly inadequate and thus was not invited to submit revised prices) as follows:

	North Electric	Philco-Ford
SCHEDULE I (CPFF)		
Basic system.....	\$19,743,524	\$11,787,668
Support, maintenance, etc.....	390,387	363,312
Total prototype.....	20,133,911	12,150,980
SCHEDULE II (FPI)		
Basic system.....	89,130,257	59,939,098
Support, maintenance, etc.....	2,961,030	2,794,288
Total production.....	90,091,287	62,733,386
Total contract.....	110,225,198	74,884,366

In a letter from the EVS Source Selection Evaluation Board (SSEB) to the Chairman, Source Selection Advisory Council (SSAC), dated 1 September 1972, it was stated that "Members of the Source Selection Evaluation Board have completed their evaluation of the three (3) proposals received from industry in response to RFP WA4M-2-0207. The evaluation was conducted in accordance with the EVS Proposal Evaluation Procedures, dated 14 March 1972." It was further stated that,

4. Conclusions

"(a) The result of the SSEB review and evaluation of the three (3) proposals are as follows:

"CH and DO proposals are from an overall standpoint technically acceptable and compliant with the requirements of the RFP and EVS specification.

"The MT proposal is not within the range of technical competition in terms of the requirements of the RFP and EVS specification.

"(d) The Master Cutover Plans submitted by CH and DO are technically acceptable to the SSEB. However, the acceptability of these concepts to AT&T has not yet been resolved."

In a meeting on 19 October 1972 the general concept of "flash cutover" appeared to be the only satisfactory cutover approach to AT&T. This view was expressed in a letter from AT&T to the FAA dated 17 November 1972.

As a result of the SSAC's vote on 1 September 1972, the contracting officer was requested to enter into negotiations with Philco-Ford. In a memorandum dated

3 November 1972 the Chairman, SSAC, requested the contracting officer to enter into negotiations with North Electric. Some details of these negotiations are set forth below:

Philco-Ford

The Philco-Ford price proposals were evaluated in part by two Defense Contract Audit Agency audits as set forth in reports dated 16 June and 26 October 1972. Neither report takes significant exception to the cost elements contained within the original and revised proposals.

Face-to-face negotiations were held in late September with Philco-Ford representatives. Representing the Government were Messrs. D. Alperin, Hollis Stevens, John Curry, A. E. Tegeler, T. F. Edwards, David Yaeger, A. J. Steger, H. J. Talberth, Edward F. Humston, P. E. Hinely, Edgar L. Bolden, S. Hunn, G. D. Hadorn, Frank J. Cassidy, Charles Beam and E. Kaputa. Representing the contractor were Messrs. W. G. Hipps, A. P. Jaskelewicz, P. Lipken, E. G. Cordeo, Howard A. Bond, Robert W. Steele, Thomas M. Gleason, Charles J. Kulesza, J. Springer, and Harry K. Mellinger.

Basically, the Government representatives attempted to discover the rationale for the lowering of the contractor's price proposal from \$93,044,720 to \$74,994,366, between the original submission in April and the revised proposal of August. About \$7.6 million of the reduction was attributable to reductions in two key sub-contract quotes and to a reduction in the monies requested for potential price escalation. About \$10.4 million is left unaccounted. Even if those monies questioned and found unsupported by the Government auditor are conceded for elimination by the contractor, the revised price is found to be lower still. One of the objects of the negotiation was to assure the Government that the contractor had no discernible intention to recoup the \$10.4 million through "add-ons" or change orders. No evidence was obtained that such "add-ons" or change orders were to be sought.

Through continuing discussions in October with Philco-Ford, the Patent Indemnity clause was removed, for a reduction of \$511,531 in costs (after gaining the concurrence of the DOT Patent Counsel who agreed that given the circumstances the price for inclusion of the clause was simply not worth it). Upon the advice of the Chairman, ASPR subcommittee on Wage and Materials Price Escalation, and based on his own review, the contracting officer decided to abandon any attempt to use a separate price escalation clause, and instead incorporated the essence of the escalation proposal into the contract line items. The formula used was developed by the Wharton School of Finance and is thought to be reasonable. Numerous other changes resulted from the September and October discussions including the use of the "flash cutover" technique, incorporation of travel and subsistence costs in contract line items, the use of Government Bills of Lading, new cabinet racks and a value engineering clause.

At the close of negotiations on 30 November 1972 Philco-Ford's price was as follows:

Schedule I:

(Evaluated) see Note 1	-----	\$12, 419, 888
(Non-evaluated) see Note 1	-----	188, 759
Total	-----	12, 608, 647

Schedule II:

(Evaluated) see Note 1	-----	\$60, 534, 603
(Non-evaluated) see Note 1	-----	2, 679, 719
Total	-----	63, 214, 322

Thus for award purposes, except for \$2,200,000 (est.) for spare parts, we have the following:

(Evaluated)	-----	\$72, 954, 491
(Non-evaluated)	-----	2, 868, 478
Total award price	-----	75, 822, 969

Note 1: In accordance with the RFP only certain contract line items will be considered for award. These items are herein called evaluated items; those contract line items not considered for award, although submitted by offeror and therefore not used in comparing prices of the different competitors, are called non-evaluated items. Item 33e was included in the Schedule I evaluated line at a price of \$48,000.

The pre-production phase of the proposal, that is, Schedule I, was negotiated on a cost plus a 5% fixed fee basis; the production phase, Schedule II, on a fixed price incentive basis. The target price is 110% of total cost and the ceiling price is 120% of total cost with a share ratio of 75/25.

North Electric

The North Electric original price proposal was evaluated in part by Defense Contract Audit Agency audit as set forth in a report dated 22 May 1972. The report does not take significant exception to the cost elements contained within the contractor's proposal. The complete revised North Electric proposal was submitted on 17 November 1972. Revised cost data was obtained. Negotiations were conducted on 29 & 30 November 1972. Various changes, similar to those agreed upon in the Philco-Ford negotiation, were made. Representing the Government were Messrs. D. Alperin, A. E. Tegeler, Edgar L. Bolden, John Curry, H. J. Talberth and G. D. Hadorn. Representing the contractor were Messrs. C. A. Conry, J. R. Meeting, R. F. Starr, D. E. Larrimore and Randall L. Halverson.

At the close of negotiations on 30 November 1972, North Electric's price was as follows:

Schedule I:	
(Evaluated) see Note 1-----	\$15,748,135
(Non-evaluated) see Note 1-----	202,923
Total -----	15,951,058
Schedule II:	
(Evaluated) see Note 1-----	\$71,041,565
(Non-evaluated) see Note 1-----	2,052,538
Total -----	73,094,103
Thus for award purposes, except for \$2,200,000 (est.) for spare parts, we have the following:	
(Evaluated) -----	\$86,789,700
(Non-evaluated) -----	2,255,461
Total award price-----	89,045,161

Note 1: Same as Note 1 for Philco-Ford except that Item 33e was included in the Schedule I evaluated line at a price of \$58,590.

Schedule I was negotiated on a cost plus a 5.8% fixed fee basis. The contractor's offer of a ceiling on the CPFF portion was not accepted because it was believed that this procedure would inhibit the development of the vital first EVS system. Schedule II was proposed on a fixed price incentive or firm fixed price basis. The contracting officer thought that the fixed price incentive approach for Schedule II was appropriate because the supplies and services being procured are of such a nature that assumption of a degree of cost responsibility by the contractor is likely to provide him with a positive profit incentive for effective cost control and contract performance. The use of the firm fixed price approach was thought to be inappropriate because of uncertainties involved in contract performance, and thus was not accepted. For the fixed price incentive basis the target price was negotiated at 9.3% of total cost and the ceiling price at 120% of the total cost with a ratio of 80/20.

The drastic price reduction by North Electric from its August 1972 submission (a reduction of \$21,180,038) is based essentially, according to North Electric, on the following:

"(1) Through consistent repricing and updating of our material purchases throughout this proposal effort, we have been able to more efficiently purchase major component groups. Our confidence in this area has also prompted us to entirely eliminate material price escalation factors throughout [Schedule II].

"(2) As a result of progress made on two major in-house programs somewhat related technologically, we have realized substantial benefits in both the engineering hardware and software efforts associated with the EVS requirements thus allowing reductions in these important areas.

"(3) Our third major effort was to effect an agreement with our subcontractor, Martin Marietta Corporation, to transfer the production of hardware for the position equipment from Martin Marietta to North Electric Company. Martin Marietta will maintain the responsibility for the design and engineering of this equipment; however, as a result of North Electric's lower rates and burdens coupled with our experience in the manufacturing of similar communication devices, substantial savings are realized by this change in facilities."

An FAA analysis of the August proposal submitted by North Electric suggested that negotiations successful in the extreme could possibly reduce the contractor's price from about \$110 million to about \$94 million. The actual figure offered by the contractor was about \$89 million. It appears that a management overview was decisive.

A quick comparison of the Philco-Ford and North Electric negotiated total evaluated prices shows the following:

Schedule I:	
Philco-Ford	\$12,419,888
North Electric.....	15,748,135
Schedule II:	
Philco-Ford	60,534,603
North Electric	71,041,565
Totals:	
Philco-Ford	72,954,491
North Electric.....	86,789,700

If non-evaluated and Government estimates for spares are included, the totals are as follows:

Philco-Ford	\$78,022,969
North Electric.....	91,245,161

It is noted that since the initial price submission in April 1972 to the "best and final" offer, the price reductions by both offerors have been as follows:

Philco-Ford	(\$17,221,751)
North Electric.....	(\$35,750,172)

Thus for award purposes, and in accordance with the RFP, Philco-Ford's price is \$13,835,209 lower than the North Electric price. In this regard the letter from the Chairman, SSAC for EVS, to the contracting officer, dated 20 November 1972, which states that, "a 'best and final' offer be requested from both offerors and award be made to that offeror with the lowest aggregate price", is relevant. In accordance with the Federal Procurement Regulations 1-3.805-1(b), a "best and final" offer was requested from both offerors, on 30 November 1972, with responses to be made no later than 3:00 p.m. on 5 December 1972. Both offerors responded on time; both declined to change their prices.

Therefore, in view of the foregoing, Philco-Ford's proposal is determined to be most advantageous to the Government after considering the technical dissertation, the most favorable pricing arrangement and other factors. The price of \$12,276,622 (Schedule I minus Items 25, 38, 42 and 44) is fair and reasonable and all terms and conditions of the proposed contract are acceptable.

DAN ALPERIN,
Contracting Officer, ALG-380.

Mr. Brooks. FAA subsequently concluded that Philco-Ford had underbid the Univac subcontract by \$10.7 million.

This is exhibit No. 8.

[Exhibit No. 8 follows:]

EXHIBIT NO. 8

FEBRUARY 6, 1974.

EVS Contract, DOT-FA73WA-3202, Proposed Contract Modification
EVS Project Manager, ARD-223
Contracting Officer, ALG-340

Enclosed are background data that we are providing to assist you during negotiations with Philco-Ford that are planned to incorporate changes required to the EVS specification and contract schedules. The procurement request is prepared and we are coordinating it with AAT and AAF prior to sending it to you for action.

Enclosure.

J. F. SCHREDER.

FEBRUARY 5, 1974.

EVS Contract DOT-FA73WA-3202, Cost Impact Areas and Estimated Costs
 EVS System Engineering Team Leader, ARD-223
 Files

The following outlines the estimated cost impact areas that will result from changes that are proposed to be negotiated with Philco-Ford (P-F). Impact on contract prices will result from changes to Specification FAA-E-2479, reduction in the quantity of contract deliverables, and potential claims that may be submitted by P-F. The potential claims result from direction to P-F that has been issued by the Contracting Officer, ALG-340, to incorporate several required changes in P-F's EVS system design in order to meet present requirements of FAA-E-2479.

The following subparagraphs, a through o, are keyed to the System Pricing Summary, Attachment A, and provide the background and rationale of estimates for the changes to Schedule I and Schedule II of the contract.

(a) The present contract with P-F, exclusive of any of the proposed changes, totals \$78.0 million.

(b) Various letters by the Contracting Officer, ALG-340, have directed P-F to incorporate several design changes in the EVS preproduction model to meet present requirements stated in FAA-E-2479. P-F contends that the directed changes are not within the present scope of the contract and it is reasonable to expect claims will be filed in the future based on excess costs. The potential changes have been grouped into twelve (12) general areas as listed in Attachment B. For Schedule II, the fixed price phase, the total claim is estimated at \$23.0 million for the four (4) production options.

(c) AAT and AAF have requested 18 changes to be incorporated into FAA-E-2479. These changes, which are in the final stages of coordination, expand the operational and maintenance functions and system capability to meet revised user requirements that were established subsequent to contract award. These changes are summarized in Attachment C. Total increase in the contract price is estimated at \$16.9 million.

(d) The contract would be increased by \$9.6 million for the PPM if all 12 claims were acknowledged after the 18 changes were incorporated into the design; similarly, Schedule II production system prices would be increased by \$33.4 million.

(e), (f), (g) P-F has terminated their subcontract with Univac for the common control subsystem for default, and they are currently negotiating with several manufacturers to select a cost-effective source as a replacement. Attachment D outlines the rationale for estimating that P-F's subcontract to Univac was under-bid some \$10.7 million. This figure reduces to an \$8.0-million deficit for Schedule II when \$2.7 million are added to the contract to incorporate modifications to the common control resulting from the 18 changes (Attachment C). There are two strong contenders for the new common control subsystem. They are the AUTODIN 102 processor built by Philco-Ford, and the APZ-130 processor, which is currently built by North Electric for sale to the independent telephone industry. It is not known whether or not North's processor is the most cost-effective replacement and if a "loaner" unit can be provided to P-F almost immediately; otherwise, a major slippage can be expected in delivery of the PPM. A loaner 102 processor could be made available immediately should P-F choose this approach. It is understood that P-F favors this alternative to preclude a major slippage in delivery. If this approach is selected, P-F has estimated \$3.4 million would be required to repackaging the 102 discrete, solid-state processor to a 102A common control subsystem which utilizes state-of-the-art microcircuits. The pricing analysis shown on Attachment A assumes the 102 approach with the \$3.4-million investment recovered in Schedule II. This approach includes a risk of major concern to Philco-Ford; namely, repackaging must start prior to the Government's award of the first production option if timely production delivery is to be achieved. Should there be no award of a production option, P-F stands to lose a great part of the \$3.4-million investment for the 102 repackaging costs.

(h) The \$22.3 million (Schedule I) and \$110.1 million (Schedule II) reflect the adjusted system prices. Viewed from the standpoint of P-F, these are the "should-have-been" prices in the basic contract to incorporate the 18 changes, a more realistic price for the Univac subcontract, and negate all potential claims.

(i) Cost reduction items are itemized in Attachment E. Of the 27 items suggested by P-F with a total estimated savings of \$17.5 million, AAT and AAF representatives have agreed to the 13 listed for a total savings of \$5.8 million.

(j) Based on a request from AAT, sizing of the EVS has been reduced from a maximum of 125 ATC sectors to 90 ATC sectors, which is consistent with NAS Stage A sizing for the CDC. Provisions for up to 15 Supervisory positions are retained. As a result of this reduction in the maximum system size, there are significant reductions in the quantity of end-item deliverables for Schedules I and II.

(k) Based on the 13 cost-reduction items and reduced system sizing, the system pricing has been adjusted downward by \$12.3 million.

(l) The combination of the 18 changes, the cost-reduction items, and the reduction in maximum system sizing can net a \$17.0-million reduction in the potential claims (Attachment B).

(m), (n), (o) Based on the adjusted system pricing estimates (item m), P-F has a \$200-thousand surplus and a \$8.4-million deficit for Schedule I and Schedule II, respectively, when compared to the revised system prices that have been submitted to DOT for approval. Thus, it can be expected that \$8 million to \$10 million in claims will remain outstanding for Schedule II after the changes have been negotiated to the contract.

Attachments: 5.

G. D. HADORN.

ATTACHMENT A
SYSTEM PRICING SUMMARY

[In thousands of dollars]

Item	Schedule	
	I	II
(a) Present contract, no changes.....		
(b) P-F potential claims, 12 general areas—no changes, see attachment B.....	12.7	65.3
(c) Expanded options/maintenance requirements—18 changes, see attachment C.....	3.1	23.0
	6.5	10.4
(d) Items (a+b+c).....		
(e) P-F's deficit for common-control—see attachment D.....	22.3	98.7
	0	8.0
(f) System prices, items (d+e).....	22.3	106.7
(g) Repackaging 102 processor.....	0	3.4
(h) Adjusted system prices—items (f+g).....	22.3	110.1
(i) Cost reduction specification changes—13 items, see attachment E.....	-8	-5.0
(j) Reduced quantities of contract deliverables.....	-5	-6.0
(k) Adjusted system prices—item h—items (f+g).....	21.0	99.1
(l) Reduction in potential claims (item b) resulting from items, c, i, and j.....	-2.0	-15.0
(m) Adjusted system prices, items (k-l).....	19.0	84.1
(n) Revised system prices requested for DOT approval items (a+b).....	19.2	75.7
(o) P-F deficit, items (m-n) (surplus).....	+2	-8.4

NOTES

1. Estimates for schedule II are based on Government making an award of first production option by 35 mo. after contract award, December 1975.

2. Items (b), (i), (j), and (l) are based on FAA and MITRE estimates using best available pricing data. These estimates may be optimistic; i.e., favoring the Government as to a pricing position. If such is not the case, the P-F deficit of \$8,400,000 listed in item (o) for schedule II could be considerably more.

ATTACHMENT B
POTENTIAL CLAIM AREAS
[In thousands of dollars]

Item	Schedule	
	I	II
(a) Univac subcontract.....	0.3	1.2
(b) Additional effort due to PDR action.....	.3	0
(c) Power distribution protection.....	.15	1.0
(d) EMI cabinetry.....	.2	2.5
(e) Automatic RTQC function in junction module.....	.3	6.0
(f) Additional screening of IC's.....	.1	1.7
(g) Resubmission of documentation.....	.15	0
(h) Power supply holdover function during power interruption.....	.075	.75
(i) Combine/decombining and Sept. 28 letter of direction.....	1.2	8.0
(j) Radio matrix sizing.....	.1	1.1
(k) Additional screening of LED's.....	.075	.75
(l) Additional programming due to PDR action items.....	.15	0
Total.....	3.1	23.0

ATTACHMENT C
EXPANDED OPERATIONAL
AND
MAINTENANCE REQUIREMENTS
[In thousands of dollars]

Item	Schedule	
	I	II
1. Service F multiple access.....	0.982	2.131
2. Expanded override function.....	.562	.300
3. Type 9 trunk terminations.....	.778	2.167
4. "Meet Me" conference circuits.....	.509	.560
5. Common release push button.....	.027	0
6. Position initiated combine/decombine.....	.263	.266
7. R position pre-emption/red/yellow jack.....	.045	.120
8. Beep tone/recorder disable.....	.085	.072
9. Emergency frequency PTT enable.....	.055	.120
10. BUEC/EVS common jack.....	.010	.060
11. Headset acoustic limiter.....	.015	.030
12. Optional zip tone override.....	.005	0
13. Circuit status display.....	.171	.065
14. Colored LED displays (study).....	.030	0
15. I/O devices (CRT's and MSP's).....	.738	.931
16. Selective radio frequency pairing.....	.300	3.200
17. Trunk monitoring.....	.057	.004
18. Maintenance communications.....	.052	.322
Subtotal.....	4.770	10.424
Preproduction Overrun.....	1.7	0
Total.....	6.5	10.4

ATTACHMENT D
COMMON CONTROL
[In thousands of dollars]

Item	Schedule	
	I	II
1. Common control:		
(a) Univac subcontract.....	0.6	8.0
(b) Items due to PDR.....	.3	1.2
(c) Expansion of core plus disc (Sept. 28 letters).....	1.2	8.0
(d) Subtotal (existing spec.).....	2.1	17.2
2. Philco-Ford's underbid for common control items (1d-1a).....	1.5	9.2
3. Additional costs to common control to be paid for by Government to accommodate the 18 changes, attachment B.....	1.5	1.2
4. Philco-Ford deficit to cover common control items (2-3).....	0	8.0

ATTACHMENT E
COST REDUCTION, SPECIFICATION CHANGES
[In thousands of dollars]

Item	Schedule	
	I	II
1. Cutover devices.....	0	.300
2. Hardwiring between cabinets.....	.150	0
3. Non-EMI cabinets (backroom).....	.020	.500
4. Modified reliability test plan.....	.200	0
5. Use of LSI's.....	.200	2.000
6. Commercial dialer module.....	0	.010
7. Delete MIL-STD-188C requirements for modems.....	0	0
8. Cabinet ground buss.....	.050	0
9. GFE headsets.....	.045	.500
10. Delete local RCAG control equipment.....	.020	.210
11. Supervisory junction module simplification.....	.048	.750
12. Modified LED screening requirements.....	.075	.500
13. Analog matrix at RCAG.....	.002	.230
Total.....	.810	5.000

Note: The above 13 items were selected from a group of 28 items recommended by Philco-Ford.

Mr. BROOKS. I mean these are the things which were considered as they go through this. There was some feeling that they were going in low and going to add on and change order out.

This is the way some bidders have operated before.

Mr. BUTTERFIELD. Yes, I know that has certainly been done. I have no evidence to cause me to question the total integrity of Philco-Ford, but I think Mr. Israel can speak to that.

Mr. ISRAEL. Mr. Chairman, there were some unaccounted for differences between our estimates and the contractor estimates.

Mr. BROOKS. I bet.

Mr. ISRAEL. And in one case it was \$10 million and in the other case it was \$7 million or \$8 million, as I recall.

Mr. BROOKS. That is a big flag, Mr. Israel. That is what I said, you know, it is unaccounted for. It is a \$10 million item.

Mr. ISRAEL. Absolutely, and that is why Mr. Alperin goes on to say he was concerned there was no intention for add ons and specification changes.

It is clear, when the door was opened the following year, when we made specification changes, we were in difficulty. The extent to which, it was not entirely evident until this year.

Mr. BROOKS. Now, Mr. Administrator, while we are considering these rather sensitive issues, let me read to you another comment out of the DOT's study of FAA procurement, which was mentioned earlier. The report states:

In one pending conflict-of-interest case, now under investigation, it was noted that almost all of the members of the technical evaluation group on a particular procurement had been (in some cases, several times) luncheon or dinner guests of a representative of the company that won the award, and that these incidents occurred during the period when the proposals were being evaluated.

Do you have any reason to believe that, during the evaluation of the EVS contract proposals, any FAA personnel involved in the procurement evaluation or selection were entertained in any way by any of the competitors while these negotiations were underway?

Mr. BUTTERFIELD. I certainly do not, but I will call on Mr. Hadorn—

Mr. HUNN. Let me talk to that one, please. I was the chairman of the Source Selection Advisory Council. We had many meetings in which I discussed with all the Source Selection Advisory Board people the need to keep strictly away from any contractor. In other words, I told them we didn't want them associating with them and we didn't want them having any intercourse with them of any kind.

I think all of the members of this committee adhered to that, and we have some of the members of the evaluation board here, who I think can confirm that statement. We have no evidence at all that there was any kind of discussions with the contractors, other than that which went officially over the contracting officer's letters and through official negotiations with them.

Mr. BUTTERFIELD. I would just add to that by saying that I think the FAA probably has as many multimillion-dollar contracts going as almost any agency. We deal in sophisticated materials, sophisticated equipments, and I certainly would not want to question the integrity of any of the members of an organization that has done so well on so many contracts over such a long period of time, although we have had some poor showings on certain contracts.

But taken into context of all of the business that we do in the contract area, I think we do very well, and I think our people—

Mr. BROOKS. Do you have any knowledge of FAA employees being invited to the *Jo Jan*, which is a boat reportedly owned by a consultant for Philco-Ford?

Mr. BUTTERFIELD. I don't know.

Mr. BROOKS. Mr. Hanrahan?

Mr. HANRAHAN. Mr. Administrator, on page 5, it relates to what Chairman Brooks was talking about. At the bottom of the page you say, "I believe the evaluation and selection was fair and that there was no preconceived choice or favorite candidate. I am aware, of course, that North Electric does not share that view."

Other than salemen's puff, do you have any substantial evidence why they don't share that, other than the fact that they feel their product is superior? Do you feel that this bidding was fair?

Mr. BUTTERFIELD. No, nothing other than that. I have been approached by a number of people over the past—oh, I would say 8 or 10 months with regard to this contract, and that is essentially why I say that I am aware that North Electric does not share this view, but I have no evidence.

Mr. PARRIS. Would the gentleman yield?

Mr. ISRAEL. May I say there are a number of letters that North Electric has sent to us and others which implied that they were the only ones technically qualified.

Mr. HANRAHAN. Why was Litton disqualified?

Mr. ISRAEL. They just didn't meet the basic technical criteria. A preliminary review ruled them out immediately. It was not considered possible to bring them up to the competitive range.

Mr. PARRIS. Would the gentleman yield?

Mr. HANRAHAN. Yes.

Mr. PARRIS. Are you basically saying it is a matter of proprietary pride on the part of North Electric? Is that what it amounts to?

Mr. BUTTERFIELD. Insofar as my knowledge is concerned about it, yes.

Mr. PARRIS. Thank you.

Mr. BROOKS. Mr. Administrator—

Mr. BUTTERFIELD. Well, I have heard too that they have a good bit of experience in this area. I am not saying that their proprietary pride is not justified or that they are not serious about what they are saying.

Mr. BROOKS. Mr. Administrator, this contract was awarded on January 2, 1973. Yet, when FAA and the contractors met in April and May 1973, in a preliminary design review, FAA personnel became concerned over Philco-Ford's proposed design. Ultimately, a number of major design changes were proposed by both FAA and the contractor.

Could you explain, as far as you can understand, why these were necessary, considering the many years that had gone into developing the specs and evaluating the contract proposal?

Mr. BUTTERFIELD. I—

Mr. BROOKS. You know they studied this 10 or 12 years.

[Exhibit No. 9 follows:]

EXHIBIT NO. 9

EVS CHRONOLOGY

AUG. 1974

- July 1961 - SRDS initiated project to prepare specification for an Electronic Voice Switching System (EVS).
- July 1962 - Specification No. 111-1D-2D issued by SRDS, entitled, "Integrated Air Traffic Control Communications Switching System". Name of specification later changed to EVS. RFP issued to procure solid-state switching system in accordance with specification. Evaluation of proposals favored ITT-Kellogg. Project cancelled in October 1962.
- Dec. 1964 - SRDS Report No. RD-64-132 published, "Voice Communications Switching System." Report concluded "...cost/benefit factor overwhelmingly favors the use of an FAA-owned electronic switching system."
- Feb. 1967 - EXCOM approved a NASPO recommendation that the EVS system be considered as part of the NAS Automation System at the earliest practical date, and directed that a lease, purchase, or lease-with-option-to-purchase study be initiated.
- Aug. 1968 - SRDS staff study of lease vs. purchase of EVS completed. Based on unofficial proposals solicited from industry in December 1967, and received in April 1968. Recommended purchase.
- Jan. 1969 - NASPO requested joint MITRE/SRDS study of floor space requirements (EVS vs. WECO 300) and costs (EVS vs. WECO 300). Report (MITRE No. M69-21) published July 1969, recommended (1) Buy EVS; (2) Reserve for EVS, 40 feet of basement level at end of Phase II building expansion program; (3) Limit expansion of WECO 300 until replaced by EVS. (Final study completed by MITRE October 1972.)
- July 1969 - Joint SRDS/MITRE Voice Communications Study (intercom/interphone only) completed.
- Mar. 1970 - EVS specification prepared by SRDS and coordinated with AAT, AAF, and NAFEC via NCP #384.
- June 1970 - \$5.5 million approved by ARB for evaluation model of EVS. Program transferred from SRDS to NASPO.

- Sept. 1970 - EVS specification revision and coordination. Committee chaired by MITRE; members from SRDS, NASPO, AFS, AFS, and NAFEC. Coordinated via NCP #1652. Comments from all FAA services reviewed and incorporated in final EVS specification, FAA-E-2479, June 4, 1971.
- Jan. 1971 - EVS budgetary estimate provided initially in draft attached to a MITRE letter. Draft revised and updated and report published as MITRE MTR-6077, dated Sept. 29, 1972.
- Feb. 1971 - ARB requested update study of EVS vs. present system cost comparison. MITRE study-report #WP-7542, dated April 8, 1971. Cost comparison guidelines provided by Office of the Budget; concluded substantial cost savings by going with EVS. WP-7542 was subsequently expanded in costing details and published as MITRE MTR-6081, dated October 17, 1972 (There was no change in the substance of conclusions.). Advance Procurement Plan No. 4400.1 completed. Revised August 16, 1971; approved September 13, 1971.
- Apr. 1971 - ARB requested update of 1968 lease or buy study. The result was MITRE WP-7764, dated May 19, 1971. Used updated cost data and followed BOB Circular A-76. Also followed FAA Office of the Budget guidelines. Study validated previous conclusions to buy EVS.
- NASPO briefed FAA operating services (AAT and AAF) on functional and performance parameters of EVS and proposed schedule and cost estimates. Operating services concurred with EVS Program Plan.
- June 1971 - EVS Specification No. FAA-E-2479 completed: Amend. #1 - December 24, 1971; Amend. #2 - February 22, 1972; Amend. #3 - August 18, 1972; Amend. #4 - September 27, 1972.
- Copies of WP-7542 and WP-7764 provided to ARB. ARB briefed by SRDS on EVS program. Copies of WP-7542 and WP-7764 also provided to DOT and Office of Telecommunications Policy. OTP briefed on EVS program.
- July 1971 - Detailed EVS Program Plan presented to ARB. ARB concurred with intent, but withheld approval pending answers to specific questions on program alternatives.
- Final briefing to ARB on July 30, 1971. Answered earlier questions. ARB approved program: purchase 22 EVS systems; directed 4 yearly production options -- fixed price; directed 9 months evaluation at NAFEC on EVS applicability to ARTCC prior to production award.

- Sept. 1971 - EVS Advanced Procurement Plan, dated August 16, 1971, approved by FAA Deputy Administrator.
- Specification No. FAA-E-2479 advertised in Commerce Business Daily and available to industry.
- Nov. 1971 - RFP No. WAM-2-C207 advertised. Revision #7, Mar. 10, 1972.
- Mar. 1972 - EVS proposal evaluation procedures finalized for use by the Source Selection Evaluation Board (SSEB).
- RFP closing date for receipt of EVS technical proposals, March 23, 1972.
- Apr. 1972 - SSEB convened at MITRE to review and evaluate the three EVS proposals received from industry. SSEB consisted of a chairman, 23 team members, and 9 nonvoting technical advisors/consultants. Proposals received from Philco-Ford, North Electric, and LITCOM.
- RFP closing date for receipt of EVS cost proposals, April 24, 1972.
- May thru
Sept. 1972 - SSEB reports presented to Source Selection Advisory Council (SSAC). Preliminary report on review of technical proposals, May 23, 1972; Interim Report, June 2, 1972; Final Report on review and evaluation of EVS technical proposals, September 1, 1972. Philco-Ford and North Electric negotiations initiated.
- Sept. thru
Nov. 1972 - SSEB technical negotiations and review of pricing data.
- Dec. 1972 - Philco-Ford and North Electric negotiations completed. Source Selection Authority of DOT approved award of contract to Philco-Ford.
- Jan. 2, 1973 - Award of EVS contract (DOT-FA73WA-3202) to Philco-Ford. (Spec. FAA-E-2479 and Amend. -4). North Electric debriefed January 5, 1973.
- Feb. 15, 1973 - LITCOM (Litton Div.) debriefed.
- Apr. 24 thru
May 4, 1973 - EVS Preliminary Design Review. Approximately 30 specification changes were identified during the PDR.

- May 10, 1973 - Letter from AAT-100 to ARD-200, AAF-200, AAF-400 and ALG-300 suggesting a meeting be held to discuss the possibility that the EVS specification does not meet all of the AAT operational requirements. 17 items are to be discussed and these AAT items are a result of the PDR.
- July 3, 1973- Letter from ARD-1 to AAT-1 and AAF-1 recommending a policy whereby any changes to the EVS contract and/or specification that result in changes in scope or additional money or extended time be approved by AAT-1, AAF-1 and ARD-1. It was also recommended that when such changes are proposed, we have an ad hoc group consisting of members from the respective services to do the necessary staff work.
- July 10, 1973 - Letter from AAT-1 to ARD-1 agreeing with both recommendations in the ARD-1 letter of July 3, 1973.
- July 13, 1973 - Letter from AAF-1 to ARD-1 also agrees with the recommendations in the ARD-1 letter of July 3, 1973.
- July 24, 1973 - Letter from Chairman of the Working Group (Ad Hoc committee) to ARD-200, AAT-100 and AAF-400 (containing 23 specification changes) requesting verification of the correctness of the changes.
- August 6, 1973- Letter from AAT-100 to ARD-223 confirming AAT's verbal concurrence of July 25, 1973 on the July 24, 1973 letter from the Chairman of the Working Group.
- August 1973 - MITRE worked with Philco-Ford in coordinating spec. language and in obtaining engineering estimate for cost of each of the changes (i.e., Cost $\pm 15\%$).
- Sept. 1973 - AFS, ATS requested clarifications, changes in spec. language. Ad Hoc Committee deleted nonessential changes to reduce costs.
- Sept. 17, 1973- Operational/Maintenance Working Group report informally provided to working group members for coordination.
- Sept. 21, 1973- Operational/Maintenance Working Group final report transmitted to members of the working group.
- Sept. 24, 1973- Letter from ARD-1 to the Secretary of the Agency Review-Board requesting a meeting on Oct. 5, 1973 to get more money to pay for the specification changes.
- Sept. 28, 1973- C.O. letters set remaining design non-compliances to rest by directing Philco-Ford to meet the spec.
- October 1973 - Revised spec. language coordinated with Philco-Ford, numerous changes requested to allow cost effective design.
- Nov. 2, 1973 - MITRE formally transmitted the EVS specification changes to ARD-1.

- Nov 1973 thru
June 1974 - Coordination and negotiations with FAA operating services to incorporate the new functional requirements in the EVS contract.
- Dec 1973 thru
May 1974 - All the specification changes were coordinated and negotiated with Philco-Ford.
- SRDS briefing to DOT on required contract changes estimated at \$19.2 million. DOT approved the changes to expand EVS system functional characteristics.
- Nov 1973 - AFS, ATS review of spec. changes.
- More clarification, changes needed, since many of the Philco-Ford requested changes were unacceptable.
- Dec 5-11 1973 - ARB briefed, gave approval to seek DOT approval, froze dollars for changes.
- Dec 1973 - MITRE/Philco-Ford review of spec. changes
Locked into dollars distributed in Schedules I and II for the changes.
- Because of UNIVAC sole source position on AN/UYK-15 expansion needed for the 18 changes, the AN/UYK-15 approach was judged by Philco-Ford to be no longer cost effective. Subcontract cancelled on 21 December 1973 for default, independent of changes.
- Dollars for 18 changes then became inadequate for new computer.
- 19 Dec 1973 - FAA letter went to DOT with request for approval of changes.
- January 1974 - FAA briefed DOT on request for approval of 18 changes.
- January 1974 - Further clarification and modifications requested by AFS, ATS. Some of the Philco-Ford requested changes were unacceptable.
- Feb 1974 - MITRE, ARD worked with Philco-Ford to revise spec. changes to fit dollars.
- March 1974 - DOT approval verbally obtained.
- March, April
1974 - Final review of spec. changes by FAA and Philco-Ford.
- FAA accepted many cost reduction spec. changes proposed by Philco-Ford to cover inadequate dollars.
- May 13, 1974 - RFP sent to Philco-Ford
- July 15, 1974- Philco-Ford responded to the Schedule I (Preproduction) part of the RFP.
- July 24, 1974- Philco-Ford responded to the production part of the RFP.
- Aug. 5, 1974 - EVS Contract DOT-FA73WA-3202 terminated with Philco-Ford.

Mr. BUTTERFIELD. I know.

Mr. BROOKS. They had all these experts, all the technicians, and then shortly after awarding the contract many changes had to be proposed.

Mr. BUTTERFIELD. Well, that problem plagues us on so many contracts. The operational people, who are closest to this proposal, are constantly seeing ways in which we might improve and have a tendency to request more changes than the engineers, than the research people, as a general rule.

I can't speak to this specific thing, but—

Mr. ISRAEL. I would like to address that. You are right, Mr. Brooks, I think the birth of the specifications was in 1961. It had gone through years of extensive—

Mr. BROOKS. Right, we have been nursing this thing since it was a baby.

Mr. ISRAEL. Three things happened: first, there was a change in FAA policy regarding lines to the remote radio sites. It was split versus paired lines. This was a policy change that had come along on the allocation of frequencies in the radio spectrum.

The second one was that the specifications had been prepared, to a large extent, to work with an increasingly automated system, in which the transfer of control between sectors and between centers would be done automatically. As we really got into automation, our operators began to have increasing concerns of what happens if the automation fails and what happens if the power goes out or the computer goes down. How am I going to—if this EVS fails or something else happens—talk to the next center?

They requested, and it had been discussed for years, that new override features be added that would give them the capability to have a number of people talk to the same position. We thrashed this out from the spring—from the preliminary design review—all the way until late September, until it was confirmed that yes, this was a new requirement that had to be developed or a modified requirement.

The third change that came about was one, I guess you could say, caused by the advance of technology. With a highly electronic system such as this, it becomes difficult to tell when parts have failed or what has failed. We had planned—and the specification includes, for example—that a teletype machine would printout, when a failure occurred, where the failure existed.

In fact, I believe there were to be three of these machines. As our people began to look at this, they got increasingly concerned about the increasing maintenance costs until they decided that they wanted updated electronic maintenance. They requested that we have a cathode-ray tube—in fact, a color display—to replace these electromechanical printouts. So that part of the specification change, which accounted for part of the increase in cost, had to do with making the system more automatic in its maintenance. This was justified, to a large extent, on the future savings in maintenance personnel.

Let me assure you that these changes were not taken lightly. They began to surface in April and May, but it took well into September for thorough analysis, coordination and review within the FAA. In fact, a management decision was made that these changes would be accepted.

We knew, as you pointed out, that we were opening the door to trouble once we changed one letter of those specifications. But it was

felt necessary in order to satisfy the operating people who use the system: they ultimately decided those changes had to be made.

Mr. BROOKS. Mr. Administrator, during the evaluation and performance of this contract, the Mitre Corp. has been employed as an expert technical consultant. I would like you to tell us how much money has been paid to them for work on the EVS, and why they were unable to identify, apparently, the design deficiencies, prior to the award, and performance deficiencies after the award? Do you have that information?

Mr. ISRAEL. Mitre has been paid approximately \$1.5 million for their engineering support on EVS. In recent months Mitre has had 15 staff assisting the FAA on the technical monitoring of the contract.

They have about—they have had about 15 staff on the contract.

Mr. BROOKS. Fifteen?

Mr. ISRAEL. At the present time.

Mr. BROOKS. We looked at it 12 years and we were slow getting it out, you know, then we hired consultants to do it. We paid them. But nobody seems to understand who makes the decision or apparently perceives the problem.

Is it a matter of a solution to the problem? In other words, the problem has always existed of backup or power failure. That is on everything almost.

Mr. ISRAEL. Their effort, to a large extent, has been in helping prepare the specification. When it went out, we thought it was one of the best coordinated specifications the FAA had produced.

Once the changes arose from operational and maintenance reasons, a major effort went into analyzing the impact of those changes. There were endless discussions with the contractor to understand exactly what each change was and how it was to be implemented.

In addition to the 36 changes, which were reduced to 18, there was a concurrent effort on a large number of cost-savings items.

Mr. BROOKS. Well, now that you have canceled the contract, would you give us some idea of what possibility there is for the Government to recover any of that \$12 million in progress payments already made, or will the Government be held liable for additional payments for having terminated the contract?

Mr. BUTTERFIELD. Well, our auditors are working now to determine the precise amount of money that has been spent. But, as you know, it is in the vicinity of \$13 million.

And, there is no way to recover that money. We have learned some things. I can't say that we have learned \$13 million worth of things, but some things have been gained.

We know that the EVS is technically feasible. We have arrived at a far better definition of requirements and the technology of new, large scale integration has been fairly well established.

And I do consider EVS an important item. I would consider it almost an integral part of the updated third-generation air traffic control system. So, we are not going to let it go by the boards altogether, or at least we don't think we are at this time. That is what we are investigating, but essentially, it is a loss that cannot be recovered.

Mr. BROOKS. Do you think it will affect the development of a collision avoidance system?

Mr. BUTTERFIELD. No, I do not, sir.

Mr. BROOKS. You don't?

Mr. BUTTERFIELD. No.

Mr. ISRAEL. The existing Bell 300 system is perfectly adequate for all of our operational needs. There was never any justification for EVS either on the basis of an operational need, a performance requirement, or safety. It was purely and simply a major saving of money in the 1980's and 1990's. It was the virtue of owning—

Mr. BROOKS. You are like my wife going to a sale. She is going to save me a lot of money. If you go to any more big sales like that, at \$12 million a crack, we will be broke.

Mr. ISRAEL. Yes, sir. The savings, however—

Mr. BROOKS. You saved us a lot of money on that deal.

Mr. ISRAEL. The savings were very appealing and, in fact, one of the problems is that they still are attractive in the 1990's. The difference between leasing and owning the system in communications costs to us can represent as much as \$30 million a year.

Mr. BROOKS. We have been through that in computers in the Government and have proved the desirability of it. But, instead of just buying the equipment, in other words, you were trying to get better equipment? I understand the thought.

We are just trying to figure out how we are going to avoid these contracts that don't produce anything for us. It is not easy, I understand that.

Mr. Administrator, what plans does FAA have now for proceeding with the procurement of an electronic voice switching system?

Mr. BUTTERFIELD. Well, we do know that the EVS system, as I said a moment ago, or I think I said this, would provide a feasible switching capability to keep pace with the ability to change operational jurisdiction in our centers; to change operational jurisdictions within each of our 20 centers.

And it was intended also to form a backbone of a nationwide switching network for data as well as voice through its ability to trunkfeed. And this whole network can result in significant savings, we think, to FAA by the 1990 time period.

We have received, just recently, an office of telecommunications policy circular, which I really should read to you. And because of our receiving it—and I won't say that it is highly significant, but it is of peripheral significance—we are going to go back to the telephone company to see what they might be able to do for us in the future.

Mr. BROOKS. May we have a copy of that for the record? Without objection, it will be placed in the record.

Mr. BUTTERFIELD. Yes, you should have it. It is dated June 21, 1974.

Mr. BROOKS. Without objection.

[The material referred to follows:]

OFFICE OF TELECOMMUNICATIONS POLICY,
EXECUTIVE OFFICE OF THE PRESIDENT,
Washington, D.C., June 21, 1974.

To the Heads of Executive Departments and Establishments
Subject: Federal Use of Commercial Telecommunication Service

1. *Purpose.*—This Circular establishes guidelines designed to clarify the normal Federal role as a user, rather than a provider, of telecommunication service. The policy emphasizes the need to place maximum reliance on the private sector in providing telecommunication services to the Federal Government.

2. *Background.*—It is a long-standing policy of the Federal Government to rely on the private enterprise system to satisfy its needs. In the area of telecommunications, this policy has generally been followed. However, in the absence of further guidance, agencies have been free to choose between two different approaches: the procurement or lease of telecommunication facilities (which are then used to produce a service), or the direct purchase of telecommunication service. Both approaches depend on the private sector, but the nature of dependence is distinctly different.

Agencies which procure facilities, rather than services, are forced to maintain staffs with all of the expertise necessary to develop the detailed system design. The service approach, while not eliminating the need for in-house telecommunication staffs, will shift more of the burden for system design and detailed equipment specification to the private sector. The level of in-house design-oriented expertise necessary to insure that proposed service offerings are sound depends on type and frequency of procurement actions in which the agency is engaged.

The following statement of policy is designed to distinguish between these two approaches and to emphasize that purchasing service directly is preferred.

3. *Policy.*—The Federal Government places heavy reliance on the private sector in providing telecommunication service for its own use. This means that all functions normally associated with providing the service shall be performed by the private sector. These functions include design, engineering, system management and operation, maintenance and logistical support.

In order to emphasize the government's proper role as a user, any proposal designed to provide needed telecommunication service, which requires the Federal Government to perform any of the "provider" functions such as those listed above, shall be adopted only if commercial service is: (1) not available to the user during the time needed; (2) not adequate from either a technical or operational standpoint; or (3) significantly more costly.

A non-commercial service approach is acceptable if such an approach will result in significant savings over an otherwise acceptable commercial service offering. To be considered significant the savings must exceed 10% of the cost of the commercial service. The cost estimate of the non-commercial approach must include, as a minimum, all of the factors called out by OMB Circular A-76. If the proposed approach involves heavy investment, rapid obsolescence or uncertain requirements, the minimum savings threshold should be increased to reflect these factors.

4. *Administration and Scope.*—This policy applies to the telecommunication activities of the Executive Branch which take place in the United States, its territories and possessions, the District of Columbia or the Commonwealth of Puerto Rico.

Agency heads are responsible for the implementation of this policy within their own organization. However, in the case of requirements which, under current authorities, must be submitted to the General Services Administration, it is the responsibility of GSA to determine the appropriate use of commercial service in accordance with this Circular. A report describing the implementation of this Circular shall be provided to OTP by each agency within six months of the policy issuance date.

5. *Authority.*—This Circular is issued pursuant to the responsibilities set forth in Executive Order 11556.

CLAY T. WHITEHEAD, *Director.*

Mr. BUTTERFIELD. It says:

In order to emphasize the Government's proper role as a user, any proposal designed to provide needed telecommunications service which requires the Federal Government to perform any of the provider functions, such as those listed, shall be adopted only if commercial service is: (1) Not available to the user during the time needed; (2) not adequate from either a technical or operational standpoint; or (3) significantly more costly.

A noncommercial service approach is acceptable if such an approach will result in significant savings over an otherwise acceptable commercial service offering. To be considered significant the savings must exceed 10 percent of the cost of the commercial service. The cost estimate of the noncommercial approach must include, as a minimum, all of the factors called for by OMB circularator A-76.

A-76 was a predecessor to this office of telecommunications circular. So, we are not sure what the savings would be, that is, whether they would exceed 10 percent or not, but that is something we have to investigate.

So, I am saying that I consider the EVS to be a highly important piece of the upgraded third generation system and certainly a desirable system, and it was difficult for that reason to cancel it, as I said earlier.

Our immediate plans are to get together with the telephone company to see how they can assist. And regardless of how we go, we are going to be behind, oh, I would say, a good 20 to 24 months.

Mr. BROOKS. Mr. Hanrahan?

Mr. HANRAHAN. Thank you, Mr. Chairman.

I think you have answered most of my questions. I just have a few here. I do have a question about your last statement about the high priority of EVS.

I would like to commend you for doing both an in-house study, as well as going to the outside study, and choosing this management consultant firm to look over your acquisition procedures. How was that firm chosen?

Mr. BUTTERFIELD. The outside management consultant firm?

Mr. HANRAHAN. Yes.

Mr. BUTTERFIELD. Yes, it was a competitive selection. I am not sure, but I think four or five management consultant firms were in it. Work of the firm chosen is being monitored in a sense. At least they are working out of a central office in my immediate office, under the supervision of Mr. Richard Cross, who is here. He can answer that question very briefly, if he would.

Mr. Cross, tell about the selection process and how many competitors.

Mr. Cross. Well, we went out with a standard RFP to 10 of the management consultants in the Washington area. All had national reputations.

Five responded and one was selected from that—Peat, Marwick, Mitchell & Co.

Mr. HANRAHAN. This was strictly isolated to the Washington area?

Mr. Cross. Not really. Many of them were national organizations, such as Peat, Marwick, and Mitchell and McKenzie and Booz, Allen.

Mr. HANRAHAN. On page 7—and I know we are all great at hindsight—but Mr. Administrator, you mentioned here in retrospect, you believed there were danger signals back in April and May of 1973.

Who was immediately responsible for making a decision on putting it in one single contract; the prototype as well as the 21 production models? To me, this was a terrific waste of money to go into production, unless you have a prototype first. This is silly.

This is why so many of our Federal programs have gone out of kilter, because we don't have a pilot program first and we go into production without working the bugs out, so to speak.

Mr. BUTTERFIELD. Well, to take the first part of that question, I said that, yes, in hindsight, the fact that those danger signals weren't recognized in April and May of 1973 was probably the crux of the problem, because that may well have been the time to terminate. They

just simply were not recognized as being real danger signals at that time.

With regard to the responsibility for the schedule I and schedule II, I can't answer precisely who was responsible.

Mr. ISRAEL. The decisions for that form of contract—

Mr. BUTTERFIELD. Schedule II was an option.

Mr. ISRAEL. The decisions for that type of procurement were made in 1971. There was an advanced procurement plan. It was prepared and staffed through the FAA, and adopted on August 16, 1971.

The plan for acquisition was ultimately reviewed at the Agency Review Board.

I would like to comment on your other—

Mr. HANRAHAN. Yes; but I mean who was the man who finally made the decision? You know, the buck has to stop some place, as Harry Truman used to say. Who had to make the final decision?

Mr. ISRAEL. The final approval was given by the Agency Review Board, chaired by the Administrator and Deputy Administrator.

Mr. HANRAHAN. Who was that?

Mr. ISRAEL. Mr. Shaffer.

Mr. HANRAHAN. The former FAA Administrator?

OK; let me move on to something else here.

Mr. BUTTERFIELD. Well, Mr. Shaffer himself may not have been present at that particular Agency Review Board meeting. And if he were not present, it would have been chaired by the Deputy Administrator—

Mr. HUNN. May I comment on that, because I was involved?

Mr. BUTTERFIELD. That is General Hunn again.

Mr. HUNN. The final decision, as stated, was made by the Agency Review Board. Mr. Smith, the former Deputy Administrator, was involved in that, but it went even higher than that. It went over to the Department of Transportation, and the Under Secretary and Mr. Heffelfinger were involved in the decision to have a production option tied to a cost-plus-fixed-fee prototype. That was done at the Department, but it was reviewed all of the way through the Agency.

So our Agency, plus the Department, was involved in that decision.

Mr. HANRAHAN. Are you saying that you are blaming it on the former DOT Secretary?

Mr. HUNN. Yes, sir. Mr. James Beggs was then the Under Secretary and he personally was involved in the decision.

Mr. ISRAEL. I would like to point out it was not an unreasonable or unusual decision. The production was an option. FAA did not have to exercise that option. We could stop after obtaining the schedule I computer and test it.

However, the probability of any other manufacturer building a piece of equipment designed and produced by Philco-Ford was virtually nil, so, if we did want production equipments, it was clear we had to get it on that option.

The idea that you suggested of buying a prototype and evaluating it, and then going out and readvertising it competitively is attractive, but it doesn't work out that way in a system as complex as this, because North Electric could not reproduce or build a prototype done by Philco-Ford.

Mr. HANRAHAN. Well, at least you have something. Right now you have nothing. You have \$13 million of taxpayers' money down the drain.

Mr. ISRAEL. If you feel the specifications are going to change and there is technical risk, you face the other question: should I develop two prototypes and test the two of them, so I can pick one and have a competition for the production?

There is an equally difficult problem of having an extra prototype merely to assure that the project comes out all right in the end.

Mr. HANRAHAN. Is the management consultant firm going to go into this also, that is into the engineering aspects?

Mr. ISRAEL. Not into the types of procurement. Not into the cost-plus-fixed-fee and the two-step and this sort of thing. This is—

Mr. HANRAHAN. Mr. Administrator, do you have any timetable as to when Peat, Marwick, and Mitchell will be able to complete this study?

Mr. BUTTERFIELD. Yes, sir, I do. As I said earlier, our own in-house study was done from January to April of this year. It was just on the acquisition process itself, but that is the complete process from the initial identification of operational requirements to the actual procurement of the equipment.

Then in April, as objective as that study was, I felt I was almost obliged to bring in someone from the outside to look at it and to look not only at that study, but to look at the whole range of business and include the management process as well as the acquisition study. That began in April.

We had the benefit of the in-house study. The Peat, Marwick study is an 18-week effort which should be completed at the end of September. It is around an \$89,000 to \$90,000 study.

Specifically, we know that there appears to be a need for centralized program control. That is not a prejudgment—well, it really is, because it is quite obvious that we need more centralized control, which really means centralized accountability on selected major programs.

Beyond this, the planning process needs to be formalized, we think, more than it has been, and supported by more analytical work.

We wouldn't be in some of the situations we are experiencing if this had transpired.

We need that coupled with a more formalized agency procedure on major program initiation. So we are already moving a bit in this direction, in both the plans and policy and engineering and development, but overall, we see a need for a management information system which will independently report agency status on all major programs.

I do feel that we are on the road to some recovery. I don't say that this is the panacea, but I believe that within a year's time, or less, we will be doing considerably better. And we are thinking in terms, perhaps, of returning to a senior project manager type of operation; a senior project manager, who is responsible to the Deputy Administrator and to the Administrator and who has under him the four or five or six major programs that FAA is working on at any given time, so, we at the senior management level, keep immediately abreast of them.

Mr. BROOKS. Mr. Parris?

Mr. PARRIS. Mr. Chairman, as you originally stated at the beginning of this hearing, I think it is well to emphasize, in all fairness to Mr.

Butterfield, that he was not the Administrator at the time that this contract was awarded. However, it would certainly appear, although I have no desire to second guess, that to cancel was justified in this instance. I congratulate him on that decision.

Just a couple of very brief questions. This was an acquisition of an electronic voice switch. Would you tell me in one sentence or less what that does, Mr. Butterfield? What is the purpose of it?

Mr. BUTTERFIELD. Well, all of the technicians are here.

I can tell you it gives you operational flexibility in controlling aircraft, because you can change the operational jurisdictions of your air traffic control centers. There are 20 air traffic control centers here in America. America is divided into 20 center regions.

Mr. ISRAEL. Well the telephone communication system advanced from the plug board with the operator to electro-mechanical switches, which is the main way of making connections between users today.

And rather than an electro-mechanical switch, which is slow, and with a lot of people involved, engineers have designed electronic switches and computer controlled electronic switches.

So, this system substitutes computer control of electronic switches for the conventional mechanical switching. It promises to be faster and less power consuming and small in space. If you go into one of the centers, these systems occupy a tremendous amount of space in the basement.

Mr. PARRIS. This is basically for the direct control of air traffic movements from one region to another?

Mr. ISRAEL. It is to provide all of the internal and external voice communications and radio; all of the switching necessary.

Mr. PARRIS. Now, on page 7, Mr. Butterfield, you suggest that this was not based on need. I think Mr. Israel has suggested that it is what I would call a better "black box" for the 1980's and 1990's, and you anticipated that you would have cost-benefit at that time; is that right?

Mr. BUTTERFIELD. Well, I am looking for that statement. It is on page 7?

Mr. PARRIS. Right. At the middle of the page. You state that it "was not based on an immediate need tipped the scale in favor of termination in early August."

Mr. BUTTERFIELD. Yes, that is a correct statement. Our operational experts are not champing at the bit for this at the present.

At the present, Bell System is adequate, but you know we must look to the future. We have a responsibility there and that did make it difficult.

Mr. PARRIS. I understand. That is the thrust of what I am trying to get at.

Mr. BUTTERFIELD. I think our top technical people, most of whom are here, probably felt that in terminating the contract, we may be jeopardizing, in a way, or at least retarding, the progress that might have been in the evolution of the upgraded third generation system, which is what we are moving to now during the 1977-78 period.

Mr. PARRIS. On page 6 of your statement, you indicate that a review by a new team—and my emphasis added on new team—you stated there was a desire to add new system features to further reduce the required number of maintenance personnel. You stated there were 36 changes reduced to 18 and so forth.

Now, if my mathematics is correct, that added to a roughly \$19 million increase and added these new requirements or extra requirements. Were those the technical requirements that Mr. Israel addressed himself to a moment ago, basically?

Mr. BUTTERFIELD. These were operational—

Mr. PARRIS. These were in the event of power failure and in the event of failure to switch, in other words, these technical changes?

Mr. BUTTERFIELD. Yes.

Mr. PARRIS. They were added as a result of a new evaluation by presumably different people, basically of operating, maintenance personnel? Is that correct? Is that what you were referring to a moment ago?

Mr. ISRAEL. Yes, sir. We priced each change. We have a reasonably good estimate of what each change cost.

Mr. PARRIS. These were basically operational requirements?

Mr. ISRAEL. Yes, sir, all were operational requirements.

Mr. PARRIS. Now, off the record for a minute.

[Discussion off the record.]

Mr. PARRIS. Back on the record. Mr. Butterfield, in the committee report, which you referred to and which I have had an opportunity to review prior to this hearing, and that is the report of 1970 on the problems that confront the FAA in the development of an ATS for the 1970's, there were six major recommendations, if you recall.

Recommendation No. 6 occurs on page 7 of that report and states that the FAA undertake whatever action is necessary to avoid the specific management and administrative deficiencies that have compromised air traffic control development in the past as are set forth and discussed in this report.

Now, on page 43, if you would refer to it? The purpose of my facetious comment off the record a moment ago is that this is not a new experience either. In January of 1967—and once again, in all fairness, this was before your time—there was the development of an in-route Raytheon display unit, and the contract price for 16 units of \$44.8 million was increased to \$63.8 million and a \$39 million additional claim. Strangely enough, it was 3 years past the original date for delivery as fixed by the contract. That was in 1967.

This contract was dated January of 1973, which is a full 7 years later.

Now, the point I am trying to get at, Mr. Butterfield, is I think the thing that this committee has been trying to suggest in this long period in which the chairman certainly has been involved so deeply in this question, is that there is a difference between the desirable stimulation of improvements of the state of the art and the ethereal and unrealistic hopes beyond the state of the art to reliably produce in the market.

And that is a very difficult judgment decision and we all understand that. But, I think what this committee is trying to suggest is that this agency and every other agency should be careful in adopting the attitude that all you have to do is dream up some better black box and throw money at it in order to solve a problem. This is the thing I think the chairman is trying to zero in on in this hearing and in similar hearings that we have had in the recent past.

Mr. BUTTERFIELD. Yes.

Mr. PARRIS. Now, all of that and a dime may very well get us both a cup of coffee, but it is the attitude and approach that we think should

be changed, and we think that management improvements can be made and sincerely hope and believe that you are trying to do it.

Mr. BUTTERFIELD. Well, those points are well taken and I understand them and I agree with you. I do have great hopes that this in-house study, combined with the Peat, Marwick, and Mitchell study and our desire to have one man in sufficient control over these programs will give us essentially what you are suggesting we so badly need.

Mr. PARRIS. Thank you.

Mr. BROOKS. Thank you for your comments.

Mr. Administrator, do you know what I believe happened? Under the technical evaluation review procedures, adopted by FAA, the bidder that was ultimately awarded the contract failed the tests on quality assurance, reliability, and scheduling. These testing grades were under the minimum requirement of 500. They made 493; 471; 422.

Then, after price quotations were received, FAA reevaluated and re-studied the technical evaluations, massaged them over a couple of times, and ended up giving Philco-Ford a little more credit. Then FAA weighted the technical evaluation elements with the price. The other company still came out ahead under the revised and combined evaluation.

So then what FAA did was to go back and take price as the only criterion for the award. Now prices are a very significant thing and we are aware of prices, but I just say that it proves a point.

It proves that it is wasting money to hire somebody who can't do the job. We are not second guessing you, Mr. Israel, and harassing you about it. It is just that the record is perfectly clear. You understand what happened. We don't want it happening any more.

Now, I understand that it probably will, but we want to minimize that possibility, because we know you are not going to be right all the time. Nobody is. But, with the country trying to set priorities on spending and with the tremendous need for improvements in our air traffic control and in our general safety for use of airplanes in this country, we need to get something for that money. It is going to be hard to get, but we need to get it and keep it.

Mrs. COLLINS?

Mrs. COLLINS. The only question that had come to my mind is there has been quite a bit of talk about the in-house study and the Peat-Marwick study that you are having done.

I wonder if you would be willing to submit for the subcommittee copies of the recommendations that result from those studies?

Mr. BUTTERFIELD. Well, I would certainly do that if the subcommittee requested.

Mr. BROOKS. Yes; we would like to have those. Thank you very much. Good idea.

Without objection, those studies and all other pertinent documents will be made a part of the record and the record will be open for 5 days for other submissions.

[The study prepared by Peat, Marwick, Mitchell & Co. and the study prepared by the FAA are included in the files of the subcommittee. Other documents pertinent to the EVS procurement are located in the appendix.]

[Philco-Ford Corp.'s prepared statement follows:]

STATEMENT OF PHILCO-FORD CORP.

Philco-Ford appreciates the opportunity to submit a statement for the record in connection with the Subcommittee hearing of August 14 on the FAA Electronic Voice Switching System Contract. This statement is made with respect to those aspects of this contract which are known to the contractor, Philco-Ford.

Philco-Ford was awarded a cost plus fixed fee contract for \$12.7 million to develop a prototype electronic voice switching system. This award was made after competitive negotiations and in full compliance with existing procurement regulations and policies. This was a standard cost-type contract, with no ceiling price and with the usual provisions for changes and terminations. The cost-type contract is the contracting mechanism regularly and properly used by the Government for the development of major new systems and equipment.

Separately, the contract gave the Government the right to exercise a series of options as follows:

Option 1	5 systems	option exercisable until Dec. 2, 1975
Option 2	5 systems	option exercisable until Dec. 2, 1976
Option 3	5 systems	option exercisable until Dec. 2, 1977
Option 4	6 systems	option exercisable until Dec. 2, 1978

These options were priced on a fixed-price plus incentive fee basis. The total target price, if all options were exercised, was \$60.1 million and the total ceiling price was \$65.5 million. Delivery and installation of the last of the 21 systems would take place in the eighth year of the contract, that is, in 1980. There was no guarantee that the Government would exercise any or all of these options, which were priced on an individual stand-alone basis.

None of these options had been exercised by the Government prior to the cancellation of the prototype contract.

The significant aspects of the overall contract were the following:

Employment of a cost-type contract for the prototype development was a clear and normal acknowledgement that the Government anticipated, and provided for, changes that might be found desirable as the prototype development progressed.

Employment of a fixed-price incentive-type contract for the production option normally indicates an expectation that, even in this phase, some uncertainty exists as to the eventual installed system costs.

Although, with options, the contract extended over an eight-year period, there was no contract provision for economic adjustment. (The bid price submitted by Philco-Ford did include estimated inflation factors as set forth below.)

The option provisions were related to calendar dates rather than to performance milestones.

Philco-Ford entered into this contractual arrangement with the belief that sufficient preliminary design work had been done on the desired system. Hence, only relatively minor changes were expected. Calendar date options seemed acceptable since we believed the production schedule presented no significant problems.

Very extensive changes in the requirements and design emerged from a series of reviews and conferences in the summer and fall of 1973, as has been set forth in the FAA statements at this hearing. These changes could not be accommodated within the original estimates of cost, despite very intensive engineering effort in the past nine months by the FAA, Mitre, and Philco-Ford.

In retrospect, given the magnitude of changes that have occurred, the option portion of the contract was not appropriate.

Two other factors which have contributed to cost growth should be mentioned:

A world shortage of electronic components has developed which has affected virtually all industrial and consumer electronics equipment production. This shortage became acute subsequent to the beginning of the EVS contract. The shortages have been particularly adverse for low-volume, high-quality projects such as EVS, since the components industry devoted most of its capacity to high-volume lines.

Inflation of material and labor costs has increased far beyond the escalation anticipated at the time the EVS bids were submitted. The original Philco-Ford bid included an economics escalation factor averaging approximately 3.5% per year on material and labor costs not covered by firm vendor bids. This escalation factor was in general use by government and private economic forecasting organizations at the time the bid was prepared. The subsequent performance of the economy, as is well known, has been at substantially higher rates of inflation. Cost estimates for the revised system necessarily have had to take this inflation into account. Approximately \$8 million of the increased cost of the total program is due to this inflation alone.

The original Philco-Ford bid was fully supported, and documented in detail, with cost data. All significant material and subcontract items were identified by line item and vendor, and were supported by firm quotations. Internal labor cost data were furnished to the FAA in very considerable detail, supported by audit information provided by the Defense Contract Audit Agency, an agency of the U.S. Defense Department charged with maintaining full cognizance of Philco-Ford cost records.

To our knowledge, the only significant difference of opinion on our cost estimates was in the estimate of computer programming costs, an area of costing where subjective judgement is necessarily an important element.

As a long-time responsible government contractor, Philco-Ford cannot accept the implications in portions of the hearing comments that it has engaged in irresponsible pricing or costing actions. Of course, uncertainties existed in estimating certain items of the work. This is not unusual in such large programs. It is clear, however, that the major contributions to increased program cost have been those set forth above - extensive changes, parts shortages and material and labor cost increases due to inflation.

Comments implying that an incompetent contractor was selected cannot be supported by the history of Philco-Ford performance on major government programs of equivalent complexity and technical difficulty. The following examples should suffice:

Philco-Ford built the overseas Autodin communication message switching network. This network of 10 centers, each more complex than an EVS center, carries the bulk of the Defense Department message traffic outside the U.S., handling approximately 100 million messages per year with an average system availability of over 99.95%.

Philco-Ford built and maintains the Mission Control Center at the Johnson Space Center, Houston, Texas. This 100 million dollar installation, which in many ways functions like the FAA Enroute Centers, has performed almost flawlessly throughout the Apollo and Skylab space programs.

Philco-Ford operates the NASA unmanned Deep Space Network (as a contractor to the Jet Propulsion Laboratory) and the Air Force Worldwide Satellite Control Facility Network. Both are major communication networks having even greater technical complexity and performance requirements than the EVS system.

At the time this contract was cancelled, agreement had been reached on all significant technical details of the revised program. These agreements included agreement on the equipments and technologies to be used in implementation of the program. There were no technical problems which were considered to be high technical risk.

The principal uncertainty in attaining the performance desired in the prototype was felt to be simply the testing time that would be required to shake down and bring to a full operational status this quite complex system. This uncertainty is normal to all such systems and cannot be resolved except by actually assembling and testing the prototype.

In demonstration of its confidence, Philco-Ford had proposed, in writing, a ceiling price on the cost type prototype development contract over which Philco-Ford would absorb all costs, and the Government would have been protected fully from further unknown financial risks.

The computer which is a key piece of operational equipment in this system has evoked specific comments. The following points are worth noting:

The contract required a computer built to very strict and detailed specifications similar to Defense Department specifications. These specifications precluded the use of any commercial computer.

The purchase of the AN/UYK-15 computer, which was selected for use in the original program design, was cancelled when the computer failed to meet its requisite specifications.

The revised program required a computer with greater capacity than that of the AN/UYK-15. No computer was available in industry which satisfied both the government specification for equipment design and the program performance requirements. A diligent, well-documented search was made of all possible equipments, including computers manufactured by the other prime competitor for the original EVS program.

The computer finally selected was a microminiaturized version of the Philco Autodin computer whose reliability and general performance has been well demonstrated in many years of DOD service. A prototype of this new version has been performing satisfactorily for over two years.

Both the research for an existing computer and the proposed Philco-Ford design were reviewed in great detail by the FAA with the assistance of its advisory contractor, Mitre.

Philco-Ford believes that the original EVS system would provide a highly reliable, modernized and automated communication system to meet the future growth and operational requirements of the Enroute Centers. It also believes that the revised system, in addition to meeting the initial goals, would have provided further and even more improved capabilities.

Apparently the Government has now decided that its air traffic control requirements have not yet developed to the stage where full scale installation of this system is warranted. We cannot be the judge of that.

However, that does not mean the work has been wasted. Much of the expenditure under this contract has gone to establishing and defining in great detail the implementation of the communication and operating functions in the enroute traffic control centers. This work will serve as a foundation for the design of any future EVS system.

We stand ready to implement the system, as it has been defined under this contract, at any time. We are also prepared to apply the system and hardware designs arrived at under this contract to any other evolution of the air traffic control system that may be decided upon.

Again, we express our appreciation for the opportunity to supply information for consideration by the subcommittee.

8/26/74

Mr. Brooks. I would hope, Mr. Administrator, you will agree that this hearing has been very productive in bringing out some of the procurement problems within the FAA. The problems outlined clearly point out the need for extensive review of all procurement practices within the agency. You are in the process of doing that now.

And in this particular case, FAA began by using a faulty type of contract tying the procurement of prototype with production models not fully developed technologically. The agency and its consultant were then unable to properly evaluate the proposals and awarded the contract to a high-risk bidder who was unable to overcome the problems. Major specification changes after the contract award clouded the true nature of the cost increases and delivery delays.

Nineteen months later, the Government has spent \$12 million, has no prototype, design specifications are still being negotiated, and the contract's schedule was estimated by FAA to be 36 months behind schedule.

Recognizing that, FAA has now attempted to cut the losses by canceling the contract. This appears to be a reasonable management decision, but, nonetheless, we are back where we were over 3 years ago, not to mention, a few million dollars down the drain.

Mr. Administrator, I hope that this review of what went wrong in one contract will give you and your associates in the FAA the impetus to reorganize and reorient the agency's contract methods so that these problems can be avoided in the future.

I want to thank you for your participation here, and your staff's, and we look forward to continuing our productive relationship.

Before we adjourn, I would like to take the liberty of introducing three fine young men from my district, who have been serving here this summer. A couple of them have worked on this hearing:

Mr. V. J. Tramonte of Galveston. He is a senior at St. Edward's University. We have Mr. Darrell Windham of Nederland, who is a senior at the University of Texas in Austin. Finally, we have Mr. Wayne Johnson from LaMarque, who is a junior at the University of Texas.

Any further comments or questions?

If not, the meeting stands adjourned.

[Whereupon, at 11:20 a.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

APPENDIX

ADDITIONAL DOCUMENTS PERTINENT TO THE EVS PROCUREMENT

EXHIBIT NO. 10

LETTER OF APRIL 26, 1974, FROM NORTH ELECTRIC COMPANY TO FAA ADMINISTRATOR BUTTERFIELD PROPOSING ASSUMPTION OF PRODUCTION OF THE EVS CONTRACT

NORTH ELECTRIC Co.,
Galion, Ohio, April 26, 1974.

FEDERAL AVIATION ADMINISTRATION,
Washington, D.C.

Attention: Mr. Alexander Butterfield, Administrator
Switch: FAA Electronic Voice Switch Program

GENTLEMEN: Kindly refer to my letter of 16 April 1974 in which I indicated North Electric's interest in participating in your Electronic Voice Switch (EVS) program presently under contract with Philco-Ford.

Further study of important matters relating to the EVS program now enable and motivate North Electric to present a firm offer to the Federal Aviation Administration for the supply of the materials and services required for your EVS program. Presuming that your present requirements are accurately described by the contents of the original request for proposal #WA4M-2-0207 dated 9 November 1971 as modified by FAA letter dated 11 February 1974, North Electric hereby offers to execute the EVS program by offering a firm fixed price of \$15,494,477 for Phase I and a firm fixed price of \$77,288,905 for Phase II subject to change only in accordance with the following provision.

The Phase II price of \$77,288,905 contains a material content of approximately \$38,000,000, which is subject to increases and decreases due to the long time frame involved. It is therefore proposed that this material price be adjusted during Phase II in accordance with the Department of Labor Wholesale Price Index for Electrical Machinery and Equipment. This price index was established in 1967 with a base average of 100.0. Using this base, the current base average for 1974 is 115.1; therefore, the \$38,000,000 material content is based on the current price index of 115.1. The delivery schedule being offered is detailed as follows:

Phase I

	MAC
Factory test and delivery of the NAFEC Evaluation Configuration System	23
Site installation and checkout of the NAFEC Evaluation Configuration, complete	25
Cutover and acceptance test, complete	27
Start installation of Final System Configuration	27
On-site government and testing of Evaluation Configuration	27-31
Complete installation of Final System Configuration	30
Cutover and acceptance test of Final System	31
Approval of first delivery option for Phase II	32

Phase II

Delivery of the materials and services for Schedule II will be made in accordance with the terms of the RFP beginning with the first site delivery 41 MAC. All succeeding options are presumed to be exercised in accordance with the RFP.

In the above referenced letter of 16 April, North Electric also indicated that substantial reductions in price could be obtained if our "Code Switch" matrix could be used and if certain other relaxations to the specifications were granted. North Electric wishes to confirm at this time that the Phase II price, \$77,288,905, would be reduced by \$10,500,000 if these relaxations were granted.

It has always been the judgment of North Electric that the highest technical risk of the EVS program was the implementation of software programs which could reliably perform in a processor sufficiently powerful to execute the software instructions. At the present time, I think you must admit that both the processor and the software constitute major risks if the processor to be used has not been operationally demonstrated. Conversely, I believe that North Electric can demonstrate beyond a doubt that a significant amount of the software required has been developed for use with a processor which is being used by the hundreds in both military and commercial installations.

North Electric's growth in recent years obviously indicates that we have much more productive tasks at hand than that of pursuing a program merely to cause difficulties for possible future customers. It is a matter of deep conviction with North Electric that with our extensive background in circuit switching, not message switching, we can provide a more reliable system at ultimately lower dollars than your current contractor and all of this within essentially the same time frame. We ask that you seek impartial and objective advice to review this matter and that you provide us the opportunity to discuss the pertinent details with appropriate FAA personnel.

Very truly yours,

C. A. CONRY, *Vice President.*

EXHIBIT NO. 11

PHILCO-FORD INTERNAL MEMO CONCERNING MODIFICATION OF EVS CONTRACT TERMS AND CONDITIONS

INTRA COMPANY,
May 1, 1974.

To: R. Hinton

Subject: Conference held with C.O. relating to issuance of "interim modification."

Place: FAA, Washington, Transpoint, 30 April 1974

Attendees: Philco-Ford—W. Skibbe, F. Cohen, W. Hipps, FAA—S. Fishe, E. Humston, C. Lajaunie, J. Schroeder, D. Hadorn, R. Decker.

1. Steve Fishe, C.O., called the meeting for continued discussion relative to the contract modification that he will issue once agreement is reached on specification revision and program scope. Prior formal discussion on this subject took place on 28 January 1974, at which time Philco-Ford was advised that the issuance of the "PR" was imminent and would give formal recognition to the FAA generated changes which had been in technical negotiations dating back to August 1973, or earlier.

2. There was agreement that by the end of the week the on-going technical negotiations, this week in Washington, would conclude with agreement on revisions to the spec. It was reported that the "F" changes (FAA generated changes) were agreed upon, as was the revisions to the spec language to accommodate the 24 accepted "P/F" changes (cost reduction). In process were further changes to the spec occasioned by prior submittals of Waiver Requests, Deviation Requests and general areas of the spec which required clarifications. This final action relating to the completion of the spec revision language was to be concluded by Friday, 3 May. By this completion date, Philco-Ford will have also presented for FAA discussion and acceptance, delivery dates for significant milestones.

3. The C.O. again stated his intention to work in parallel and prepare his "interim" contract modification so that this document can be forwarded for Philco-Ford signature as soon as possible once he is formally released to do so by Schroeder's group. This preliminary modification will forward, as an enclosure, the agreed spec revision to "2479" and/or "021"; it will authorize immediate implementation of the Changes provided that Philco-Ford first signs the Mod in confirmation of the following:

A. We shall perform the Changes for an amount not to exceed \$16.9M-\$6.5M for Schedule I, and \$10.4M for Schedule II; and

B. We shall perform to the not-to-exceed significant milestone schedules which shall be set forth in the Mod (derived from Philco-Ford projections and which will extend the Option date for the initial "buy" under Schedule II from month 35 to month 42; and

C. All claims submitted to the FAA up to the date of the signing of this Mod are to be considered as withdrawn.

4. Philco-Ford agreed to the above conditions and stated that, providing the spec revision actually represents the totality of the technical agreements reached, execution of the Mod would be effected with no delay or disruptive exceptions. However, as an aside, to record, but not to delay any further the processing of the "PR" and the Mod issuance, Philco-Ford made the following statements pertaining to the \$16.9M funding limitation for the Changes and the resultant \$94.9M ceiling, arbitrarily imposed upon the EVS program by the FAA/MITRE Purchase Request (PR):

A. Although Philco-Ford takes on the objective of performing within the funding of \$19.2M for Schedule I and \$75.7M for Schedule II, the \$6.5M limitation imposed by the FAA appears to fall short by some \$6.3M to effect completion of Schedule I as currently defined. The following explanation was given:

(1) The \$6.5M essentially provides only for: \$1.7M—due to component acquisition problems and related schedule slippage; \$4.8M—to implement the FAA changes.

(2) No provision is made for: One-time costs relating to Schedule II cost reduction (some \$1.6M). This Schedule I spending to save Schedule II costs will approximate \$1.8M (Redesign for Cost Reduction). Remaining added scope items to be implemented (could be washed out had all Philco-Ford cost reduction items been accepted—although only 4 out of 28 were rejected, they contained a high dollar total that could have been used to accommodate the expanded requirements). Additional costs related to moving the option date from month 35 to month 42, i.e., lose options with vendors, keep people on job longer, rate changes, etc. Redesign effort relating to larger processor (reported Hunn's comment that it was unfortunate that responsible FAA and MITRE personnel did not take this cost item into account when they estimated and made their pitch for additional funding).

The above items will approximate \$4.5M bringing the total of the Philco-Ford task to \$6.3M.

B. Philco-Ford emphasized that it had taken on the objective to conclude the program within the \$94.9M and that reciting the above situation was solely for the purpose of establishing perspective with regard to the Philco-Ford task involved in its efforts to achieve the objective.

5. The Mod that we are awaiting, the Contracting Officer refers to as the "interim" Mod in that it will release the additional funding of \$16.9M and solicit a firm proposal which will, after negotiation, result in the "final" Mod which formalizes the settlement, further confirms spec revisions and will recite specific delivery dates. Schedule I shall remain CPFF and Schedule II shall remain Fixed-Price-Incentive. The \$94.9M total includes fees for Schedule I and is at the Target Sell level for Schedule II which means the "Spread" dollars to the Ceiling remain and are over and above the \$94.9M total.

6. Philco-Ford stated that, during the later part of the week, scheduling would be discussed—after spec agreement—and that various presentations would be made. However, we expressed concern about the component long lead time and the related problem of making Schedule II delivery within one (1) year after the option is exercised at the outside date of the 42nd month. Philco-Ford stated that one of our plans called for the FAA to authorize the placement of long lead items some 8 to 10 months prior to the option date. FAA stated that this approach was realistic and that we should generate an estimate of the type of items involved, together with the aggregate total of this "advance release." They requested this data be included in our response to the "interim Mod."

7. The FAA confirmed that at the present time the PPM will go to NAFEC as called for by the Contract and not to Oak City (the Academy) as was being discussed.

8. Philco-Ford will be requested to accommodate Oak City personnel at an earlier date. FAA desires a formal program for these "observes," but Skibbe stated this will not be possible. They are welcome, but no formal training will be possible at the early date being suggested.

9. There was a brief discussion of the ATC-021. The CO will solicit information on the "021" and the basis for its selection. We confirmed that we were working on the redesign going from the "102M", the model presently utilizing IC's, to the ATC-021. Philco-Ford stated that the September 28, 1973 directives from the CO made the need for a larger processor necessary, and the current effort is related to this CO direction. Philco-Ford emphasized that the

Univac termination coincided in time, but was totally unrelated to the requirement for a different, larger processor. Univac was defaulted for non-compliance to the P.O. requirements and not because the processor would be inadequate. The record will show that, had the AN/UYK-15 been compliant, Philco-Ford was prepared to accept delivery. Philco-Ford agreed to prepare and transmit a presentation on the ATC-021, which, among other technical considerations, will also show the basis for its selection and why its utilization on EVS will serve the best interests of the Government. This should be accomplished as soon as possible.

10. The FAA Programs Office stated that they had authorized the CO to make \$500,000 immediately available to prevent a funding problem. The CO will move out immediately once he receives the authorization. Hunn/Skibbe/Hips recognize these funds coming from a reserve for Schedule I options to be replaced at a later date. Schroeder/Yevonishon were of the opinion that the 19.2 for Schedule I would still provide for the Options; which approach is not in keeping with Hunn's dictate issued at the 13 March 1974 conference held at Philco-Ford. General Hunn would make the \$500K available and at some later date the FAA would make replacement funds available for option exercising. The other approach would require Philco-Ford to replenish the \$500K once the \$6.5M became available. It comes down to whether we get \$7M or \$6.5M. The CO will handle situation as his Program Office advises.

11. The ACO escalated the ACTS tester situation to the PCO, who stated that he was about to disallow costs associated with this item. The ACO stated that he had a recent meeting with R. Derr and that he was sending a paper to the PCO clarifying the matter and that any disallowance action should be held in abeyance.

12. The FAA stated that they would forward, in piecemeal fashion, portions of the spec, schedules, etc., agreed upon for Philco-Ford to get started on its firm pricing action. Philco-Ford responded by stating that fragmenting the pricing effort in this manner was not possible and that we must await the interim modification which will contain the revised spec, complete with modified tables, schedules, etc. It was agreed that Philco-Ford would respond upon receipt of the interim Mod, an action 2 to 3 weeks away. Our response time will be over a 30 to 60 day period.

FRANK COHEN.

EXHIBIT NO. 12

LETTER FROM PHILCO-FORD TO FAA
PROPOSING INCREASED CONTRACT PRICES

PHILCO-FORD,
Dearborn, Mich., June 24, 1974.

General SPENCER S. HUNN,
Director, Systems Research and Development Service, Federal Aviation Administration, Washington, D.C.

DEAR GENERAL HUNN: I would like to propose the following modifications to the EVS contract:

We are prepared to accept the capped ceiling on Schedule I of \$26.4 million and to change from a CPFF to a CPIF basis. Consistent with this change, should the cost for Schedule I reach \$26.4 million, we shall receive no fee and no further liability will accrue to the FAA. Should we succeed in underrunning the proposed ceiling, we will participate in a 50-50 sharing arrangement to allow a maximum earned fee of \$1.0 million.

To maximize the potential for an underrun we are prepared to underwrite the development costs of the proposed Philco-Ford processor up to \$2.0 million.

In exchange for acceptance by the FAA of the proposed cost reductions, all claims to date will be withdrawn by CSD and an extension of the Schedule II option date from month 35 to month 42 will be granted.

A modification to the Schedule II contract must be made to increasing the funds by \$10.4 million and to enhance our ability to maintain costs within the proposed funding level. This modification would authorize CSD to procure all production material in a single buy mode rather than under the presently stipulated requirement for four separate and distinct options.

The rate of inflation since this program was bid in March 1972 has drastically exceeded anyone's expectation and, specifically, has far exceeded the material escalation factors used at the time of proposal submission. Our current cost-to-complete estimates assume a material escalation factor of 6% per annum. Because of the uncertainty of the economic situation, sufficient protection must be provided in the contract language to assure recovery of material costs above our present projected escalation rates.

I am convinced that we can now move forward to a successful completion of the EVS Program. I have been assured that a defined baseline specification is now available and has been agreed to by both FAA and CSD personnel. It is on that basis that I am agreeable to convert Schedule I from a CPFF to a capped CPIF arrangement. A formal response to your RFP will be submitted within 30 days. I have instructed CSD upon contract modification incorporating the above to treat Schedule I as a capped CPIF arrangement and to make every attempt to successfully complete Schedule I below the agreed to ceiling of \$26.4 million.

Sincerely,

EDWARD L. MONTGOMERY.

EXHIBIT NO. 13

MEMO TO HADORN (FAA) AND NYSTROM (MITRE) REQUESTING ANALYSIS OF UNIVAC PAPER SUMMARIZING CANCELLATION OF COMMON CONTROL CONTRACT BY PHILCO-FORD

DAVE HADORN: This is a Univac paper on their side of the Common Control Cancellation.

Bob Meier asked that you annotate it to confirm or deny or correct any of the points raised from our point of view.

R. F. D.

REMINDER MEMO

FEBRUARY 11, 1974.

To: R. Nystrom-H. Talberth

Subject: Univac "Confidential" Summary Paper

Please review and provide me with your comments on the subject paper.

G. D. HADORN.

SITUATION SUMMARY—EVS TERMINATION FOR DEFAULT

CONTRACT OVERVIEW

Univac has a firm fixed price contract with Philco-Ford's Communication System Division of Willow Grove, Pennsylvania to provide computers and peripherals for the common control element of the EVS. Philco-Ford has a prime contract for the overall EVS system with the FAA on CPFF basis. A brief summary of Univac's contract follows:

Contract value:

Phase 1	-----	\$945, 800
Phase 2	-----	6, 139, 547
Total	-----	7, 085, 347

CONTRACT REQUIREMENTS

Only Phase 1 was authorized. It consists principally of line items for hardware shown on Attachment 1, a Software demonstration, Factory Acceptance Test (FACT) developments and numerous data items. Equipment and quality specifications are contained and generally represent Univac's standard specifications. In any case, total compliance to FAA-ER-650-021 Specifications is not requirement of the contract. The original delivery schedule for Phase 1 was 6 months ARO.

Phase 2 options to the contract are to be exercised in four lots of hardware similar to Phase 1 (Attachment 1) in quantities of 5, 5, 5 and 6 over the next 71 months. In both phases these equipments were procured as hardware line items and not as systems.

STATUS OF CONTRACT ITEMS

All equipments for Phase 1 exist, have completed preliminary acceptance tests and are currently undergoing final acceptance tests by an independent testing agency. Philco-Ford representatives executed and signed acceptance test procedures for the following:

- 2 UYK-15 Control Processors
- 2 Mass Disk Storage Elements
- 3 Input-Output Typewriter Elements.

LISTED REASONS FOR DEFAULT

Philco-Ford listed the following items as reason for default:

1. *Delivery*.—Failure to deliver Common Control System with related software and logistics data by 14 December 1973.
2. *Quality/Performance*.—Failure of equipments to meet specifications specifically in the areas of quality requirements, instruction execution times and integrated circuit usage (-00 and -05 components versus -01 components).
3. *FACT Software*.—Failure to produce adequate FACT software test routines.
4. *Software Demonstration*.—Failure to demonstrate equipment software by 14 December 1973.

UNIVAC POSITION ON DEFAULT ITEMS

Univac's position regarding the reasons for default was outlined in a letter to Philco-Ford on 4 January 1974. This position is summarized below.

1. *Delivery*.—Meetings were held with Philco-Ford 30 and 31 October 1973 and a plan was agreed to for acceptance of the equipments in a system by 14 December 1973. Subsequently there were disagreements regarding number of work shifts to be worked during acceptance with Philco-Ford wanting Univac to pay for any of their increased costs. On 11 December 1973, Philco-Ford representatives commenced witnessing acceptance and continued until 20 December 1973 on which date they returned home. As stated above, they signed off certain tests.

One significant point regarding delivery is that assembly of the equipments into a system was a concession by Univac in the interest of expediting software demonstrations which were contractually to be performed at Philco-Ford's plant. Obviously, the normal integration tasks and problems associated with interconnections of the prototype equipment of any system were the responsibility of Philco-Ford. Univac agreed to accept these tasks without change of scope.

2. *Quality/Performance*.—After Univac, Philco-Ford and FAA meetings on 8 through 11 November 1973, Philco-Ford drafted 17 hand-written pages of discrepancies. On 10 December 1973 Univac responded to these discrepancies in writing. All discrepancies were resolved except the use of jumper wires. Univac submitted a memo of justification for use of jumper wires on P.C. boards indicating that they are reliable (they have been tested to be so) and commonly used and accepted in the industry particularly for prototype equipments. In any case, replacing P.C. boards containing jumper wires was certainly negotiable with Univac management.

The matter of instruction execution times can best be summarized as a matter of interpretation. Again, Univac provided an in-depth memo regarding how it interprets execution times. The specifics of the different interpretations becomes lengthy and detailed but in general involves measurement of instruction execution in terms of cycles rather than time.

The third issue, that of using -00 and -05 components rather than -01 components was also addressed with Philco-Ford prior to commencing acceptance. Univac agreed to replace all -00 (plastic) chips with -01 or -05 (ceramic) chips depending on parts availability. However, some -05 chips were necessary because -01's were not available. (Current vendor lead times on integrated circuits exceed 6 months ARO themselves.) The two chips (-01 and -05) are identical except the -05 chip is burned in. Again, Univac management was willing to negotiate replacement of -05 chips in this situation.

3. *FACT Software*.—The issue of fault detection in the FACT procedures had been a disagreement between the two parties. Univac feels it produced FACT software and procedures which demonstrate acceptability of the equipments and according to contract. It has delivered comparable and more complex equipments for military application for years using similar FACT software techniques. Univac accommodated numerous Philco-Ford requests for changes without consideration for time or cost.

4. *Software Demonstration.*—This item could not be accomplished since it is contractually required after formal acceptance of hardware units.

EVS CHRONOLOGY AT UNIVAC

A brief chronology of the EVS program at Univac is provided to clarify the sequence events.

1. Univac's original proposal to Philco-Ford was for about \$14M and included very capable equipments of good commercial quality as requested. This quote included 1616 computers. This proposal stated Univac's position regarding elements of compliance and non-compliance to the FAA-ER-650-021 Specification.

2. Univac submitted numerous subsequent proposals in response to Philco-Ford changes attempting to reduce costs and comply to certain parts of FAA-ER-650-021. These proposals resulted in a change of computers from 1616 to UYK-15, a change to lower performance peripherals and a \$6.9M proposal price. There was, however, no detailed statement of work at this time.

3. Six months later, Philco-Ford won the competition and a lengthy and intensive negotiation began. Philco-Ford insisted on adherence to 650-021 and a complete system. Univac held to black box sale of commercial type equipment as in the price proposal that would functionally meet Philco-Ford requirements. Philco-Ford discussed taking legal actions and broke off negotiations for a short time. Upon resumption of negotiations, a paragraph-by-paragraph comparison was made between the Univac proposed equipment and FAA-ER-650-021, which resulted in a contract providing more than that originally contemplated in Univac's proposal. In any case, total compliance to FAA-ER-650-021 is not a part of the contract.

4. The six month scheduled program proceeded for four months with a good relationship. In August 1973, Philco-Ford told Univac of FAA expanded requirements for the entire EVS system. From that point, relationships began to deteriorate rapidly. Philco-Ford indicated they may supply Phase 2 peripherals. Fault was found with previously insignificant technical details, and documented carefully by Philco-Ford in formal communications.

5. Univac informed Philco-Ford that acceptance tests would not take place as originally scheduled and outlined the reasons:

- a. Some vendor supplied parts being unavailable
- b. Late approval of acceptance test procedures
- c. Mechanical difficulties encountered in vendor supplied peripherals.

6. Philco-Ford met at Univac on October 30 and 31, 1973 for a program review. The review resulted in a PERT chart showing six remaining tasks to be completed by both Philco-Ford and Univac. December 14, 1973 was set as a target completion date.

7. On November 8 to November 11, 1973, Philco-Ford and the FAA performed a visual inspection of the equipment. Philco-Ford drafted a 17 page handwritten report of possible discrepancies. No record was ever received of the FAA inspection comments, and it was presumed that Philco-Ford incorporated the FAA observations in their report to Univac. Later Univac discovered that this was not true. Univac never received a copy of the Philco-Ford official report to FAA.

8. These discrepancies were discussed at a meeting at Philco-Ford on December 10 and 11, 1973. Almost all of the discrepancies were a result of irregularities in the preliminary documentation. Philco-Ford agreed with the resolution of all discrepancies except for the use of wire jumpers on printed circuit boards and Univac's occasional use of -05 burned-in chips in place of -01, non-burned-in chips. This information was not forwarded to the FAA.

Directors of the quality organizations of both Philco-Ford and Univac corresponded with reference to the use of jumpers on printed circuit boards and use of -05 versus -01 chips.

Also, at that program review it was decided that acceptance testing would begin on December 12, 1973 and continue ten hours a day including weekends until complete. Philco-Ford representatives remained at Univac through December 20, 1973 witnessing acceptance tests of two of the three UYK-15's and two of the four peripheral subsystems. Even though all of the equipment was operating and capable of completing the prepared acceptance tests, testing could not be completed because: A minor malfunction developed in one UYK-15. A disagreement occurred on the acceptance procedure for the card system.

9. On December 20, 1973 Philco-Ford was told by telephone that Univac had repaired the computer and would acquiesce to their recommended changes to the procedures and resume testing on January 8, 1974, provided they furnish

Univac with formal requests for the changes, promptly. Philco-Ford agreed to forward the requests shortly. Discussion also took place on resolution of the -05 versus -01 parts and the instruction execution time issue.

10. Philco-Ford contacted Univac's program director on December 21, 1973 stating that Philco-Ford was terminating the contract for default. They sent a telex the same day. The telex was received at Univac on 26 December 1973.

11. Univac management attempted to contact management (namely Mr. Hinton and Mr. Eastman) continuously from 28 December 1973 to 8 January 1974 to discuss the matter. Finally, on 8 January 1974 contact was made with Mr. Ambrose and a meeting established.

12. On 9 January 1974 a meeting was held between E. D. Hams, J. J. Meyer, and Mr. Eastman. Mr. Eastman refused to discuss the matter other than to confirm the particulars and emphasize that the decision would not be reversed.

13. Univac retained an independent law firm for a legal opinion to augment that of its own attorneys.

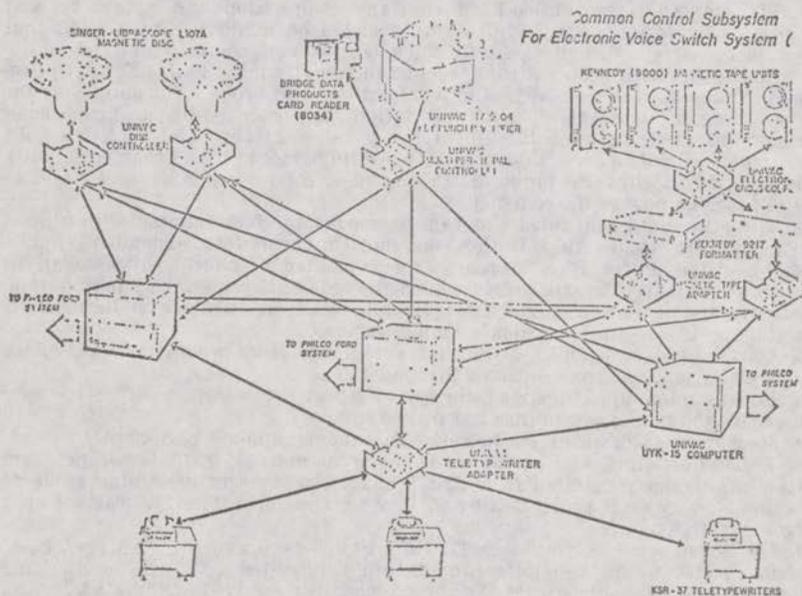


EXHIBIT NO. 14

FINAL REPORT OF SOURCE SELECTION EVALUATION BOARD

EVS SSEB FINAL REPORT

EVS SOURCE SELECTION EVALUATION BOARD, EXECUTIVE SUMMARY, 1 SEPTEMBER 1972

During the contract negotiations with the Northern Electric Company and the Philco-Ford Corporation, subsequent to the completion of the final SSEB Report, the following actions were taken: (1) The software risks associated with the Philco-Ford proposal were re-examined; (2) the SSEB scores were updated; and (3) Negotiations were held with AT&T concerning the cut-over from the 300 system to the EVS system.

A detailed examination of the Philco-Ford software cost during negotiation leads to the conclusion that their estimate is low by about \$3M. Their estimate is \$1.5M for 42 man-years of programming, whereas the FAA estimates that the effort will be more nearly 120 man-years and should cost about \$4.5M. The difference represents a \$3M cost risk which, if applied to their bid of \$78,022,969 to equate the Philco-Ford cost risk to the North Electric cost risk, would increase the Philco-Ford cost to \$81,022,969 or \$10.3M below the North Electric cost of

\$91,245,161. It was the consensus of the Board this difference was of sufficient magnitude that it is in the interest of the Government to award to Philco-Ford even though other risks associated with their proposal are somewhat higher than those associated with the North Electric proposal.

The updated scores contained in the Executive Summary of the Final SSEB Report on the chart labeled "Checklist Scores Supporting Element Scores" reflect the re-examinations of changed items made during the contract negotiations.

By letter of 17 November 1972, the American Telephone and Telegraph Company advised that the reversible flash cut-over from the 300 system to the EV system is acceptable to them and that they will cooperate as necessary in removing existing facilities and services, providing new services and in protecting the continuity and integrity of services provided by them. The flash cut-over method has been included in the contract.

A. E. TEGELER,
Member, Source Selection Evaluation Board, EVS.

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., September 1, 1972.

Subject: EVS Source Selection Evaluation Board Executive Summary
To: Chairman, Source Selection Advisory Council

Members of the Source Selection Evaluation Board have completed their evaluation of the three (3) proposals received from industry in response to RFP WA4M-2-0207. The evaluation was conducted in accordance with the EVS Proposal Evaluation Procedure, dated 14 March 1972. This executive summary updates the prior SSEB reports presented to the SSAC during meetings held at the MITRE Corporation on 23 May 1972 and FAA Headquarters on 2 June 1972.

Enclosed is a summary of the evaluation team scores assigned to each proposal, the proposed program schedule, and the prices submitted by each offeror for the CPFF and fixed price phases of the proposed contract.

Six (6) sets of questions, comments or specification changes to FAA-E-2479 were submitted to the offerors by the SSEB during the technical evaluation. The first round of questions and comments were submitted to all three (3) offerors, CH, DO and MT. Specification changes were not submitted to the offerors until the fifth and sixth round of questions and then only to CH and DO on 3rd and 21st of August 1972.

1. General

As a result of reviewing the basic MT proposal and the response to the first round of questions, the SSAC determined from the SSEB evaluation presented during the 2 June 1972 meeting that the MT proposal was not within the technical range of competition. Accordingly, further evaluation of MT proposal has not been conducted.

As a result of evaluating the basic proposal and response to the six (6) rounds of questions, comments and specification changes, the CH and DO proposals are considered by the SSEB to be technically acceptable. The cost analysis score for CH has been evaluated as "below standard" of acceptability.

Clarification discussions which were held with CH and DO representatives during technical negotiations have resulted in modifications to the Master Cut-over Plan. Both the offerors approach to the EVS System cutover are now considered to be technically acceptable. The two (2) cutover concepts have been discussed with AT&T, Bell Laboratories and N. J. Bell representatives. Acceptance of these concepts by AT&T has not yet been resolved.

All other significant deficiencies in the CH and DO proposals which were outlined in the 2 June 1972 briefing have been resolved. Based on the offerors response to the SSEB questions, subsequent minor changes to the specification/RFP and the offeror's amendment to their technical proposal, there are no significant deficiencies remaining which have been identified in either proposal.

2. Changes to FAA-E-2479, RFP and selection of design options

Changes incorporated in Amendment-3 to FAA-E-2479 and requirements of the RFP are summarized as follows:

- (a) Increased maximum reconfiguration time from one (1) second to two (2) seconds and clarified the definition of this timing requirement.
- (b) Increased floor space requirements from 880 square feet to 1000 square feet.
- (c) Specified "LED" designations for DA and radio select modules, deleting the incandescent lamp option.
- (d) Specified MF confirmation signaling between ARTCCs, deleting the CCITT #6 options.
- (e) Defined the minimum system configuration for Type Tests and Production Tests at the factory.
- (f) Redefined the printed circuit board size requirements to permit a maximum of 50 square inch size, deleting the mandatory requirement for 3 x 4½ inch boards. This change allows both offeror's alternate on the proposed increase in card size.
- (g) Deleted the requirement for a one (1) hour battery source for the EVS system for use during a power failure and specified that the power source will be derived from the ARTCC critical (UPS) buss.
- (h) Added a requirement for remote control of MAIN/STANDBY antennas at the RCAG when the MAIN/STANDBY radio equipment transfer is enabled (oversight in the basic specification).
- (i) Redefined and clarified the requirement for voice circuit multiplying on radio trunks.
- (j) Specified minimum testing requirements for electromagnetic interferences.
- (k) In addition to the specification changes, Attachment E of the RFP will be modified to provide more specific guidelines for the training requirements. Requirements for a comprehensive software training course will be added as required by maintenance personnel.
- (l) Changed the delivery schedule for the preproduction NAFEC system from seventeen (17) months to twenty-one (21) months. This was necessitated to permit a comprehensive reliability and performance test program at the factory prior to shipment to the site, and both offerors' inability to meet the delivery without compromising these tests. Delivery of production systems are also delayed four (4) months.

3. Factors influencing relative technical risk

The following summarizes the factors of the proposed CH and DO system design in terms of assessing the relative technical risk to the Government. These risk factors are for existing design or new design and reflect the evaluation scores assigned by the SSEB to Checklists Numbers 1 and 2 which are as follows:

Evaluation element	Checklist numbers			
	1, overall function approach		2, design/development status	
	CH	DO	CH	DO
A. Design and technical requirements.....	632	510	686	396
B. Quality control.....	645	500	628	443
C. Reliability/maintainability.....	603	444	640	630
D. Schedule.....				

Overall functional approach	CH	DO
A. Hardware:		
1. Position equipment.....	New design.....	New design.
2. Junction modules.....	do.....	Do.
3. Interconnection network (IC/IP/radio and support telephone).	Minor modification of existing system designs (TTC-25, SA-100).	Firm up design based on devices used in development model.
4. Common control:		
(a) CPU.....	Existing design (TTC-25).....	Existing design (Univac 1616).
(b) I/O processor.....	New design.....	New design.
(c) Device controllers.....	Modification of existing designs.....	Do.
(d) Program memory system.	Repackaging of existing design.....	Do.
(e) Mass memory system...	Modification of existing design.....	Existing design (DISC).
(f) Peripherals.....	Existing design.....	Existing design.
(g) Common control hardware element interfaces.	Minor modifications.....	Integration of new design of SCU, plus subcontractor equipment (CPU and memory system).
5. External interfaces.....	Modification existing techniques—also part of 4(b) above.	Trunk buffers and trunk TM's are new design.
6. Reliability and maintainability.	Modification of existing design plus new design.	Modification of existing designs plus new design.
7. Cable and power.....	Existing design (standard TELCO-type approach).	Existing design.
8. RCAG equipment.....	New design.....	New design.
B. Software:		
1. Call processing.....	Modification of existing TTC-25 plus new design.	New design for Univac 1616 and SCU.
2. LED control.....	New design.....	New design.
3. Reconfiguration.....	do.....	Do.
4. RTOC.....	Modification of existing AMM plus new design.	Do.
5. External interface signaling and control.	Modification of existing TTC-25 plus new design.	Do.
6. RCAG control/restoral.....	New design.....	Do.
Total new design areas: CH, 11; DO, 14.		

DESIGN AND DEVELOPMENT STATUS

CH

The system utilizes a repackaged common control processor and interconnection network elements which are now employed in military switching systems (TTC-25). The radio interconnection network is based on an existing Martin Marietta (SA-100) system. The existing software now utilized in the TTC-25 performs functions similar to those required by the EVS.

DO

The system utilizes a militarized Univac 1616 processor not previously used for circuit switching. The interconnection networks proposed are the same as used in their development module of an EPABX, but is controlled by a different CPU. No existing software is available for utilizing the Univac 1616 to provide functions, similar to those required by the EVS.

The above summary of overall functional approach and design and development status provides a comparative assessment of effort required by CH and DO to adapt their existing switching technology to the requirements of the EVS.

4. Conclusions

(a) The result of the SSEB review and evaluation of the three (3) proposals are as follows: CH and DO proposals are from an overall standpoint technically acceptable and compliant with the requirements of the RFP and EVS specification. The MT proposal is not within the range of technical competition in terms of the requirements of the RFP and EVS specification.

(b) Scores assigned by the SSEB to each proposal for the evaluation elements and checklists reflect the relative rank order position of each offeror with respect to the degree of technical compliance and risk to the Government.

(c) Assessment of the factors in the CH and DO proposals in terms of system design versus relative technical risk indicates that CH has offered a system design with a lower risk.

(d) The Master Cutover Plans submitted by CH and DO are technically acceptable to the SSEB. However, the acceptability of these concepts to AT&T has not yet been resolved.

G. D. HADORN,
Chairman, SSEB.
C. BEAM,
Leader, Team A.
E. KAPUTA,
Leader, Team B.
E. BOLDEN,
Leader, Team C.
G. CAMPBELL,
Leader, Team D.
G. KNIGHT,
Leader, Team E.
H. STEVENS,
Leader, Team F.

EVS PROPOSAL EVALUATION—HIGHLIGHTS OF SSEB FINAL REPORT

EVS PROCUREMENT

1 Preproduction system—NAFEC

21 Production systems:

Academy-Oklahoma City

20 Centers

EVS evaluation

SSEB:

R&D, air traffic, airways facilities, logistics, general counsel, training, audit
Rome Air Development Center (AF)

Consultants—Mitre Corporation

EVS program schedule

Activity:	Months after contract award
Complete prototype factory tests.....	21
Prototype installed at NAFEC.....	23
Evaluation complete at NAFEC.....	34
Order production option No. 1-5 systems.....	35
Start delivery lot No. 1, order production option No. 2-5 systems....	47
Start delivery lot No. 2, order production option No. 3-5 systems....	59
Start delivery lot No. 3, order production option No. 4-6 systems....	71
Start delivery lot No. 4.....	88

Scoring procedure

Evaluation criteria:	Checklist evaluation range
No data (unacceptable).....	0
Unacceptable.....	100-299
Below standard.....	300-499
Meets standard.....	500-699
Exceeds standard.....	700-899
Exceptional.....	900-1000

PROPOSAL EVALUATION—OVERALL SCORES

Element	Applicable checklists	Maximum/ average raw score	SSEB raw scores total/average		
			CH	DO	MT
A.....	1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 21, 22.....	14, 000/1, 000	8, 144/582	7, 703/550	5, 447/389
B.....	1, 12, 13, 22.....	4, 000/1, 000	2, 503/625	2, 169/542	1, 440/360
C.....	1, 2, 10, 12, 14, 15, 16.....	7, 000/1, 000	3, 705/529	3, 522/503	3, 377/482
D.....	2, 3, 4, 13, 17.....	5, 000/1, 000	3, 016/603	2, 830/566	2, 478/496
E.....	2, 17, 18, 19, 20.....	5, 000/1, 000	2, 329/582	2, 299/575	1, 962/392
F.....	23.....	1, 000/1, 000	390/390	595/595	342/342

Note: Element and evaluation area—A, design and technical requirements. B, quality assurance. C, reliability—maintainability. D, schedule. E, management. F, cost analysis.

SSEB EVALUATION RESULTS—GENERAL

MT proposal not considered by SSEB to be within the technical range of competition—SSAC during June 2, 1972 meeting concurred.

Both "CH" and "DO" proposals are considered technically acceptable by the SSEB.

Clarifications and amendments to the "CH" and "DO" proposals as a result of six rounds of questions have removed major deficiencies.

The cost analysis score for "CH" has been evaluated as "below standard" of acceptability.

MASTER CUTOVER PLAN STATUS

Clarification discussions with "CH" and "DO" representative during technical negotiations have resulted in modifications to their master cutover plans. Both offeror's approach are considered by the SSEB to be technically acceptable.

"CH" and "DO" cutover concepts were discussed with representatives of AT&T, Bell labs and New Jersey Bell.

Acceptability of these concepts to AT&T has not been resolved.

Specific details on interfaces with common carriers for both interim and final EVS/300 system configurations need to be developed.

RESOLUTION OF SIGNIFICANT DEFICIENCY AREAS

Significant deficiencies in the "CH" and "DO" proposals, outlined in June 2, 1972 briefing have been resolved.

Based on the offeror's responses to SSEB questions, minor changes to the EVS specification/RFP and amendments to their proposals, no significant deficiencies remain in either proposal.

EVS SPECIFICATION CHANGES AND DESIGN OPTIONS

Reconfiguration maximum time from 1 second to 2 seconds.

Floor space from 880 square feet to 1000 square feet.

"LED" option specified for DA and frequency designators vs. incandescent.

"MF confirmation" signaling specified vs. CCITT #6.

Minimum system configuration for type tests and production tests specified.

PCB size changed to a maximum of 50 square inches vs. 3" x 4½" mandatory size. This allows both offerors alternate proposal on card size to be used.

Deleted 1 hour battery requirement. Critical "UPS" buss to be used instead.

Added antenna transfer control for main/standby radio switchover.

Clarified voice circuit multiplying on a single radio frequency.

Specified minimum testing requirements for EMI.

RFP CHANGES

Attachment "E" of the RFP (training requirements) will be modified to provide more specific guidelines. Requirements for a comprehensive software training course will be added as requested by AAF.

Changed delivery schedule for the NAFEC preproduction system from seventeen months to twenty-one months. Production system delivery extended four months.

This required to permit a comprehensive reliability and performance test program prior to shipment to site. Both offerors unable to meet this requirement in the seventeen month schedule.

RELATIVE TECHNICAL RISK FACTORS—HARDWARE

Hardware item	CH	DO
Position equipment/junction modules.	New design (2 areas)	New design (2 areas).
Interconnection networks (IC, IP, radio and support).	Minor modification of existing designs (TTC-25, SA-100).	Firm up design of development model.
Common control:		
CPU	Existing design (TTC-25)	Existing design (Univac 1616).
I/O processor	New design	New design.
Device controllers	Modification of existing design.	Do.
Program memory	Repackaging of existing design.	Existing design.
Mass memory	Modification of existing design.	Existing design (DISC).
Peripherals	Existing design.	Existing design.
Common control hardware interfaces.	Minor modification of existing design.	New design for SCU, Univac 1616 and mass memory interfaces.

RELATIVE TECHNICAL RISK FACTORS—HARDWARE—Continued

Hard ware item	CH	DO
External interfaces.....	Modification of existing techniques (also part of I/O processor).	Trunk buffers and trunk TM's are new design.
Reliability and maintainability.....	Modification of existing design plus new design.	Modification of existing design plus new design.
Cable and power.....	Existing design (standard telephone type) DC system.	Existing design—AC system.
RCAG control equipment.....	New design.....	New design.
Call processing.....	Modification of existing TTC-25 plus new design.	New design for Univac 1616 and SCU.
LED control.....	New design.....	New design.
Reconfiguration.....	do.....	Do.
External interface signaling and control.....	Modification of existing TTC-25 plus new design.	Do.
RCAG control/restoral.....	New design.....	Do.
Total new design areas—hardware plus software: CH, 11; DO, 14.		

RELATIVE TECHNICAL RISK FACTORS—DESIGN AND DEVELOPMENT STATUS

CH

DO

"CH" uses a repackaged common control processor with interconnection network, which now are employed in their military circuit switching systems (TTC-25).

The radio interconnection network is based on an existing Martin-Marietta (SA-100) system.

The existing software utilized in the TTC-25 performs functions similar to those required by the EVS.

"DO" utilizes a militarized Univac 1616 processor not previously used for circuit switching.

The interconnection networks proposed are the same used in a development model of an EAPBX but controlled by a different processor.

No existing software is available for utilizing the Univac 1616 to provide functions similar to those required by the EVS.

CONCLUSIONS

The result of the SSEB review and evaluation of the three (3) proposals are as follows:

"CH" and "DO" proposals are both technically acceptable and compliant with RFP and EVS specification requirements.

The "MT" proposal is not within the range of technical competition in terms of the requirements of the RFP and EVS specification.

Scores assigned by the SSEB to each proposal for the evaluation elements and checklists reflect the relative rank order position of each offeror with respect to the degree of technical compliance and risk to the Government.

Assessment of the factors in the "CH" and "DO" proposals in terms of system design versus relative technical risk indicates "CH" has offered a system design with a lower risk.

The master cutover plans submitted by "CH" and "DO" are technically acceptable to the SSEB. However, the acceptability of these concepts to AT&T has not yet been resolved.

EXHIBIT NO. 15

DECISION BY FAA CONTRACT DIVISION TO CONDUCT NEGOTIATIONS WITH PHILCO-FORD

EVS INFORMATION

On 22 September 1972 a meeting was held in Mr. Comulada's office concerning the EVS procurement. In attendance were Messrs. Comulada, Rabinowitz, Woodbury and Alperin. Mr. Comulada requested that:

1. Negotiations be held with Philco-Ford with the understanding that they were not to be closed.

2. A "should-cost" figure for the Philco-Ford proposal be developed for in-house use.

3. An in-house analysis of the North Electric proposal be made which seeks to answer the question, "Is it worth our time and effort to enter into negotiations with North Electric considering the fact that its proposal was about \$35 million higher than the Philco-Ford one?"

4. All Government "data bank" information, e.g., cost overruns, whether delivery schedules were met, general contract performance, be obtained on Philco-Ford and North Electric.

Mr. Comulada requested that the above information be given him no later than COB 16 October 1972.

Mr. Comulada informed the ALG-300 members that ASRDS-1 would be responsible for scheduling and holding a meeting with AT&T concerning the EVS cutover.

In response to the above, the following is offered:

1. Negotiations were conducted with Philco-Ford on 27, 28 & 29 September 1972. Philco-Ford offers to perform the required work for approximately \$76 million. An analysis of this figure is shown in Enclosures 1 and 2. The audit and pricing analysis for the \$76 million figure won't be available until about 24 October 1972; however, no substantive changes are expected as a result of this review. Negotiations have not been closed.

2. A "should-cost" figure for the Philco-Ford proposal of about \$85 million has been developed. (See Enclosures 1 and 2 for details.)

3. An in-house analysis of the North Electric proposal was made. On the basis of this analysis (Enclosure 3) it was established that, if successful in the extreme, negotiations could result in the North Electric price being reduced by \$16 million, from \$110 million to \$94 million. It was further established that there was no obvious technical approach to reducing the North Electric prices through a change in its technical submission. Consequently, it does not appear to be profitable to hold negotiations with North Electric.

4. "Data bank" information (Enclosure 4) was obtained for ALG-300 by ALG-400. Both Philco-Ford and North Electric have performed well on past and current Government contracts.

Note: As of the date of this submission, ASRDS-1 has not held discussions with AT&T.

SAMUEL RABINOWITZ,
Chief, Contracts Division, ALG-300.

WILLIAM F. WOODBURY,
Assistant Chief, Contracts Division, ALG-301.

DAN ALPERIN,
Contracting Officer, ALG-380.

EXHIBIT NO. 16

WEIGHTING FACTOR IN EVALUATION OF PROPOSALS ON EVS CONTRACT ELECTRONIC VOICE SWITCHING SYSTEM WEIGHTING FACTORS

The Electronic Voice Switching System (EVS) weighting factors were established by the EVS Source Selection Advisory Council (SSAC), in their meeting for that purpose on 16 March 1972. These weighting factors will be applied to the raw scores obtained from the EVS Source Selection Evaluation Board (SSEB) as a result of the EVS evaluation. The EVS evaluation will be conducted in accordance with the "Proposal Evaluation Procedure for Electronic Voice Switching System RFP No. WA4M-2-027," dated 14 March 1972.

It was decided that weighting factors would be applied to the six groups of Evaluation Elements. Since the evaluation element groups are composed of varying numbers of checklists, and each checklist has arbitrarily been assigned a maximum value of 1,000, aggregate scores for each element group of each proposal will be normalized before application of the weighting factors. This normalization factor will simply adjust the aggregate checklist scores to a true percentage basis, and not affect the ranking or actual value of the raw scores obtained

in the evaluation. The weighting factors will be applied to the normalized raw scores. The following normalization and weighting factors will be used:

Group	Evaluation element	Number of checklists	Maximum aggregate raw score	Normalization factor	Weighting factor
A	System design and technical requirements	14	14,000	1/36,000	50
B	Quality assurance	4	4,000	1/36,000	15
C	Reliability and maintainability	7	7,000	1/36,000	20
D	Schedule	5	5,000	1/36,000	5
E	Management	5	5,000	1/36,000	5
F	Pricing data	1	1,000	1/36,000	5
Total		36	36,000		100

Source: Office of S. S. Hunn ARD-1, FHA.

EXHIBIT NO. 17

REPORT ON PRELIMINARY DESIGN REVIEW MEETING ON THE EVS CONTRACT

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 17, 1973.

Subject: Trip Report; Electronic Voice Switching System (EVS); Contract DOT-FA73WA-3202, Willow Grove, Pa.—May 3 and 4, 1973.

To: ALG-1

Purpose.—To attend ending of Preliminary Design Review meeting.

Attendance.—Attendance varied and included at least 13 FAA and 10 MITRE personnel. FAA personnel from ALG included the writer, the ACO and QRO. Other FAA codes represented were:

ARD-223/140/650

AAF-210/350/440

ANA-130/140

AAT-140/510

AAC-485

RADC (Air Force)

The Philco-Ford personnel included the program manager, assistant program manager and numerous specialist personnel who were called in as necessary.

Description.—The PDR started on April 24, 1973. The writer attended the first day of the meeting for purposes of assuring the ground rules were applied. (Copy of earlier trip report attached). May 3, 1973, was devoted to a resume of all the action items. There were 46 items, mostly for Philco-Ford action relating to inquiry into other data sources for continued evaluation of P/F's proposed design. The action items became operative upon contracting officer's authorization.

AAT personnel at the meeting were much concerned with the adequacy of the proposed Philco design. Later the T.O. informally volunteered to the writer that the AAT views were such that he anticipates fairly major changes in design requirements—involving additional costs for Schedule I and Schedule II of the contract.

Common Control Subsystem.—The Univac common control subsystem S/C was fully executed on May 3, 1973, when the writer was at the Philco-Ford plant. Philco maintains that this S/C complies fully with the earlier conditional consent of the FAA. The writer is awaiting written confirmation of this from the T.O. The principal condition was that the specifications not be further degraded below the minimum level accepted by the CMB.

Event Scheduling Integration.—PERT is not required under the contract. Neither is specific cost control employing WBS or equivalent cost control method. However, responsible contractor handling would necessarily include both cost and schedule control. The agency is considering the manner in which the contract will be modified to require schedule and cost control procedures.

STEPHEN FISHE,
Contracting Officer, ALG-340.

EXHIBIT NO. 18

LETTER FROM FAA CONTRACTING OFFICER TO PHILCO-FORD ATTACHING PROPOSED CHANGES IN EVS CONTRACT AND OUTLINING ACTIONS TO BE TAKEN ON CONTRACT BY FAA AND PHILCO-FORD

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., July 12, 1973.

In reply refer to: Contracting officer, ALG-340.

Subject: Contract DOT-FA73WA-3202, list of PDR action items.

To: Mr. Frank Cohen, contract manager, Philco-Ford Corp., 3900 Welsh Road, Willow Grove, Pa.

Reference: (1) FAA Letter, "Contract DOT-FA73WA-3202, Philco-Ford; Comments on Philco-Ford Deliverable Documentation," June 1, 1973.

(2) Philco-Ford letter FC: 73-165.

(3) Philco-Ford letter FC: 73-166.

(4) Philco-Ford letter FC: 73-170.

(5) Philco-Ford letter FC: 73-177.

(6) Philco-Ford letter FC: 73-184.

(7) Philco-Ford document, "FAA EVS PDR Action Item Summary," June 8, 1973.

GENTLEMEN: As a result of the EVS Preliminary Design Review from April 24 to May 4, 1973, May 8-10, 1973 and May 15-17, 1973, Action Items were generated for resolution by both Philco-Ford and the FAA. At the end of each session, agreement was reached on the Action Items from that session. At the end of the PDR meeting, on May 17, 1973, the FAA summarized the resulting Action Items (Reference 1, Attachment B). In the meantime, before Reference 1 was published, Philco-Ford assembled a list of Action Items (References 2 through 7) which differed from the list generated by the FAA.

An attempt to resolve these differences was made on July 2, 1973 in a meeting held at Philco-Ford. Attachment A is a summary list of Action Items that were mutually agreed to by Philco-Ford and FAA. All future actions and responses to Action Items shall only refer to this list.

Upon satisfactory completion of all PDR Action Items by both Philco-Ford and the FAA, the PDR shall be considered as being concluded.

STEPHEN FISHE,
ALG-340 Contracting Officer.

Attachment.

ATTACHMENT A

LIST OF ACTION ITEMS FROM EVS PRELIMINARY DESIGN REVIEW

1. FAA will notify the cutover/interconnect steering committee of those items of information required by Philco-Ford for design of external trunk interface, already identified in correspondence by Philco-Ford.
2. Philco-Ford will schedule a separate meeting to discuss impulse noise budget for interconnect matrix relative to performance requirements levied on total system.
3. Philco-Ford will reevaluate their interpretation of intercabinet cabling requirements under this contract, particularly with respect to cabling through sides of cabinets.
4. Philco-Ford will provide a technical paper for submission to FAA which provides their interpretation of contract requirements for cabinets to be fully wired when delivered.
5. Philco-Ford will provide a written statement of their interpretation of sizing requirements for radio matrix per Table 1 of FAA-E-2479 for FAA's review and comment.
6. Philco-Ford will address the following items in a written response to FAA:
 - (a) The apparent discrepancy between the switch performance specification and the PDR technical presentation relative to the design of the pulse-width modulator.
 - (b) Philco-Ford will provide a written statement relative to the switchover technique employed for the interconnection network controllers using relay devices. Philco-Ford will also investigate the feasibility of using network controllers in a load sharing mode of operation.

7. Philco-Ford to confirm providing line and trunk test board equipment for the initial and final NAFEC configuration.
8. Philco-Ford will formally request approval from the FAA for use of ferrous material for equipment enclosures in the ARTCC cabinets, ATC position equipment, junction modules, DAP and supervisory positions.
9. FAA will investigate availability of EMI profile information and provide available information to Philco-Ford.
10. FAA will provide to Philco-Ford whatever information is available on upper limit for sound pressure levels for headset; in response Philco-Ford will define sound pressure level for headset and will put in hard limit on the receive side of the VF path between the jack and the amplifier nearest the jack.
11. Philco-Ford will review their procedure for initiating a conference call, with a view toward eliminating switchhook action (the second dial tone) to add each party to the conference.
12. Philco-Ford will review the voice recording pick-up points for both transmit and receive VF paths to ensure that they meet the specification and its intent. The pick-off points should be as close as possible to the headset and speakers after volume controls to ensure that the voice recording corresponds to what the controller hears.
13. FAA will decide on the proposed arrangements of designations and push-buttons in the DA panel and Philco-Ford will review the spacing requirements for pushbutton spacing per Paragraph 3.2.5.2.8 of FAA-ER-650-021.
14. Philco-Ford is to review the design against FAA-ER-650-021 for such requirements as quarter turn fasteners, pushbutton spacing, etc.
15. Philco-Ford will submit to FAA a list of recommendations and/or interpretations in regard to personnel safety requirements as stated in FAA-ER-650-021.
16. Philco-Ford will review the requirement for picking up the PTT lead for recording purposes at NAFEC.
17. Philco-Ford will substantiate their position that they are not required to furnish GPI/GPO adapters.
18. The FAA will consider requirements for additional I/O devices, such as disc controller, tape controller, high speed printer or medium speed printer.
19. Philco-Ford will substantiate their ability to accommodate a 50% expansion above maximum Table 1 size capabilities in the common control subsystem.
20. Philco-Ford will review and determine the maximum size of core memory required for the maximum size system defined in Table 1 of FAA-E-2479.
21. The FAA will provide Philco-Ford with more definitive information on the CTS interfaces, specifically looking into main/standby selection of CTS.
22. Philco-Ford will review their design to ensure that signal ground terminals are available in each cabinet with test and monitoring points.
23. Philco-Ford will review their design to determine if the DC supply returns are physically available for use by maintenance personnel.
24. The FAA will furnish guidance on grounding of M1 console.
25. Philco-Ford will provide peak and steady state power requirements for each site in three categories: small, medium and large.
26. Philco-Ford will coordinate with FAA regarding the detailed levels of maintenance readouts prior to implementation.
27. Philco-Ford will review feasibility of adding a test jack to accommodate additional test equipment. This includes a set of switches permitting connection of this equipment to the test trunks, adjacent to switches located on the maintenance console.
28. Philco-Ford will investigate feasibility for providing for three way conferencing between EVS maintenance console, portable radio trunk maintenance panel, and the RCAG maintenance panel.
29. Philco-Ford will review software implications of multiplying all positions in an ARTCC to a single frequency.
30. Philco-Ford will coordinate with FAA to establish a preferred method of controlling audible and visual alarms.
31. FAA will provide information with regard to the maximum number of RML alarm indicators to be mounted on the maintenance console and guidance information on the carrier alarm interface.
32. FAA will consider the desirability of paralleling the monitor select pushbuttons to the SMMC.
33. FAA will review procedures for bringing the off-line processor into an on-line standby status.

34. FAA will establish a desired PTT confirmation timeout alarm interval based on an analysis of propagation delay times.
35. FAA will determine whether Philco-Ford should leave space in the maintenance console for Wickes Clocks and, if so, will provide panel space requirements.
36. FAA will review space constraints within the SMMC with regard to mounting EVS status panels, position equipments, and junction module.
37. FAA will investigate availability of additional technical information on the GPI/GPO adapters.
38. Philco-Ford and FAA will mutually schedule a meeting to discuss input message validity checking philosophy and the philosophy for selectable printouts on the SMMC I/O teletypewriter.
39. Philco-Ford and FAA will review the requirement for background tests on the alternate voice/data matrix.
40. Philco-Ford will review the utilization of alarm indicators and associated pushbuttons (reset and alarm acknowledge philosophies) for the maintenance console, and will also submit alternate approach of alarm display (by exception utilizing CRT displays).
41. Philco-Ford will review the application philosophy of the portable maintenance panel used at the ARTCC.
42. FAA will review the requirements for location of the 3 I/O teletypewriters.
43. Philco-Ford will specify the characteristics and precision required for dial tone detection.
44. R&M portion of PDR to be rescheduled. Specifically included in the PDR presentation will be the parts applications derating guidelines and parts list.
45. Philco-Ford will forward all additional information relative to the qualification testing of AN/UYK-15 in accordance with MIL-E-16400, as it becomes available from Univac.
46. Philco-Ford will provide a calculated thermal analysis of the junction module assuming a 50°C ambient environment.
47. The combine/decombine philosophy must be changed to preserve continuity of radio connections during a sector plan change. The proposed approach places unusual responsibility on the individual who generates adaptation data for the various sector plans. In addition, the software program does not take into consideration the hardware complement at each position, but places this responsibility on the person generating the sector plans. This is not the intent of the specification. Also, a frequency cannot be removed from a position if the TX is selected. Thus detection must be provided to the common control for use by the combine/decombine program.
48. Several waivers in the common control subsystem units will be required. Some peripheral devices do not meet MIL specs as required, and others may not meet environmental requirements.
49. An on-line background test of the alternate voice/data network must be provided.
50. Sizing parameters of radio network must be established, consistent with specified requirements.
51. Specification control drawings for all IC's must satisfy:
- (a) Screening for non-standard device.
 - (b) MIL-STD-883 test requirements.
52. Utilization of RML carrier alarm in RCAG trunk monitoring must provide for sensing and display of carrier alarm.
53. Design of ARTCC equipment cabinets is unacceptable in the following areas:
- (a) Steel runners used for drawers and enclosures.
 - (b) Maintenance on two drawers simultaneously cannot be achieved.
 - (c) Intercabinet cables through sides of the cabinet are used in related cabinets of the same subsystem; all cabling must be via top of cabinets.
 - (d) EMI requirements cannot be met by the proposed design.
54. Conferencing (via IA) does not conform to specification requirements. The on-hook action before dialing each conferee should not be required.
55. Voice recorder connection of position headset and speakers is in the wrong location and should be located so that the VF signal on the recorder leads is precisely what the controller has heard or said.

56. DA pushbutton switches do not conform to specification requirements and spacing is inconsistent with FAA-ER-650-021.
57. Philco-Ford will review their PTT data collection capability for both NAFEC and all other sites (Reference Paragraphs 3.1.4.6 and 3.4.2.1.7 of FAA-E-2479).
58. Detailed areas of compliance or non-compliance of UNIVAC AN/UYSK-15 with MIL-E-16400 have not been established.
59. Full compliance with FAA-ER-650-021 must be reviewed and corrective action taken where appropriate. Specific areas missed include quarter turn fasteners, pushbutton spacing, etc.
60. Portable maintenance panel does not meet the intent of Paragraph 3.6.3.6 of FAA-ER-650-021.
61. It is not clear that the diagnostics will isolate failures to single pluggable PCBs or modules.
62. All delivered cabinets and racks are to be fully wired per Paragraph 3.12.2.5 of FAA-E-2479.
63. Philco-Ford must show how the common control capacity can be expanded to at least 50% beyond that required for maximum size system requirements of Table 1 of FAA-E-2479.
64. Extensive investigation must be performed on modularity and growth in all subsystems including common control and software.
65. Inadequate attention has been given to automation of both RTQC and off-line maintenance of position equipment subsystem. For example, minor efforts in the hardware design effort will provide for automated loop back testing of the VF path through the matrix to the position and back. On-line diagnostic (RTQC) should be expanded to include subsystems and equipments other than those provided for the interconnection networks. In general, the overall tests and diagnostic procedures require too much manual intervention.
66. Further consideration must be given to the human factors engineering in the position equipment subsystem.
67. Philco-Ford has elected to use the BCD output of CTS, which does not provide a redundant output without patching from one CTS to the other. Further consideration must be given to this selection.
68. Utilization of the IOT at the SMMC for fault and status reports from EVS need to be reviewed in light of the CCC/EVS Interface Control Document to ensure compatibility.
69. Combining/decombining procedures need detailed review to ensure compatibility with the CCC/EVS interface.
70. No limiting on output to headset is provided and some protection to the controller must be provided.
71. No VF patch panel for NAFEC is being designed.
72. Relay transfer of main/standby network controllers is not state-of-the-art and has a critical single failure mode. Load sharing techniques should be utilized with either controller having the capability to carry full load.
73. Philco-Ford will review the utility of the Stationary Radio Trunk Maintenance Panel.
74. Common oscillators for tone supplies at trunk circuits use relays for main/standby switchover. Active load sharing consistent with state-of-the-art techniques desired.
75. No rationale for the temperature rise within the 4X4 crosspoint device has been derived.
76. Standard parts and non-standard parts lists have not been generated. (Basis for system design parameters not established.)
77. The design of the junction module is not supported by thermal analysis.
78. Redundant power supply distribution in branch breakers appear not to have been given consideration. Redundant power supply design approach should consider optimization of distribution of power supply and branch breaker in order to take full advantage of redundancy available.
79. Jacks must be provided for common maintenance conferencing with jacks at each sector, at reasonable spacing in each EVS equipment aisle, at the EVS maintenance console, and at the SMMC.
80. Design of monitor/CPU relationship should be reconsidered.
81. Twenty-four (24) racks of power supplies in the Chicago +25% size system is considered excessive. A cost benefit study should be performed which considers alternate methods of meeting the power requirements.

82. GPI/GPO adapters :

(a) Who is furnishing?

(b) Complete understanding of characteristics is required.

83. Emergency maintenance procedures should allow the maintenance man at the RCAG to selectively disable/enable main/standby selection for maintenance purposes, with indication going back to the ARTCC on the data channel and a flashing red indicator in the RCAG.

84. Philco-Ford will revise the common control model to reflect the time required for manual intervention to transfer the off-line CPU to standby mode.

85. Philco-Ford will look at the possibility of switching the off-line CPU in automatically, if it has been designated as available for switchover to standby.

86. Philco-Ford will develop a model for override, considering two positions on normal intercom, with two additional positions accessing one of these, on override. Philco-Ford will calculate the results.

87. Philco-Ford will develop a model for the radio function, considering fanout of a frequency to six sectors. Philco-Ford will calculate the results.

88. Philco-Ford will verify that the system model treats the two-party override and fanout to six sectors for radio.

89. Philco-Ford will develop a new model for fanout of a local radio channel to 25% of the sectors. Philco-Ford will calculate the results.

90. The Government's interpretation of Paragraph 3.5 of specification FAA-E-2479 is that common control cannot be involved in radio except to reassign frequencies. Philco-Ford will investigate and report.

91. Philco-Ford will investigate the feasibility of automating fault detection in the Junction Modules.

92. Philco-Ford will cover single point failures in the reply to a previous question of use of relays from the PDR at Philco-Ford.

93. Philco-Ford will provide a new model which will combine the four sub-elements of Support Communications (ATC to SC, SC to ATC, SC to DDD/FTS and SC to AUTOVON).

94. Philco-Ford will assess the impact on common control of one out of two models for on-line CPUs, and incorporate into following models which use the common control: radio, intercom, interphone, support communications and trunk-to-trunk switching function availability models. Philco-Ford will calculate the quantitative effect.

95. Philco-Ford will incorporate the requirement for resubmission of failed parts, per MIL-M-38510, if there are no problems with the suppliers of TTL devices.

96. The FAA will provide documentation pertaining to failure rates due to problems detected by visual inspection.

97. Philco-Ford will review values of I_{OS} and I_{IL} for TTL devices. Discrepancies will be resolved. Tables I and III will be made compatible. The recommended parameter values are too stringent for the Philco-Ford design application.

98. Philco-Ford will review values for I_{IH2} and I_{IL} for TTL devices. Tables I and III will be made compatible. The recommended parameter values are too stringent for the Philco-Ford design application.

99. All changes agreed to for all 3 TTL specifications under review will be incorporated by Philco-Ford into all TTL device specifications. NOTE: Submissions for NSPA will be in accordance with these agreements.

100. Philco-Ford will advise the FAA where maximum and minimum power consumption of 4X4 devices will appear in documentation.

101. Philco-Ford will advise where the information on operational states of 4X4 devices will appear in documentation.

102. Philco-Ford will advise the FAA where clarifying information on Figures 1 and 2 of drawings 398-14215-1 and 398-14225-1 will appear in documentation.

103. Philco-Ford will check with suppliers, and if there are no significant problems, will adopt the recommended inspection criteria of Appendix B of MIL-M-38510 for 4X4 devices.

104. All changes agreed to for the two 4X4 devices under review will be incorporated by Philco-Ford into all switching element device specifications.

105. Philco-Ford will provide impact (Phase I and Phase II) on following items for incorporating 100% screening of TTL devices at $+70^{\circ}\text{C}$:

(a) Cost.

(b) Schedule.

(c) Loss of Suppliers.

106. Philco-Ford will provide analytical calculations for verification of 65° C junction temperature, or any necessary corrections, used in predictions for 4X4 devices.
107. Philco-Ford will review the radio function module, considering that loss of an RCAG can affect more than 10 positions.
108. Philco-Ford will determine if failure of a speaker module causes failure of volume controls.
109. Philco-Ford will check to see if the 1KHz matrix test tone automatically tests a path when the path is initially set up.
110. Philco-Ford will look into possibility of providing automatic detection of faults in the Junction Module.
111. The FAA will provide to Philco-Ford the requirements for an interface between Reliability and Configuration Management, to be included in Task Scheduling.
112. Philco-Ford will provide the FAA with non-standard part data as available per MIL-STD-749 for the Univac subcontract. Philco-Ford will inform the FAA of procedures planned for non-standard part approval of subcontractor items.
113. Philco-Ford will include in the RPP, clarification of how changes resulting from thermal measurements are implemented.
114. The FAA will determine whether or not to direct Philco-Ford to relate the MPP to subsystem and system design.
115. The FAA will determine whether or not to direct Philco-Ford to include inputs for a Maintenance Plan in the MPP.
116. The FAA will provide Philco-Ford the format for a more comprehensive FMECA.
117. The FAA will formally submit the comments on the RPP and the MPP, noted in the RMA meeting of 10 May 1973.
118. Philco-Ford will investigate the possibility of permitting an over-ridden party to initiate or answer a call without terminating an override call.
119. FAA will review requirement for permitting an overriding position to be overridden, specifically, and other override considerations, generally.
120. Philco-Ford will review conferencing capabilities to insure that the hardware and software design will allow up to four trunks on a conference.
121. Philco-Ford will review the possibility of allowing the conferees to be selected by both DA and IA in the same conference.
122. Philco-Ford will review the problem of answering a DA conference call at a position which does not have a conference pushbutton.
123. FAA will clarify the requirement for accessing SS-1 trunks through DA trunk selection followed by IA dialing.
124. Philco-Ford will review the operation of a position when the headset is removed and a voice call and an override call received at the position during the same time period.
125. Philco-Ford will investigate the requirement for terminating Type 3 (ringdown) trunks at ATC positions.
126. Philco-Ford will clarify EVS operation of AUTOVON calls.
127. FAA will review SS-1 calling procedures in relation to EVS numbering plan and will review the plan which requires multiple extension number assignments to a position.
128. FAA will verify requirements for Direct Inward Dialing (DID) versus switchboard operation. The topic will be referred to the cutover committee to insure that the capability for DID can be provided by TELCO. FAA will look at the possibility of terminating DDD trunks at the DAP.
129. FAA will determine if the restriction of 20 DA interphone lines (except voice call) per position is acceptable.
130. FAA will define classmark requirements for positions and trunks and present explicit requirements, where possible. The number of classmark lists anticipated for Table 1 maximum sized system will be assessed by the FAA.
131. FAA will review classmarking with respect to a main/standby control restriction to given positions for a frequency.
132. FAA will review requirement for automatic radio trunk restoral following recovery.
133. FAA will clarify the requirements for combining/decombining for both sector to sector changes and plan to plan changes.

134. Philco-Ford will investigate the possibility of providing for uniform CPU usage.

135. Philco-Ford will review concurrent main/standby CPU processing with respect to specification requirement in Paragraph 3.4.3.1.2 of FAA-E-2479.

136. Philco-Ford will schedule a meeting with the FAA to resolve all remaining questions on TELCO interfaces, as well as technical and interpretation problems related to the definition of interface to antenna through GFE relay from antenna transfer relay control circuit.

137. FAA will review requirement to use GPI/GPO interface with SMMC and will provide Philco-Ford with clarification of interface characteristics.

138. Philco-Ford will consider impact of simultaneous use of both signaling controllers on-line.

139. Philco-Ford will review network controller/signaling controller interface to determine if redundant network controllers are dedicated to separate signaling controllers.

140. Philco-Ford will review grounding criteria as it relates to signaling controller due to number of signals at a given point in the system and possible source of noise.

141. FAA will provide to Philco-Ford documentation on updated grounding practices.

142. FAA will review a potential problem of a false initiation of a call when two parties release simultaneously from a call. When one party releases, there is a possibility that the second party, in attempting to release the call, will reinitiate a call to the same party.

143. FAA will resolve the problem of an accidental override preventing the overridden position from initiating calls.

144. Philco-Ford will refer the precision dial tone availability to the Cutover Steering Committee to verify dial tone tolerances of external facilities.

145. FAA will clarify Table 3 note relative to DA pushbutton use.

146. Philco-Ford will research design changes required to permit transfer of a position as a result of a combine/decombine operation, even though the position has a voice call in the speaker.

147. Philco-Ford will investigate the possibility of providing a printout, at timed intervals, of those positions which have not released their calls, and thus cannot change their communications in the sector plan change currently being implemented.

148. Philco-Ford will investigate the possibility of using DA pushbuttons to enter commands which initiate a combining/decombining operation.

149. Philco-Ford will request a meeting with FAA and MITRE in order to complete the detailed review of operational software and system procedures involving combining/decombining.

150. Philco-Ford will review to determine if 1.65 ma maximum for I_{cch} is acceptable for TTL devices.

151. Philco-Ford will review to determine if 5.0 ma maximum for I_{cch} is acceptable for TTL devices.

152. FAA will investigate the trunk options which are applicable on the various trunk types specified for the EVS System.

EXHIBIT NO. 19

LETTER FROM MITRE CORP. TO FAA COMMENTING ON PROPOSED CHANGES IN
EVS CONTRACT

MITRE CORP.,
McLean, Va., November 2, 1973.

Subject: EVS specification changes.

Brig. Gen. SPENCER S. HUNN, *Retired*,
Acting Director, Systems Research and Development Service, ARD-1, Federal
Aviation Administration, Washington, D.C.

GENTLEMEN: As you are well aware, it is a continued MITRE policy on MITRE Technical Direction assignments, such as on the EVS, that MITRE act as necessary to assure satisfaction of specified requirements within contract costs and schedules as well as assume responsibility to our sponsor, the FAA in this case, for technical integrity of the end product. Therefore, it was with grave concern

that we first viewed the specification changes proposed by the FAA's "EVS Operation/Maintenance Requirements Ad Hoc Committee". At the direction of FAA's EVS Program Management, we provided support to that committee, in documentation of the proposed changes, in determination of program impact, and in assessing the need for each proposed change. In addition, the changes and the associated budgetary estimates were coordinated with the EVS Contractor, at the suggestion of and with full consent of FAA's EVS Program Management, to assure feasibility of each change, to investigate alternate implementation approaches and ultimately to establish confidence in the budgetary estimates.

Following these initial efforts, MITRE worked with the committee at great length in attempting to eliminate any of the changes that are not essential to operation and maintenance of the ATC system. Through full cooperation of the involved Services and after extensive deliberation, the number of changes was reduced by one third and the impact on contract cost was nearly halved. Now, after a complete assessment of why the changes were not provided for in the specification, summarized in Attachment A, and of why the changes are needed, we are convinced that nonessential changes have been eliminated. It is our considered opinion and our recommendation that the changes be incorporated in the EVS System.

Our remaining concerns are two-fold:

1. Does the increased contract cost invalidate the cost studies which economically justified the EVS Program?

2. What is the best approach for accomplishment of the changes?

These have been considered by our technical staff and answered to our satisfaction.

On the first question, the budgetary estimate for the changes is \$15.2M, within $\pm 15\%$, bringing total contract cost, with the changes, up to \$93.3M. The original budgetary estimate of contract costs was \$89.8M, within $\pm 10\%$, upon which the cost studies were based. Examination of these figures indicates that the total contract cost, with the changes, is within the original budgetary estimate and obviously would not invalidate the cost studies. This is further illustrated by the chart provided as Attachment B, which includes the cost of the changes and illustrates that the changes have little impact on the economic crossover of EVS and Present System costs.

Consideration of the second question above is more involved since a trade-off of time and money must be considered. The two basic approaches that can be considered for changes to the EVS contract are "negotiation" and "directed changes" via use of the "Changes" clause. The former requires an inordinate length of time prior to redirection of the contractor but retains control of cost. The latter provides for immediate redirection of the contractor, but sacrifices control of cost.

A compromise is possible wherein an acceptable not-to-exceed ceiling on cost and schedule is negotiated at which time the contractor is redirected. An estimated 30 days, from initiation of negotiations to contractor redirection, would be required. Negotiation of fixed prices, within that ceiling, for the production options would follow. This approach has an added advantage in that it affords an opportunity to negotiate off-setting cost reductions due to items like reduced sector forecasts and to eliminate minor but troublesome specification and contract language and typographical problems. It is this approach that we recommend.

Should you have questions in regard to our recommendations, we will be pleased to discuss this further at your convenience.

Sincerely,

J. PAUL LOCHER, III,
Associate Technical Director,
Air Transportation Systems Division.

Attachments.

ATTACHMENT A

SUMMARY OF THE SPECIFICATION CHANGES

The proposed specification changes were listed in the vu-graphs presented to ARB (see Attachment A) and are again listed as follows:

1. Intra-Center Conferencing (Expanded Override).
2. Inter-Center Conferencing (Multiple Trunk Accessing).

3. Circuit Status Displays.
4. Increased Voice Page Line Terminations.
5. Meet-Me Conference Circuits.
6. Direct Access Release Pushbutton.
7. Position Initiated Sector Combining/Decombining.
8. "R" Position Jack Preemption.
9. Beep Tone, Recorder Disable.
10. Emergency Frequency PTT Control.
11. BUEC-EVS Common Jack.
12. Headset Acoustic Limit.
13. Optional ZIP Tone For Override.
14. Colored LED Displays.
15. CRT Displays and Medium Speed Printer Capability.
16. Interphone Trunk Maintenance.
17. Additional Communications Capability at EVS Maintenance Console.
18. Automatic RCAG Trunk Restoral.
19. Selective Radio Channel Pairing.

ANALYSIS OF THE CHANGES

Detailed below is a historical review of why each requirement was written into the EVS Specification as it now exists and why it is now being changed.

1. Intra-Center Conferencing (Expanded Override)

The EVS Specification currently requires that up to 2 positions may override a third busy position, going directly into his headset and requiring no action on his part for him to respond. A third overriding position will receive a busy tone. This requirement was known, understood, and agreed to by ATS members of the specification team in the Fall of 1970. Similarly, it was coordinated via NCP #1652. Previous versions of the specification, as far back as December 1965, had similar, if not identical limitations on override. For example, the 18 March 1970 version of FAA-E-2251 (the EVS Specification) represented a completely coordinated set of operational requirements coordinated via NCP #384 and had a limitation of three overriding positions with the fourth receiving a busy. Since this limitation saves money and since handoffs would be automated via the CCC except when shutdown during light traffic periods, ATS agreed to the limitation. Recent comparisons of EVS with the WECO #300 plus freight caused by possible Automatic Tracking outages during busy traffic periods has prompted ATS to up the requirement to at least a minimum of five overriding positions in order to provide for manual handoffs during busy periods.

2. Inter-Center Conferencing (Multiple Trunk Accessing)

The EVS Specification currently requires that when an interphone trunk has been seized by a controller and it is therefore in use, another controller in attempting to access that trunk will receive a busy tone. This requirement is identical to that which resulted from the NCP #384 coordination as reflected in the 18 March 1970 version of the EVS Specification (then labelled FAA-E-2251). To quote that specification, "If the selected circuit is an interphone circuit and is busy, the calling position shall receive a busy". Past versions of the specification, as far back as June 1968, contained the identical requirement and many of those past versions had been coordinated, at least informally.

ATS is now requiring, that multiple access for at least a minimum of five positions, to those types of trunks used for handoffs, be incorporated. The types of lines are type 4-SS-1 out and voice call in, type 5-SS-1 and type 9-voice call. The why's are best discussed in two parts, inter-center and other interphone trunks.

2.1. Inter-Center Trunks

Of first concern is the philosophy to be imposed on EVS to EVS trunks. Dialed calls, either direct access or indirect access, will be via MF confirmation signaling over time-shared trunks directly to the desired called position thus eliminating type 4 and 5 trunks. The first available time-shared trunk would be used for call completion. The grade of service would be controlled by leasing an adequate number of such trunks and would therefore be under ATS control. It is not on these trunks that multiple access is required.

Previous versions of the specification provided for inter-center override on these types of trunks thereby eliminating the need for type 9 voice call trunks

for inter-center. During the Fall 1970 specification rewrite, ATS directed elimination of inter-center override due to jurisdictional problems in reprimanding personnel for misuse of override from adjacent centers. The voice call trunk (hot lines or handoff lines) requirement for type 9 trunks was put into the specification to replace the override. However, since these hot lines would be used exclusively for handoffs or for handling emergencies and since the duration of voice calls for handoffs has an observed worst case average of 18 seconds and since the circuit status would be displayed thereby eliminating attempted accesses of a busy voice call circuit, ATS verbally agreed at that time to the lack of need for multiple accessing of any inter-center trunk. These facts and the resulting agreement are applicable to both EVS to EVS and EVS to WECO No. 300 voice call trunks. The first three comments in the AT-1 letter commenting on NCP No. 1652 support the above (see Attachment D).

2.2 Other Interphone Trunks

During the Fall 1970 specification rewrite effort, ATS policy, per AT-30, was striving year by year to install discrete hot lines from Centers to facilities involved in active Air Traffic Control and this conversion was expected to be complete prior to EVS implementation. These discrete lines would be used exclusively for handoffs and emergencies with the same facts and agreements as stated above for Inter-Center hot lines. However, the gradual separation of these functions from currently existing multipoint lines to discrete hot lines has recently been judged as being too expensive and that has resulted in a policy reversal. Thus, since these discrete lines will not exist for all active ATC facilities by the time EVS is installed and since administrative use and flight data use ties multipoint lines for extensive periods of time, ATS has concluded, rightly so, that multiple access to type 4, 5 and 9 trunks is required in order to handle priority voice traffic.

3 Circuit Status Displays

The EVS Specification currently requires illumination of DA status indicators for DA pushbuttons associated with voice call trunks. When a position is being called by or is accessing or has accessed a trunk his DA pushbutton associated with that trunk, if so associated, will indicate trunk status. However, busy trunk status is not currently provided for non-voice call trunks via visual indication, thus the position must attempt trunk access and if it is busy will receive a busy tone. The exclusion of trunk busy visual indication for non-service call trunks is an *obvious oversight*.

4. Increased Voice Page Line Terminations

The EVS Specification currently requires multiplying each voice call trunk out to up to five loudspeakers where each speaker's location (i.e., which position located at) is independent of the location of the other up to four speakers associated with that voice call trunk. Also, only those positions, which are included in the up to five speakers, would have DA access to the trunk.

Unless all such trunks are hardwired, as in the WECO No. 300, a matrix for reconfiguration of the trunk to speaker multiplying is necessary, as illustrated in the Philco-Ford design. The number five was arrived at during the Fall 1970 specification rewrite effort as a compromise of present system multiplying capabilities in order to keep costs under control in light of the fact that most Centers do not normally multiple to more than five.

The new requirement is for ten circuits which can terminate everywhere (could be hardwired), remaining circuits to terminate in one speaker per sector at up to ten sectors, with all R, D, C, and H positions at each such sector having DA access to those circuits. A maximum of 18 DA at a position could be associated with voice call circuits.

5. Meet-Me Conference Circuits

The EVS Specification currently provides only for Progress Conferencing wherein one position initiates a conference and progressively connects each conferee to the circuit by DA or IA addressing of each conferee. Previous versions of the specifications had Meet-Me Conference capability as far back as 1965. The first informal rewrite committee contained three types of conferencing: Progressive, Pre-Set and Meet-Me.

The Pre-Set Conference is one in which a single DA action or IA of a special conference code would automatically set up a conference and flash all a priori defined conferees. The Meet-Me Conference is equivalent to the Coordinator Circuit provided in the WECO #300.

During the specification rewrite effort in the Fall of 1970, after extensive informal coordination, the committee elected to delete two of the three conferencing modes in an effort to control costs. The Progressive Conference was retained as having the inherent capabilities of the others yet as providing greater flexibility in its ability to call-up or add conferees without apriori arrangements.

6. *Direct Access Release Pushbutton*

The EVS Specification currently does not require a release pushbutton. Release from a call in progress is to be accomplished by depression of any other pushbutton to initiate or answer another call or by depression of the DA pushbutton of the call in progress for simple call termination with no further initiations. A race condition exists for the latter case when the two positions having the DA call in progress, both attempt to release. Unfortunately, the first to hit his DA pushbutton will release while the second hit will reinitiate the call. This is obviously a specification oversight.

7. *Position Initiated Sector Combine/Decombine*

Initiation of Sector Combine/Decombine operations by EVS of the voice communications as currently specified can be accomplished via command from the CCC or in the event of CCC outage via command from an EVS I/O entry device, all in a manner in accord with NAS State A design. The NAS Stage A design, however, does not provide for the independent procedural operations performed in the manual system at the discretion of the sector crew supervisor. With this change, Combine/Decombine will be initiated by the crew supervisor with EVS supplying the appropriate on-line commands to the CCC and configuration data to the CCC at CCC startup.

8. *"R" Position Jack Preemption*

Provision was not made in the current specification for the trainee, trainer concept required at the "R" position for training of "R" controllers. Clearly a specification oversight.

9. *Beep Tone, Recorder Disable*

These features are not provided in the current specification through an obvious oversight. The beep tone is required by FCC regulation whenever a recorder is connected to an FTS or DDD line. The recorder disable must be supplied for supervisory positions for FTS and DDD calls, when the beep tone is not desired, per the PATCO contract.

10. *Emergency Frequency PTT Control*

The current specification makes no special provisions for handling of emergency frequencies. Only after review of the Philco-Ford design and considerable thought did it become apparently desirable to avoid PTT lockout on emergency frequencies by automatic release of the transmitter selector pushbutton after one complete PTT cycle by the controller having selected it.

11. *BUEC-EVS Common Jack*

During the specification rewrite effort in the Fall of 1970 it was agreed that the BUEC should be totally independent of EVS even down to a separate jack. The separate jack has now been judged as operationally unacceptable, hence a bridged termination for a BUEC connection to the equipment side of each jack with radio capability is now required.

In addition, there exist a number of other questions of policy re the BUEC-EVS relationship which must be settled prior to definition of the BUEC enhancement program. The basic issue is to what extent is BUEC considered a backup. It is agreed that it must provide protection against RCAG site isolation, however, should it also backup EVS backroom equipment related to the radio functions and, even further, should it backup EVS position equipment. Even beyond this, how should data re current sector configuration be supplied to it and how should it be used?

12. *Headset Acoustic Limit*

Not currently specified is a limit on headset output as required to protect the controllers hearing. This was not included in the specification since headsets do provide some natural truncation of SPL output by the nature their dbm to db SPL transfer functions. However, some protection is required to limit headset output to about 95 db SPL and since the characteristics of future headsets to

be used by the FAA is at present uncertain, this protection should be provided to a large extent in the position circuits.

13. Optional ZIP Tone For Override

As currently specified a ZIP tone is provided to a position when he is overridden. Since a ZIP tone is also supplied as confirmation of radio transmitter keying it is felt that the desirability of the override ZIP tone may be questioned by some controllers. Therefore, it is to be made an option on a Center-wide basis to be turned on or off by software adaptation data.

14. Colored LED Displays

The evaluation of the desirability of colored LED designations was inadvertently left out of the human factors study requirements. Thus Philco-Ford has elected to provide red, since they are the lowest priced, whereas another color may be found more desirable when the appropriate human factors determinations are made.

15. CRT Displays And Medium Speed Printer Capability

The EVS Specification currently requires maintenance status panels and controls and IOT's at the EVS Maintenance Console, status panels to be mounted in SMMC racks with a scanner interface, and selected status printouts at the SMMC 1052 IOT via queries to EVS via the CCC. These represent maintenance concepts consistent with those of NAS Stage A. Desired is replacement of this concept with one that reflected maximum automation of maintenance via use of high speed colored video displays for status information and fault diagnosing with medium speed printers for generation of required hard copy logs.

16. Interphone Trunk Maintenance

The EVS Specification provides for conventional manual maintenance checks of EVS-EVS trunks. Now identified as valuable to the maintenance effort is automatic checking of all trunks in an EVS-EVS trunk group, when manually initiated by an IO request, with reporting of trunks failing the check with below margin levels.

17. Additional Communications Capabilities At EVS Maintenance Console

Currently provided for is one complete set of voice communications position equipment at the EVS Maintenance Console. Since it has now been identified that two maintenance men may occasionally operate simultaneously at that console, a second set of such equipments are required.

18. Automatic RCAG Trunk Restoral

Currently provided for is continuous monitoring of RCAG trunks which are taken out-of-service when the test tone level becomes submarginal when integrated over a one second time interval. Any further monitoring or restoral of the out-of-service trunk would require manual action. It has since come to light that most failures detected by such an approach will be transient failures causing the need for frequent manual testing and restoral action. In order to control maintenance workload, this is required to be automated by including a ten second integration interval and continued monitoring of out-of-service trunks followed by automatic restoral of out-of-service trunks as spares when levels return to within margins for any ten second interval.

19. Selective Radio Channel Pairing

At the time the EVS Specification was rewritten in the Fall of 1970 and coordinated in 1971, FAA policy was oriented toward splitting of paired frequencies to separate RCAG trunks. Escalating leased line charges caused a reversal of this policy early in FY 1974. Whereas radio channel pairing had not previously been provided for, each RCAG must now be equipped with the selective pairing capability and a kit defined so that frequencies may be paired as the need to do so is identified for each frequency pair at each site.

EVS/PRESENT SYSTEM
ECONOMIC CROSSOVER

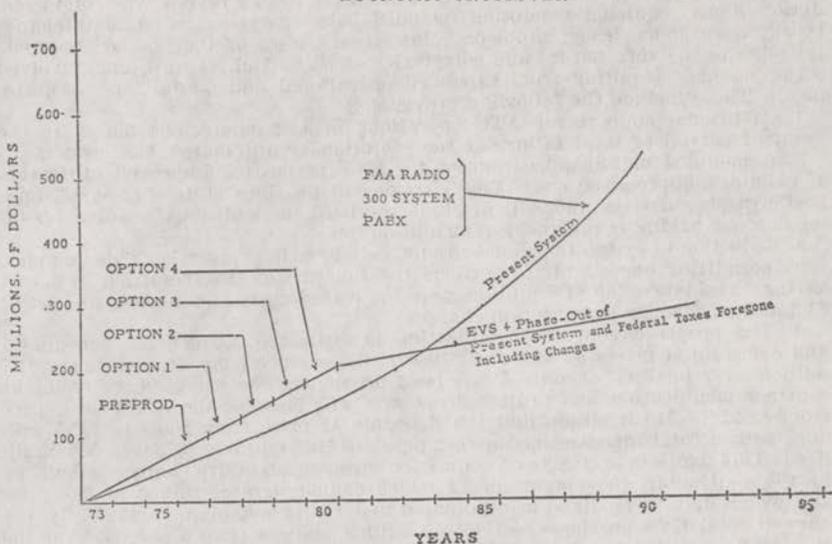


EXHIBIT NO. 20

LETTER FROM FAA ADMINISTRATOR BUTTERFIELD TO UNDER SECRETARY OF DOT
EXPLAINING REASONS FOR INCREASED COSTS IN EVS CONTRACT AND DELAYS IN
DELIVERY SCHEDULE

JANUARY 2, 1974.

Subject: Contract DOT-FA73WA-3202, Electronic Voice Switching (EVS)
Systems.

To: The Under Secretary.

The purpose of this letter is to advise you of recent procurement cost and pending contract changes for operational and maintenance requirements for the Electronic Voice Switching (EVS) System. Before outlining these changes, let me review for you the more pertinent background facts.

a. The contract for the procurement of EVS was awarded on January 2, 1973, to Philco-Ford. The award of the contract was approved by former Under Secretary Beggs. The approval procedure included substantive briefings to Mr. Beggs, who, incidentally, was also the Source Selection Authority. Justification for procurement of the EVS system was based on a projected cost savings to the Government to exceed \$340 million by 1990. The savings will be realized by implementing EVS by 1977 . . . as opposed to continuing today's voice communications systems at the twenty Air Route Traffic Control Centers (ARTCC's). The EVS also will provide voice communication flexibility and considerably improve the present Air Traffic Control (ATC) operation during its gradual transition to the automated environment.

b. The contract is structured in two parts: Schedule I is a \$12.7 million cost-plus-fixed-fee (CPFF) effort covering the design, manufacture, installation, test, and evaluation of a preproduction system at NAFEC; Schedule II is a \$65.3 million fixed price incentive fee (FPIF) effort associated with the delivery and turnkey installation of 21 EVS systems at all ARTCC's and the Federal Aviation

Administration (FAA) Academy. Schedule II has four separate (annual) production option clauses.

c. During April and May of 1973 a preliminary design review was conducted. Action items requiring resolution included both operational and maintenance issues, as well as design problems. Many items were of the "to be expected" type due to the very nature and complexity of EVS. And several items involved major changes resulting from expanded operational and maintenance requirements. These include the following provisions:

1. Additional support for ATC operations in a manual environment in the event of partial or total failure of the evolutionary automated ATC systems.

2. A modified maintenance concept for EVS permitting improved utilization of existing maintenance staff. This change will provide "state-of-the-art" diagnostic display devices and will preclude the need for additional staffing resulting in a cost saving (avoidance) of \$2 million/year.

3. Reduction of leased telephone circuit costs by using "piggy back" techniques, thus permitting one circuit to perform the function of two, resulting in a cost saving (avoidance) of \$1.7 million/year for leased costs and a one-time cost of \$1.5 million for new construction charges.

d. The proposed contract modification is estimated to increase Schedule I and Schedule II prices by \$4.8 and \$10.4 million, respectively. In addition, a \$1.7 million overrun for Schedule I has been projected. The net increase from the contract modification and projected overrun will increase the Schedule I price from \$12.7 to \$19.2 million and the Schedule II price from \$65.3 to \$75.7 million, with a total increase in contract price of \$16.9 million (\$78.0 to \$94.9 million). This figure is exclusive of claims for seven constructive changes submitted by the contractor, the magnitude of which cannot be ascertained at this time and which may be modified or eliminated under this new plan. Incidentally, the current total EVS purchase cost (\$94.9 million) is less than 6 percent over the cost (\$89.8 million) set forth in the original EVS Advance Procurement Plan of February 19, 1971. A recent cost-benefit review confirmed the earlier EVS cost-benefit advantage determination which justified EVS procurement.

e. If these proposed changes are accepted, at least a 6-month delay in the contract schedule is anticipated. In addition, Philco-Ford had projected a 6-month delay due to industry-wide component delivery problems. This will result in a 1-year delay for delivery of the NAFEC system (Schedule I). The resultant delay in the production delivery (Schedule II), will be negotiated, but is expected to be 1 year. Therefore, the date for the first production option will be mid-FY 1977 as opposed to mid-FY 1976, which is currently in the contract.

I agree with the FAA staff that it is in the best interest of the Government to make the foregoing contract changes at this time . . . because of their impact on design and delivery, and on the test and evaluation of the preproduction system at NAFEC. Savings within the NAS Stage A program and the continuing Facilities and Equipment program will cover additional current costs in the EVS contract.

I therefore request that you, as Source Selection Authority, approve the changes detailed in this letter. Of course if you want a more thorough review, the staff is fully prepared to brief you at your convenience. Meanwhile, to minimize further costs, an early solution is obviously rather imperative.

ALEXANDER P. BUTTERFIELD, *Administrator.*

EXHIBIT NO. 21

TWX FROM PHILCO-FORD TO FAA PROPOSING COST REDUCTION ITEMS IN EVS CONTRACT TO OFFSET INCREASED PRODUCTION COSTS

PHILCO-FORD CORP.,
COMMUNICATIONS SYSTEM DIVISION,
Willow Grove, Pa., April 5, 1974.

Attention Mr. J. Schroeder/Code ARD-223.

Consider this as our response to your TWX of 4 April 1974 which requested confirmation pertaining to compliance with 3.12.2.1 of the EVS specification:

(1) The largest system capacity designed to the original or baseline spec would not occupy more than 1,400 square feet including aisle nor would it require

cabinets of height greater than 7 ft., consequently there was no intent to request relief from the spec citation, however;

(2) Items claimed by Philco-Ford as added scope as a consequence of letters of direction of September 28, 1973 will, among other things, necessitate either greater square footage and/or higher cabinets.

(3) These claim items plus the impending 18 changes will cost significantly more than the additional funding which FAA has stated as being available to add to the contract. Philco-Ford has as a consequence suggested cost reduction items which, if accepted, will enable all the claim items and changes to be incorporated in the contract within the overall ceiling price for schedule I plus schedule II, one of these cost reductions is for a simpler and much cheaper packaging/cabinetry design, but which would require square footage in excess of 1,400 square feet for the largest capacity system.

(4) From the foregoing it can be deduced that we cannot do all the claim items and changes within the ceiling of funding FAA has unless all the cost reduction items are acceptable. If square footage cannot be increased and the relevant cost reduction item is therefore not acceptable, a funding problem remains should relief not be found.

It is not Philco-Ford's intent to ever dictate requirements to the customer but merely to realistically present impact of proposed actions. Your continued cooperation toward the resolution of these matters is sincerely appreciated.

FRANK COHEN, *Contract Manager.*

EXHIBIT NO. 22

DOT PROCUREMENT REQUEST OFFICIALLY PROPOSING CHANGES IN EVS
CONTRACT

Read INSTRUCTIONS ON REVERSE NO CARBON REQUIRED PAGE 1 OF 2

DEPARTMENT OF TRANSPORTATION				PROCUREMENT REQUEST NO.	
PROCUREMENT REQUEST PROCESS				4 5322	
1. NAME, PHONE NUMBER, AND ROUTING SYMBOL OF PERSON TO CONTACT G. D. HADORN, ARD-223, 202-426-0986				A. <input type="checkbox"/> NEW REQUEST	
3. ORIGINATING OFFICE DATA No. C-342002				B. <input type="checkbox"/> CHANGE TO PENDING PR NO.	
4. ADDITIONAL INFORMATION *Approved by the person having dual role.				C. <input checked="" type="checkbox"/> MODIFICATION TO CONTRACT OR ORDER NO. 702-PA72WA-3202	
5. APPROVALS				6. COMPLETION AND DESTINATION	
APPROVING OFFICIALS	ROUTING SYMBOL	DATE	INTERNAL ROUTING SYMBOL	7. MATERIALS REQUIRED See notes.	
<i>[Signature]</i> Director, Systems Research and Development Service	ARD-1	5/1/74	ARD-223 ARD-220		
82. ACCOUNTING CERTIFICATION OFFICER			ARD-203		
88		9/7	ARD-200 ARD-55		
9. DESCRIPTION OF ITEMS OR SERVICES				8. GOVERNMENT FURNISHED PROPERTY <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (If "YES," see part 4 of Instructions on reverse)	
ITEM NO. (42)	ITEM OR SERVICE (Include Specifications and Special Instructions)		QUANTITY (43)	UNIT (44)	ESTIMATED COST (45)
67 511	It is requested that a contract modification be negotiated with the Philco-Ford Corp. to incorporate the changes to Schedule I and Schedule II of the contract, and to EVS System Specification, FAA-E-2479 and Amendments 1 through 4 that are included in the following attachments dated April 26, 1974: Attachment A - Changes to FAA-E-2479 due to PDR action items, requests for waivers, corrections, and clarifications. Attachment B - Changes to FAA-E-2479 due to revised operational and maintenance requirements requested by the Operating Services (AAT/AAF). Attachment C - Changes to FAA-E-2479 to incorporate cost-reduction design considerations. Attachment D - Amendment (draft) to the contract.				
10. ACCOUNTING DATA					TOTAL ESTIMATED COST \$6,500,000.00
430.W/3/7040/L37/2481/100/3121 - \$4,912,483 430.W/3/7040/L20/2630/100/3121 - \$1,587,517					<i>Class A NEW ARD 55 5/1/74</i>

FORM DOT F 4200.1

ATTACHMENT F

CHANGES TO FAA-E-2479 THAT CAN BE ACCOMMODATED IN THE EVS
SYSTEM DESIGN

NOTES TO THE CONTRACTING OFFICER

1. Attachment A is a compendium of all currently approved Requests for Waivers (RFW), letters of direction, and items of clarification concerning the

contract and Specification FAA-E-2479 which have been formally issued by the Contracting Officer. Also, there are changes to FAA-E-2479 that result from 152 separate, preliminary design review (PDR) action items, and typographical errors. In addition, other clarifications are included which were requested by Philco-Ford and agreed to by ARD personnel during recent technical coordination meetings held with the contractor. These changes do not have a significant or material effect on FAA-E-2479 and are considered to be within the intent of the present contract requirements. All of the above are incorporated as 149 separate changes by paragraph to FAA-E-2479.

2. Attachment B includes a group of 18 general areas of functional change to FAA-E-2479. Each change includes the required modification to FAA-E-2479, by paragraph, to provide the expanded operational and maintenance functions and system capabilities that have been requested by the Operating Services (AAT and AAF). Attachment E includes a narrative description of each of the 18 general areas. It also includes a justification for each change to provide the required expansion in operational and maintenance capabilities.

Estimated prices to incorporate these expanded requirements in the contract are as follows:

Preproduction system (item 1) (schedule I)-----	\$4.8M
Production Systems (items 2-22) (schedule II)-----	10.4M
Total -----	15.2M

3. Attachment C incorporates 27 general areas of change to FAA-E-2479 and the contract Schedules I and II. These changes should result in significant price reductions to the contract, exclusive of the changes listed in Attachments A, B, D, and F. These 27 cost-reduction changes have been selected from a listing of 32 changes that have been recommended by Philco-Ford. These Philco-Ford changes are identified as follows:

Accepted: PF-1, 3, 10, 14, 15, 16, 21, 23, 24, 26, 28, 29, 31, 34, 35, 36, 38, 44, 45, 57, 58, 60, 61, 62, 65, 66, and 67.

Rejected: PF-43, 46, 51, 55, and 56.

Also included is a major cost-reduction that impacts on FAA-E-2479, and results from reducing the maximum EVS system size from 125 ATC sectors to 90 ATC sectors. This change is based on recommendations by AAT-1 to reduce the EVS sizing requirements to be consistent with NAS Stage A equipment procurement quantities. Sizing reductions and changes to the ATC sector configuration are reflected by changes to FAA-E-2479, Table 1, and Attachment C to this PR. All cost-reduction changes do not compromise current specification requirements in terms of EVS specified functions, reliability, maintainability, system performance, cutover, quality of materials, safety, or workmanship.

4. Attachment D includes recommended changes to be incorporated into the contract. A draft of the proposed Contract Modification No. 4 is included with the following changes:

(a) Revised Articles I, II, III, and IV (retyped with all prices and schedule dates omitted).

(b) Contract Modification No. 1 has been included in the revision.

(c) Several page revisions to Articles V through XXII.

(d) Revised Attachment A to the contract, including new Tables A and B to incorporate reduction/change in deliverable quantities of equipment for each of the 22 EVS systems.

(e) Revisions to Attachment B (System Installation and Checkout).

(f) Revised Attachment C (NAFEC Preproduction System Requirements).

(g) Revisions to Attachment E (Training Program).

(h) Revised Attachment H (Reversible Cutover Method).

(i) A new option, Item 46, RCAG Equipment (option), has been included in Schedule II (Article I) based on a request from AAF. The estimated unit price per equipment is \$20K, with a total option quantity price of \$1M.

5. Attachment E, as indicated above, is provided as background information for the Contracting Officer and should not be incorporated into the contract modification. Pricing estimates for each of the 18 changes (Attachment B, above) were provided to ALG-340 in a memorandum dated February 6, 1974, from ARD-223.

6. Attachment F includes new requirements to FAA-E-2479, which it is believed can be incorporated into the present EVS system design at minimal or no cost.

7. It is requested that Attachments A, B, C, D, and F to this PR be forwarded to Philco-Ford to form the basis for contract negotiations and "interim" Contract Modification No. 4. At completion of all negotiations, Modification No. 5 will be issued; this modification will include all specification changes in the form of a complete reissuance of the EVS Specification, either as FAA-E-2479a or as Amendment-5 of FAA-E-2479, whichever is the more appropriate. The above is in accordance with discussions with ALG-340 on this subject.

8. In order to conserve present expenditure of funds under Schedule I of the contract and expedite the incorporation of changes required in FAA-E-2479, it is recommended that the "changes" clause provision of the contract be used to establish a price agreement on a "not-to-exceed" basis for both Schedule I and Schedule II which is mutually acceptable to the Government and the Contractor.

DELIVERY SCHEDULE

1. It is requested that the Contractor submit a revised delivery schedule for all equipment and documentation deliverables required under Schedule I and Schedule II. (The Contractor should insert his revised delivery schedule requirements in the appropriate blank spaces of contract modification—Attachment D of this PR.) The revised scheduling, if acceptable to the Government, should be incorporated as part of the interim contract modification along with the "not-to-exceed" pricing for Schedules I and II.

2. The revised scheduling should place the contract in a current status and reflect all known delays including the following:

(a) Existence of at least a 6-month slippage due to component deliveries that have been previously reported by Philco-Ford.

(b) System design modifications to incorporate the 18 changes included in Attachment B to this PR.

(c) Slippages due to the Contractor's termination of the Univac subcontract. A revision in the delivery schedule is consistent with the Administrator's letter to the Under Secretary, dated January 2, 1974, which outlines the proposed changes to the EVS contract.

3. As a minimum, it is requested that the Contractor submit a revised delivery schedule in accordance with 1, above, and include delivery schedule revisions to the following paragraphs of the EVS Specification, FAA-E-2479:

(a) Appendix E.

(b) paragraph 4.1.

(c) paragraph 4.3.

(d) paragraph 4.3.1.1.1.

(e) paragraph 4.3.1.1.2.

(f) paragraph 4.3.1.2.

(g) paragraph 4.3.2.

4. The sequence of delivery of the 21 EVS systems for Schedule II has been revised in Attachment D to reflect changes requested by AAT. The quantities of systems as stated presently for each of the four yearly options remain unchanged. If the Contractor indicates that there will be increased costs to make this change, the sequence of system deliveries shall be retained as presently required in the contract.

5. The following are acceptable changes in the contract delivery schedule. It is recommended that these revised dates be forwarded to the Contractor to assist him in formulating a revised schedule for Government review.

(a) Complete factory system tests (item 1) (within 38 months).

(b) Complete on-site system tests and Government acceptance of item 1 (within 42 months).

(c) Award production option No. 1 (schedule II) (within 42 months).

(d) Award production option No. 2 (schedule II) start delivery option No. 1 production systems (within 54 months).

(e) Award production option No. 3 (schedule II) start delivery option No. 2 production systems (within 66 months).

(f) Award production option No. 4 (schedule II) start delivery option No. 3 production systems (within 78 months).

(g) Start delivery option No. 4 production systems (within 90 months).

The above schedule revisions are based on the following assumptions and considerations:

(1) A critical design review is required.

(2) Switching assembly and common control design qualification tests are required.

(3) Except as indicated in (6), below, all factory tests will have been completed for item 1.

—All deficiencies or unacceptable conditions, if any, shall be thoroughly documented. These include any exceptions in functional requirements, system performance, materials, construction, workmanship, etc.

—“Fixes” for all deficiencies and unacceptable conditions shall be identified.

—At completion of factory tests, Operating Services personnel (AAT/AAF) will be permitted a 120-hour “hands-on” familiarization period with the system.

—The Government may exercise training option (item 35c) for Academy instructor personnel. Exercising this training option prior to completion of T&E at NAFEC and the Government's acceptance of Item 1 will allow EVS course material required for the Academy to be developed in a timely manner and more consistent with ATR and AAF requirements.

(4) At completion of factory tests, item 1 will be shipped to NAFEC for completion of system tests by the contractor and on-site evaluation by the Government.

—60 days to pack, ship, install, and check out at NAFEC.

—30 days for completing on-site system tests per FAA-E-2479.

—30 days for the Government to conduct its T&E of the EVS system with the Contractor in a standby mode, prepared to perform technical services where required (item 25, Option).

(5) The common control subsystem and its associated software to be delivered with item 1 shall be used during all factory and on-site tests.

(6) System reliability tests for item 1 may be postponed at the Contractor's option until after completion of T&E at NAFEC. Reliability and maintainability demonstration tests can be conducted at NAFEC by the Contractor, but at his own risk in terms of retrofitting any deficiencies or design changes to item 1 and to production systems, if ordered.

(7) Release of Schedule II funds for procurement of long lead items, on a sliding scale basis, may be required prior to acceptance of item 1 in order for production quantities to be delivered 12 months after full production release for Option 1. If so, the Contractor should be requested to provide the following data for Government review on this issue:

(a) Long lead items, release dates, dollar amounts, associated risks, and termination liabilities.

(b) Maximum dollar limitation.

A no-cost change to delay award of the production Option 1 (Schedule II) from 35 months from date of contract to within 42 months from date of contract.

6. The Contracting Officer is requested to examine potential methods that may be applied to Schedule I of the contract to “encourage” the Contractor to perform on time in accordance with key milestones listed above under items 5a and 5b. Since these milestones are considered to be realistic and achievable, the objective is to stay within the estimated cost-to-complete that has been approved for Schedule I; i.e., 19.2 million dollars. Two possible methods are suggested:

(a) The Government should be permitted to defer its decision to award Schedule II Option 1 at the 42-month based on a day-to-day slippage resulting from all nonexcusable delays chargeable to the Contractor that impact on the 38-month milestone. Similarly, delays caused by the Government should be recognized in the form of some negotiated fixed dollar value per day for each day's delay chargeable to the Government.

(b) Convert the present CPFF Schedule I phase to a fixed-price form of contract.

POTENTIAL CLAIMS

The ALG-340 letter to the EVS Project Manager, ARD-223, dated December 3, 1973, cites seven (7) general areas of potential claims that Philco-Ford considers to be an increase in scope and will impact on the fixed-price phase of the contract, Schedule II. These potential claims are predicated in part on several letters from the Contracting Officer which have directed the Contractor to revise the preproduction model design approach to meet requirements of FAA-E-2479. There is concern over these potential claims; however, it is believed to be feasible that as a result of the negotiations, the Contractor may be able to either negate all potential claims to date against the Government or the residual areas of potential claim will be minimized.

FUNDING

1. This PR provides the estimated \$6.5 million in funds required for Schedule I to incorporate all changes requested for the Preproduction Model, Item 1. Estimated funds required for Schedule II to incorporate all changes requested for the 21 production systems is \$10.4 million. The revised total contract, including options, is as follows:

Schedule I, preproduction system.....	\$19. 2M
Schedule II, production systems.....	75. 7M
Total	94. 9M

2. It should be noted that ARD-1 has forwarded to ALG-1 PR No. C-340004, which provides authorization for Philco-Ford to expend up to \$500K of Schedule I option funds currently provided for in the contract. The PR for \$500K is a loan against the above-referenced \$6.5M associated with this PR. It is understood that the \$500K option moneys will be returned to Schedule I when the requirements of this PR are picked up in Contract Modification No. 4.

ADDITIONAL NOTES TO CONTRACTING OFFICER

1. It is requested that Contractor's cost-proposal submitted in response to this PR include an itemized selling price and/or cost savings for each of the 18 changes (Attachment B) and cost-reduction items (Attachment C).

2. Delete Attachments G and J to the contract. These changes are in accord with a letter to Philco-Ford from the Contracting Officer, dated March 2, 1973.

EXHIBIT NO. 23

LETTER OF APRIL 16, 1974, FROM NORTH ELECTRIC CO. TO FAA ADMINISTRATOR BUTTERFIELD PROPOSING THE ASSUMPTION OF PRODUCTION OF THE EVS CONTRACT

NORTH ELECTRIC Co.,
Galion, Ohio, April 16, 1974.

To: Federal Aviation Administrator, Washington, D.C.

Attention: Mr. Alexander Butterfield, Administrator.

Subject: FAA Electronic Voice Switch Program.

GENTLEMEN: Recent developments with the FAA Electronic Voice Switch Program as reported in various trade periodicals and by FAA officials have prompted us to review our position with respect to the EVS program. It has occurred to us that the results of this review and our activities over the past several months may be of interest to you and may offer the FAA several viable alternatives with respect to the manner in which the EVS program is now being pursued. These activities and alternatives are outlined in the following paragraphs.

As a result of discussions with Philco-Ford and FAA officials during the past December and January, North Electric Company was solicited by Philco-Ford for a processor system to be used in the Electronic Voice Switching system. We understand that several other firms were also solicited for a processor to replace the Univac processor originally intended for use in the EVS. North Electric currently has in production two specialized communications processors for use in telephone switching systems in sizes up to 70,000 trunks; however, these processors are designed to intimately interoperate with North Electric designed switching matrices and software programs and have not previously been sold as separate items. After careful consideration of Philco-Ford's request, we concluded that the technical risk associated with separating the North Electric designed processor from our matrix and software organization was substantial and to concur in such an approach could well lead to additional delays and cost increases. We therefore chose to offer to Philco-Ford a processing subsystem, matrix subsystem and software package incorporating all of the proposed changes to the FAA specification, which were provided to us by the FAA on February 11, 1974. The equipment proposed to Philco-Ford was essentially the same as that originally proposed to the FAA and judged by FAA evaluators to fully satisfy their requirements. Considering that our price of \$5,307,700 for Phase I and \$16,169,900 for Phase II included substantial and important hardware subsys-

tems and software programs, and also considering that the offer to Philco-Ford was responsive to the latest FAA changes, we felt that the offer was most competitive and that Philco-Ford would be receptive to such an offer. It now appears that such is not the case and that Philco-Ford has chosen to reject all offers and embark on a development program for the processor system. This, in our opinion, adds a considerable risk factor to the program which will eventually manifest itself in further delays and cost increases.

As an alternative to the above, we would suggest that the FAA assess the total performance, technical and cost risk associated with the current EVS program as opposed to other approaches that are available to the FAA. To assist in this evaluation, we wish to take this opportunity to update the cost proposal submitted by North Electric on 14 November 1972 and included as an attachment.

At that time our estimated cost plus fixed fee for Schedule I of the EVS program was \$15,494,477. Since that time we have substantially completed work on two major switching programs (SAFEGUARD and TRI-TAC), both of which contain significant design elements relating to the EVS program. Completion of these programs also places us in a position at this time to provide the radio matrix and position equipment designs thereby substantially reducing the estimated technical cost previously quoted for this task. The impact of the proposed FAA changes on our design has been estimated at \$750,000 for Phase I. Labor and material cost increases resulting from inflationary factors over the last 18 months has also been considered. Both the FAA changes and these inflationary increases are offset by the reduced technical expense referenced above thereby substantially maintaining our Schedule I cost plus fixed fee estimate of approximately \$15,500,000.00.

Estimated costs for fully compliant EVS systems in accordance with Schedule II have been revised to include estimated inflationary increases and proposed FAA changes and are summarized below:

November 14, 1972 price-----	\$70,138,905
Estimated increase for FAA changes-----	3,900,000
Estimated inflationary increases-----	3,250,000
Revised schedule II estimate-----	77,288,905

It should be pointed out that the above estimates are for a fully compliant EVS system. North Electric has previously suggested that a "Code Switch" matrix, previously used for both military and commercial applications and currently in volume production, be used for the radio matrix. Although this does require a relaxation in the time required to reconfigure the sectors, it does not sacrifice other performance parameters, reliability or availability. The Schedule II cost reduction utilizing the "Code Switch" matrix is estimated to be \$3,000,000.

We would also like to point out that further reduction in our Schedule II price is possible should the FAA approve changes reportedly being suggested by Philco-Ford. Most significant of these are (1) replacing the administrative support matrix with a commercial matrix, (2) replacing two-part connectors with less reliable one-part connectors, (3) replacing military specification type transformers, resistors, and headsets with commercial type components, (4) reducing the crosstalk rejection requirements, and (5) installation of the first switch at the Oklahoma City Academy rather than at NAFEC.

In our opinion, Items 1 thru 4 above significantly reduce the performance, reliability, and availability of the EVS system to the point where it would be difficult to substantiate the need for the development of the EVS system. Item 5 introduces a risk that the small training system for the Academy will not sufficiently test the design to assure that larger systems will perform satisfactorily. Although we cannot concur that these changes should be made, we have estimated that they should further reduce the Schedule II price by \$7,500,000 if they were to be approved by the FAA.

North Electric remains most anxious to participate in the FAA Electronic Voice Switching program. It has occurred to us that the FAA may, at this point, wish to involve the extensive experience of the Bell organization in the EVS systems design. Should this be the case we, of course, would be receptive to, and experienced in, working with AT&T. North Electric would also be willing to consider utilizing portions of the design completed by Philco-Ford that do not significantly impact our system design or increase the total program cost.

Please be assured of our willingness to meet with you or your representatives at your earliest convenience to discuss any aspect of this proposal. We are confident that even at this time it could be mutually beneficial for North Electric to participate in the EVS program.

Very truly yours,

C. A. CONRY, *Vice President.*

EXHIBIT NO. 24

LETTER FROM FAA TO PHILCO-FORD CO. SEEKING CLARIFICATION OF PROPOSED
CONTRACT CHANGES

JUNE 28, 1974.

Mr. PHILLIPS EASTMAN,
Vice President and General Manager,
Philco-Ford Corp.,
Willow Grove, Pa.

DEAR MR. EASTMAN: This letter responds to the proposed modifications to the EVS Contract DOT-FA73WA-3202 set forth in Mr. E. L. Montgomery's letter dated June 24, 1974. The proposed contract changes raise several significant issues which require clarification before we could agree to any contract modification. These issues are briefly discussed below.

1. The proposed CPIF contract arrangement for Schedule I should unequivocally establish a cost ceiling to the Government of \$26.4 million. This would be an absolute ceiling cost to the Government regardless of whether or not factory tests discussed below in Item 2 are completed by the 42nd month after date of contract. Philco-Ford should absorb all costs above this ceiling and guarantee to complete satisfactorily *all contract* requirements of Schedule I.

2. A production release for the initial Schedule II option must be based on completion of a significant contract milestone, and not a date. To this end, and in accordance with our prior discussion on the matter, this key milestone should be satisfactory completion of all factory acceptance tests, excluding reliability-maintainability-availability (RMA) tests. Should there be a slippage in the factory acceptance test milestone, it is our understanding Philco-Ford will absorb all costs that may impact on the production design should the Government exercise the first production option at your proposed 42nd month. Slippage of the 42-month milestone should also result in a day-for-day slippage in all succeeding milestones and option dates.

3. Specifics are lacking regarding the proposed fifty-fifty fee-sharing arrangement. At what level does the fifty-fifty arrangement start and what percentage is fee earned below this level?

4. What cost reductions are being referenced in the letter? We assume the cost reduction items are those incorporated in the Contracting Officer's RFP, dated May 13, 1974, with the EPABX deleted per our TWX dated June 14, 1974.

5. The \$10.4 million reference we understand is the total increase for Schedule II, which, if so, would equate to a new firm-fixed-price of \$75.7 million for all production options.

6. The total dollar amount and associated schedule involved in all production materials for a single buy mode has not been clearly established. Based on discussions, we understand the advance of funds for materials you are requesting amounts to \$35 million, which must be released by the 42nd month, assuming schedule is achieved. Also, we understand there is the need of a long-lead item release for procurement of materials starting the 32nd month after contract, in order to meet a 54-month initial production delivery.

7. The Schedule II price should clearly specify the measure of escalation that has been included. We interpret your letter as indicating there is a 6 percent escalation factor included in the \$75.7 million for Schedule II (item 5 above). If escalation has not been included, this fact should be clarified.

In summary, the above issues must be explicitly defined before we could agree to any further contract modification. Your response to this letter is requested as early as possible. Please note that nothing in this letter should be construed as modifying the requirement of the RFP, and your response to the RFP should be in consonance with your response to this letter.

Sincerely,

(Signed) ROBERT W. MEIER,
SPENCER S. HUNN.

For Director, Systems Research and Development Service, ARD-1.

EXHIBIT NO. 25

TOTAL PROGRAM COST STUDY CONTAINED IN PROJECT PLAN—TANDEM ELECTRONIC VOICE SWITCHING [EVS] SYSTEM, PREPARED BY FAA, JUNE 1, 1973

TABLE 12-1.—Total program cost summary (through fiscal year 1982)

I. F. & E. Costs (contract cost)-----	\$78,022,969
II. O. & M.—Maintenance (regions) ¹ -----	17,778,000
III. TLA liabilities (regions)-----	9,700,000
IV. FAA support:	
(A) Schedule I (fiscal years 1973-76):	
1. System installation and checkout, and site preparation (NAFEC)-----	200,000
2. System evaluation (NAFEC)-----	500,000
3. System cutover and acceptance (NAFEC)-----	200,000
4. Software adaptation (NAFEC)-----	300,000
5. ARD—Engineering and management (headquarters)-----	3,003,000
Subtotal-----	<u>4,203,000</u>
(B) Schedule II (fiscal years 1976-82):	
1. System installation, checkout, and site preparation (21 systems) (regions)-----	2,100,000
2. System cutover and acceptance (regions)-----	2,000,000
3. Software adaptation (regions)-----	1,025,000
4. AFS engineering/program management/training (headquarters)-----	3,071,000
Subtotal-----	<u>8,196,000</u>
V. Total EVS program costs (fiscal years 1973-82):	
A. Contract costs-----	78,022,767
B. TLA-----	9,700,000
C. FAA support-----	<u>12,399,000</u>
D. O. & M. (FAA) ¹ -----	<u>7,778,000</u>
Total program-----	<u>117,899,969</u>

¹ O. & M. maintenance figures do not include costs for continual training at the academy or other training costs. Costs for trainee time are included in item (B) 4 for Contractor provided training programs, per attachment E of the contract.

EXHIBIT NO. 26

RISK ASSESSMENT OF PHILCO-FORD CONTRACT PROPOSAL AND PERFORMANCE
PREPARED BY EVS PROGRAM MANAGER

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., June 27, 1974.

In reply refer to: ARD-223.

Subject: EVS Contract DOT-FA73WA-3202, risk assessment.

From: EVS program manager, ARD-223.

To: ARD-200 through ARD-220.

Per your request, enclosed is our update of the technical risk factors associated with the EVS procurement program. We have highlighted only those prevailing risk factors which potentially could have a major impact on the contractor's performance in terms of cost and schedule.

Our assessment has been coordinated with inputs from the EVS System Engineering Team and MITRE.

Enclosure.

J. F. SCHROEDER.

RISK ASSESSMENT OF PHILCO-FORD'S EVS PREPRODUCTION SYSTEM DESIGN,
MANAGEMENT, AND CONTRACT PERFORMANCE

GENERAL

There are several risk areas that have been identified with Philco-Ford's contract efforts to date that are associated with the design and development of the preproduction EVS System. Major problem areas are listed below. They are considered to be high risk factors and are identified as "old problems." These problems still prevail today, nearly 19 months after date of contract (DOC) and after an expenditure of \$12 million. Other "new problems" are also identified below, resulting from either the functional specification changes requested by the operating services or those cost-reduction specification changes that Philco-Ford has recommended to FAA in order to stay within the additional funding of \$6.5 and \$10.4 million for Schedules I and II, respectively, that has been approved by DOT.

High risk is defined as being associated with Philco-Ford development activities which have never been implemented in an operational circuit switching system and, thus, have potential impact on schedule and cost during development of the preproduction system.

This risk assessment reflects the coordinated viewpoint of the EVS Program Manager and members of the EVS System Engineering Team.

OLD PROBLEMS

1. *Lack of development progress*

(a) *Switching assemblies.*—There were four matrices in the original design, and a total of five are now proposed for the new design. However, the development has not been completed, and there are no completed assemblies available for test. Switching elements (part of an assembly) were not completed until the 13th month, approximately 9 months late. Note that the required FAA specification changes have not impacted on the basic approach to the switching element or switching assembly design.

A Philco-Ford evaluation with 20 switching matrix cross points (elements) was conducted this month (18 months after DOC). Tests disclosed five problem areas in the pseudo-assembly configuration. The problems are centered around grounding, noise, and crosstalk within the assembly model. (The contract requires tests with a 100-termination assembly to start 6 months after DOC.) Philco-Ford believes they have identified design fixes for each of these problems which they plan to validate in August 1974, again with only 20 terminations using non-deliverable hardware, and not the 100 terminations that are required. Philco-Ford has proposed formal assembly tests would not start until 32 months after DOC.

(b) *Common control.*—Philco-Ford terminated their common control (CC) subcontract with Univac 12 months after DOC for technical reasons, e.g., non-compliance with several specification requirements. The contract requires the CC assembly to be tested starting 8 months after DOC. No formal tests were witnessed by FAA.

Philco-Ford has selected their 102 AUTODIN processor to replace the Univac AN/YUK-15. It will be redesigned and repackaged for the EVS CC. This approach is considered to be a high-risk activity due to the significant hardware and software problems that can be expected in "speeding up" a 10-year old discrete-component design and modifying the 102 software from a message switch to the call-processing switch functions required for EVS. The schedule for completion of the 102 redesign with integration tests as a part of the EVS is proposed by Philco-Ford for 34 months after DOC.

2. *CMOS/SOS*

One of the three CMOS/SOS LSI devices has been reported to have been successfully tested. However, this device will not be used as a result of one of the proposed cost-reduction items. Philco-Ford is currently incorporating changes in the artwork (masks) of the remaining two LSI devices to satisfy design

requirements. The contractor has been unable to date to conduct successful performance tests on a sufficient number of these LSI devices to validate the logic functions required by the devices. Last October, Philco-Ford projected completion of all CMOS/SOS development by March 1974. There are no data to support that Philco-Ford has resolved their problem in order that the sub-contractor, INSELEK, can proceed to manufacture the required number of each type of device for certification and approval. It is significant to note that all control information to and from the common control requires the use of CMOS/SOS devices. Should this design effort with the new SOS technology fail, Philco-Ford's fallback alternative is to use the conventional CMOS devices. If this alternative were required, Philco-Ford has estimated an 18-month delay in delivery and a major increase in floor space, cabinets, cabinet wiring, circuit design requirements, and costs.

3. Philco-Ford management

Several apparent deficiencies prevail in the Philco-Ford management or its procedures to effectively control contract performance and associated costs to date on Schedule I. Several obvious examples which support this are:

(a) Ineffective accountability and control.—This problem is accentuated from FAA's funding standpoint with a CPFF contract for Schedule I. A recent audit report confirms that, because of Philco-Ford's administrative procedures in use on this contract (and on all other Government contracts), it is not readily possible for the Government to identify from present cost data available where the various resources are expended against the EVS subsystems. Only through an extensive study of cost and control data involving significant cost expenditure could this information be extracted in order to determine the effectiveness of Philco-Ford management and its utilization of manpower and materials.

(b) There is no conclusive evidence to indicate that the Philco-Ford management is applying the required and FAA-approved System Engineering Management Plan (SEMP). Several examples are:

Two or three iterations of the EVS power subsystem;

Lack of management control and/or program visibility allowed the 1,400 square foot floor space limit to increase to 2,000 square feet, notwithstanding extensive use of space-saving LSI devices;

The uncontrolled "take it or leave it" attitude by Philco-Ford management that additional floor space is required, regardless of FAA's problems associated therewith; and

To date, approximately 35 documents of one form or another have been submitted by Philco-Ford as deliverable items under the contract. Only three of these documents were of sufficient depth, detail, and/or accuracy to permit their approval. This unsuccessful effort on Philco-Ford's part represents a considerable uncontrolled expenditure of funds.

NEW PROBLEMS

1. Override and multiple position access of Service F trunks

This new functional requirement is considered to be an application engineering effort by Philco-Ford using known technology. However, this technique has never been accomplished in its application to call-processing switching networks. The problem of success in applying this technique is the software and network controller design complexities to establish the required multiple connections within the network (not the well-known conference-bridging techniques) on a cost-effective basis. The basic risk is the impact on scheduling should an alternate approach be required to provide the function. FAA will probably not know whether Philco-Ford's present approach will be successful until the critical design review, which is presently planned by Philco-Ford for 29 months after DOC.

2. RCAG control functions

This cost-reduction item results in changes in the existing system design, which will allow each trunk devoted to a split or pair frequency to contain all logic for the following control functions:

PTT.

Main/standby.

Trunk restoral.

Automatic split/pair operations.

The basic risk assessment as viewed at this time is the effectiveness of this untried or unproven concept in the real world of leased transmission facilities. The basic risk to the Government is a schedule impact should Philco-Ford fail in this approach and be required to fall back to their original design, which is the classic common data channel approach that was originally specified. It is significant to note that the Government's risk is high since only limited tests to validate the operational acceptability can be conducted at the Philco-Ford plant if the production option is to be exercised by the 42nd month.

3. Schedule risk

It will not be possible to conduct any on-site system tests prior to a full production release. This automatically escalates the Government's risk that unresolved problems will remain until a more comprehensive set of test and evaluation exercises are conducted at NAFEC (or a field site) to validate all external interfaces and operational concepts.

4. Philco-Ford management

In addition to the "old problem" discussed above, the "new problem" aspect is there is little evidence indicated during recent discussions with Philco-Ford at the working level that they will meet specification requirements. The basic concern which has come through to FAA loud and clear so many times is that the normal engineering disciplines are being overwhelmingly preoccupied with the least-cost design that benefits Philco-Ford. These designs are not necessarily cost-effective in meeting specification requirements.

CONCLUSIONS

1. There are no identified design or development activities being pursued by Philco-Ford which are considered by the Government to be beyond state-of-the-art. The EVS Program was represented to FAA management and approved on the basis of being an application engineering of current production technology, and not a development contract.

2. There are development activities of state-of-the-art techniques which Philco-Ford has elected to pursue to minimize their costs while increasing the risk of failure, at the Government's expense. This is evidenced by the following cost-reduction examples:

- One-piece printed circuit boards.
- Reduced reliability testing.
- Develop new CMOS/LSI device for position equipment.
- Delete common data channel for RCAG.
- Non-EMI cabinet design for back-room equipment.

SUMMARY

Based on past experience and Philco-Ford's performance to date on the contract, the above items will remain high-risk issues until it is demonstrated that Philco-Ford's management posture has changed and is evidenced by engineering and cost controls. These changes must demonstrate Philco-Ford's intent to fully meet specification requirements within the new cost and schedule being considered. Without clear indication of this, and based on past experience, there is no assurance that a responsive EVS System will be provided within the time frame and costs yet to be negotiated.

EXHIBIT NO. 27

MITRE CORPORATION REVIEW OF PHILCO-FORD'S SELECTION OF COMPUTER PROCESSOR
AND REFUTING OF ALLEGATIONS THAT FAA HAD EXPANDED REQUIREMENTS

THE MITRE CORPORATION,
McLean, Va., June 3, 1974.

D44-0889.

Mr. DONALD W. TISDALE,
ARD-50, Technical Officer, Federal Aviation Administration,
Washington, D.C.

Attention: Messrs. J. F. Schroeder, ARD-223, G. D. Hadorn, ARD-223, J. Yevonishon, ARD-223.

Subject: MITRE Comments on the Philco-Ford "Report on Processor Selection for EVS Programs" (TOS #062-45A)

GENTLEMEN: We have reviewed the subject report provided to the FAA via Philco-Ford Letter No. FC:74-565, dated 17 May 1974. This review has found the report's substance insufficient for either concurrence or nonconcurrence with the conclusions stated therein. This in no way is intended to imply that we disagree in principle with the Philco-Ford decision to use the Philco 102/102M Processor as redesigned and repackaged to satisfy EVS Contract requirements and nomenclatured the "ATC-021". This agreement in principle is reinforced by the report, which justifies that selection, assuming that the ATC-021 Processor is responsive to EVS Contract requirements. However, to judge its responsiveness to the requirements, one would need to know what the ATC-021 Processor and its memories, peripheral devices, peripheral device controllers, interfaces and its supporting software are as packaged and configured for the EVS System application. This is the area wherein lie the major deficiencies in substance of the report.

To be specific, an identification of the proposed ATC-021 should have been provided. This might have been achieved by inclusion of the following:

1. Summary specifications of the hardware and supporting software of the existing Philco 102/102M Processor including performance, environmental, functional, reliability, component and packaging specifications.
2. Identification of those specific areas of new design or repackaging required to produce the ATC-021 and its supporting software starting from the existing Philco 102/102M.

Or, as an alternative, detailed specifications of the ATC-021 and its supporting software could have been provided to satisfy the intent of 1. and 2. above while including little or no descriptive material for the Philco 102/102M.

In addition to the above, the following types of information are required.

3. An analysis that conclusively demonstrates that the proposed ATC-021 configuration will meet the requirements of FAA-E-2479 and identifies any areas of those requirements where deficiencies or deviations may be expected. Where deficiencies or deviations are identified, they must have companion analyses or models with supporting data as necessary to conclusively demonstrate that the functional, performance, reliability and maintainability requirements of FAA-E-2479 are achieved.

4. A program plan, possibly the one referenced in the report, that includes a test and quality assurance program designed to verify satisfaction of the Philco-Ford common control specification prior to integration into the EVS. Also included must be a technical milestone chart for the development, test and integration of this subsystem. This program plan would primarily be intended to demonstrate, to the FAA's satisfaction, that Philco-Ford has a firm grasp on the tasks involved, that the development of the ATC-021 is "doable" and that a reasonable probability of accomplishment within the necessary schedule exists.

In summary, MITRE has no basic disagreement in principle with selection of the ATC-021 Processor. However, we cannot assess responsiveness of the ATC-021 Processor to the EVS requirements with the information made available via the subject report.

As an aside, an important issue related to the processor selection is again broached in the Philco-Ford report and its letter of transmittal. The issue, which reappears at each available opportunity, revolves around the Philco-Ford allegation that requirements were expanded by Contracting Officer letters dated 28 September 1973. Those allegations were correctly and efficiently refuted when initially made. However, since they have reappeared on numerous occasions, we recommend that your EVS Program Management Office consider the need and desirability for further rebuttal. Our staff are available to provide any assistance necessary in this regard.

While no response to this letter is necessary, we are available at your convenience for any discussions required in this regard.

Sincerely,

F. E. IRISH,

Project Leader, NAS Telecommunications and Systems.

EXHIBIT NO. 28

LETTER FROM FAA CONTRACT OFFICER TO PHILCO-FORD OUTLINING PROPOSED
CHANGES IN EVS CONTRACT

MAY 13, 1974.

FRANK COHEN,
Contract Manager,
Philco-Ford Corp., Willow Grove, Pa.

DEAR SIR: The Philco-Ford Corporation is requested to submit a proposal for modifications in specifications and other requirements in Contract DOT-FA73WA-3202. The changes are as set forth in attachments to this letter, A, B, C, D, and F, and other information set forth herein. The referenced attachments to this letter are as follows:

Attachment A—Changes to FAA-E-2479 due to PDR action items, requests for waivers, corrections, and clarifications (Apr. 26, 1974).

Attachment B—Changes to FAA-E-2479 due to revised operational and maintenance requirements (Apr. 26, 1974).

Attachment C—Changes to FAA-E-2479 to incorporate design cost-reduction changes (Apr. 26, 1974).

Attachment D—Amendment (draft) to the contract (Apr. 26, 1974).

Attachment F—Changes to FAA-E-2479 that can be accommodated in the EVS system design (Apr. 26, 1974).

Each of the above attachments has been developed with your participation and has been extensively discussed with you during the course of its development. In this connection, Attachment C, constituting cost-reduction specification changes, is included almost entirely at the request of your company. On May 8, 1974, Attachments A, B, C, and F to this letter were informally forwarded to you for your advance review so as to facilitate your early proposal submission. Under no circumstances, however, was such transmittal to you, or is anything in this letter, to be interpreted as an authorization to proceed with the indicated changes before an acceptable modification reflecting these changes is executed by both your company and the Government.

Your proposal is required in the form set forth in Attachment D and Contract Proposal Forms No. 60 and No. 59 for contract Schedule I and Schedule II, respectively. Instructions for submission of the cost or pricing data required for the proposal are also enclosed. Copies of the latter forms and instructions were furnished to you May 10, 1974. You are requested to provide separate cost submissions in accordance with the enclosed instructions for each of the 18 changes in Attachment B and the 27 cost-reduction items in Attachment C and all other areas that result in cost-reductions. A total cost proposal for Schedule I as well as Schedule II of the contract is required with a reconciliation of all other submitted cost information, leading to the totals indicated. It is anticipated that this required information is, for the most part, readily available to you for presentation as required in view of the costing studies by your company which would have had to have been made to date in order to arrive at levels of pricing information previously discussed with the Contracting Officer.

Should the negotiation of detailed pricing for each of the items requested involve substantial delay as well as the necessity for an audit report, the Government will give consideration to establishment of ceiling prices for Schedule I and Schedule II of the contract pending later definitization by separate modification of such detailed pricing.

To assist you in the development of your complete delivery schedule proposal information, the following pricing delivery schedule items are set forth below:

Activity	From date of contract
a. Complete factory system tests (Item 1)	Within 38 months (3/76)
b. Complete on-site system tests and Government acceptance of Item 1	Within 42 months (7/76)
c. Award Production Option 1 (Sched. II)	Within 42 months (7/76)

As a minimum, the document submission schedule information (Appendix E of FAA-E-2479) should be revised in conformance with your proposed delivery schedule, particularly for the following:

- a. Appendix E
- b. para. 4.1
- c. para. 4.3
- d. para. 4.3.1.1.1
- e. para. 4.3.1.1.2
- f. para. 4.3.1.2
- g. para. 4.3.2

Certain other matters have been discussed with your company relative to issuance of such negotiated modification as may result from your proposal as negotiated. These include the necessity for a firm expression by your company with respect to release of the Government from all claims of the company whatsoever as of the date of any resulting modification. Another matter discussed relates to a future incorporation, for administrative convenience, of all the changes involved herein within the format and cover of the FAA-E-2479 specification. It is to be understood that the attachments to this letter, however, constitute the governing specification documents should any conflict or ambiguity from format restatement arise. Still another matter relates to the appropriate handling of the option date provisions which may be negotiated so as to provide adequate measures for flexibility of the Government's exercise of such options in the event of contractor-caused delays. The specific language and conceptual features of these particular considerations, of course, require discussion and completion of negotiations, which will depend on the nature of your responses on these particular matters.

Although it is probable that considerable negotiation may be involved, it is anticipated that a successful modification under the "Changes" clause of the contract may be effected in a timely manner.

/S/ STEPHEN FISHE,
Contracting Officer, ALG-340.

8 Enclosures.

EXHIBIT NO. 29

TWX FROM FAA CONTRACT OFFICER TO PHILCO-FORD REQUESTING JUSTIFICATION
BY PHILCO-FORD IN SELECTING THEIR OWN COMPUTER PROCESSOR

FEDERAL AVIATION ADMINISTRATION,
SYSTEMS PURCHASE BRANCH, ALG-340,
Washington, D.C., May 1, 1974.

FRANK COHEN,
Contract Manager, Philco-Ford Corp.,
Willow Grove, Pa.

Your progress report, furnished by letter of April 9, 1974 (FC: 74-546), states that you have started full-scale activity toward use of the Philco-Ford 102/ATC-021 processor. One of the factors in the selection of your company for the EVS procurement was the choice of your processor as set forth in your technical proposal. You have not furnished this office with the particulars with respect to your selection of the 102/ATC-021 processor relative to processor availability elsewhere. This represents a departure from the "make or buy" provisions of the contract which requires justification. None of the particulars reflecting the bases for your selection—the extent of competition obtained, the relative evaluation of competitive sources, relative pricing, delivery, relative technical design applicability and qualifications—have been provided as a basis for FAA ascertainment with respect to the propriety of your choice to proceed with the 102/ATC-021 processor.

You are therefore requested to provide such justification in writing setting forth specifics.

STEPHEN FISHE,
Contracting Officer.

EXHIBIT NO. 30

LETTER TO FAA FROM PHILCO-FORD EXPLAINING REASONS FOR DELAY IN
PERFORMANCE UNDER EVS CONTRACT

PHILCO-FORD CORPORATION,
COMMUNICATION SYSTEMS DIVISION,
Willow Grove, Pa., June 22, 1973.

In Reply Refer to: FC:73-180.

FEDERAL AVIATION ADMINISTRATION,
Washington, D.C.

Attention: Mr. S. Fische, Contracting Officer ALG-340.

Subject: Contract No. DOT-FA73WA-3202 Philco-Ford No. 2077.

Reference: Contracting Officer letter dated 19 June 1973, Re: Program Delay.

GENTLEMEN: Pursuant to the provisions of the "Notice of Delays" clause, GP20 of DOT-P-4, as contained in the subject contract, Philco-Ford, as early as February 1973 had detected a dramatic change in the marketplace, whereby component acquisition time would be significantly lengthened and reporting to this effect, together with its potential schedule implication, was preliminarily presented to the Government within the content of Monthly Progress Report No. 2. Subsequent monthly reports, transmitted to the Contracting Officer, maintained continued coverage of this major problem area, which was recognized as a real deterrent to the achievement of scheduled contractual events.

A pulsing of the component market confirms the regrettable situation to be industry-wide, covering complete families of items such as connectors, capacitors, resistors, IC's, diodes, transistors, etc., with no projection for improvement in acquisition lead time through the balance of 1973. Consequently, while we are expediting component releases from engineering through the procurement cycle, on as realistic and feasible basis as possible, we are confronted with this situation where 5 to 7 week capacitors will now be acquired from 30 to 35 weeks, resistors within 44 weeks in place of 4 weeks, IC's in 30 weeks in place of the usual 6 weeks and on it goes. The situation that we have described has been well documented in industry trade-papers as a national problem and represents a condition with many opinions as to origin, but one which could not be anticipated nor controlled by a contractor.

This matter of program delay would have been previously addressed in specific correspondence to your office were it not for the recognition that the dynamic state of program events would actually make for a premature forecast relating to schedule extensions. Plans for the possible containment of projected slippage can not be finalized until direction is first received from the Government relating to their desired approach for the Power Subsystem, as well as a formal response to the LED subcontract package, forwarded for consent to order placement on 16 May 1973.

Although formal confirmation has not yet been received, cognizant Government program personnel at our plant on 21 June 1973 indicated that the package as presented would be rejected. It appears that testing requirements will be augmented by the Government with newly imposed requirements, not presently called for within the governing specifications. Should such action be formalized by your office, it is our preliminary estimate that it will take at least three to four months of processing time before our Purchasing Department could be in a position to resolicit the LED requirement. This time would be devoted to the generating of specifications in consonance with the non-contemplated testing requirements referred to above. Based upon experience to date with the LED procurement, Philco-Ford is seriously concerned that a responsive supplier may not be found and if successful, what the additional funding and schedule impact will be.

Consequently, any steps which might have been taken to contain the extent of schedule slippage occasioned by the reported component problem must prudently be deferred until the other pacing items are resolved. A meaningful forecast pertaining to schedules at this juncture of program status, with the described activity in progress, is not possible. Rescheduling will be accomplished at the earliest possible date that the receipt of prerequisite Government direction will permit.

From the facts presented, we trust that it will be readily apparent that the six month delay as projected in our May report was of an origin beyond the control

and without the fault or negligence of Philco-Ford. We thank you for your continued cooperation and wish to reassure your office that Philco-Ford is keenly aware of the importance of both a successful and timely completion to Schedule I effort.

Very truly yours,

FRANK COHEN,
Contract Manager.

EXHIBIT NO. 31

DOCUMENTATION BY FAA CONTRACTING OFFICER OF 36-MONTH DELAY IN PERFORMANCE OF EVS CONTRACT

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 1, 1974.

Subject: Contract DOT-FA73WA-3202, Progress Report No. 58, Philco-Ford Corporation, Willow Grove, Pa.

From: Administrative Contracting Officer, ALG-422.

To: Contracting Officer, ALG-340.

1. Item 1—Electronic Voice Switching System (EVS).

2. Contract delivery dates:

EVS System Evaluation Configuration.

a. Complete Factory Test, October 2, 1974.

b. Received at NAFEC, December 2, 1974.

EVS System Final Configuration, April 2, 1975.

3. Contract is not on schedule.*

4. Total quantity on Schedule I: 1.

5. Total quantity factory tested to date: 0.

6. Balance remaining: 1.

7. *Minor Items*: Documentation, Instruction Books, Site Spare Parts and Non-Standard Parts, Item Identifications, Provisioning Technical Documentation, Spare Parts Provisioning, Special Tools and Test Equipment.

A. Effects of the September 28, 1973 letters of clarification from ALG-340.

B. Common Control Subsystem (termination of Univac—after "pulsing" the market Philco-Ford's decision to manufacture the processor).

C. Contractor is essentially in a "hold status" since December 1973.

D. Redesign effort resulting from continuing technical discussions between ARD and Philco-Ford—18 proposed changes, cost reduction items, PDR items, deviations, and clarifications.

EVS Program Activity: Contract funding, incurred and obligated, will be expended by mid-May. A PR for \$500,000 is being prepared by ARD-223 to incorporate the contract option funds as an interim measure while ARD and Philco-Ford technical discussions continue.

Finalization of a firm understanding of the technical wording of the equipment specification remains as the main objective of the FAA Program Office and is the subject of meetings being held in Washington this week.

Cost and schedule may be further impacted by the specification definitions concluded. (Philco-Ford's Program Management had established April 1 as a target date for completion of the proposed contract modification.)

Light Emitting Diode (LED) Status: Moisture resistance testing, of the six additional units required to complete the lot sample (Type B), is scheduled for completion on May 7.

Final measurements will be evaluated by Philco-Ford's Quality Assurance Representatives and a decision will be made as to acceptance or rejection of the data.

* In-plant projected delay in completion of the manufacturing and Pre-production Model (Item 1) testing, previously defined as twenty-seven (27) months is revised to thirty-six (36) months. Cumulative events that formulate this forecast are as follows:

1. Six (6) months—acquisition of long lead components.
2. Thirty (30) months.

Subcontract Status:

In review date submitted	Company	Item	Value
April 16, 1974	Motorola	Transistor	\$41,472 \$50,000
April 24, 1974	Data Systems Analysts, Inc.	Computer programming	

1 Additional.

Request for Approvals (NSPRs) : Status of submissions is as follows :

- 116 Submissions.
- 89 Approved.
- 6 Disapproved
- 3 Conditionally approved
- 9 Revised NSPRs in review.
- 9 Other NSPRs in review.

ACTION REQUESTED

Technical Officer—ARD-223 is requested to:

1. Complete action on NSPRs in review over 30 days. A listing is as follows :
 - NSPR No. 24, 9/7/73.
 - NSPR No. 30B, 3/20/74.
 - NSPR No. 31A, 11/7/73.
 - NSPR No. 34, 9/17/73.
 - NSPR No. 35, 9/17/73.
 - NSPR No. 150A, 11/20/73.
 - NSPR No. 201, 2/27/74

CHARLES J. LAJAUNIE.

EXHIBIT NO. 32

INCREASED COSTS CAUSED BY DELAY IN COMPLETING EVS CONTRACT, PREPARED AS PART OF MITRE CORPORATION WORKING PAPER 7542, APRIL 8, 1971

TABLE 5-5.—CHICAGO SYSTEM INCREASED COSTS WITH EVS PROGRAM DELAYS: 1975-80

[In millions of dollars]

FAA delay	Year of implementation	Operating system differential		Total annual increased cost	Cumulative increased cost	Increase in TLA	Total additional cumulative costs
		Present system	EVS				
1 year	1976	1.82	0.244	1.58	1.58	1.38-1.18=0.2	1.78
2 years	1977	1.93	.251	1.68	3.26	1.58-1.18=.4	3.66
3 years	1978	2.02	.258	1.76	5.02	1.39-1.18=.2	5.22
4 years	1979	2.2	.265	1.94	6.96	1.61-1.18=.4	7.36
5 years	1980	2.38	.275	2.1	9.06	1.89-1.18=.7	9.76

EXHIBIT NO. 33

ANALYSIS BY FAA EMPLOYEE THAT PROPOSED COST REDUCTION CHANGES BY PHILCO-FORD IN EVS CONTRACT CONSTITUTE A REDUCTION IN TECHNICAL REQUIREMENT

DEPARTMENT OF TRANSPORTATION,
OFFICE OF THE SECRETARY,
March 6, 1974.

Subject: EVS Contractual Change Review.

From: H. B. Coleman, TST-43.

To: Director, Office of Procurement and Logistics, TAD-60.

In response to your request, I have conducted a brief review of technical changes being proposed by the EVS contractor. As costs were not assigned to

the individual changes, it has not been possible to associate appropriate "change values."

In general, many of the substantive changes appear to be a reduction in level of technical requirement; i.e., reducing effective MTBF, relaxing MIL-STD's, increasing cabinet sizes, negating responsibility for solution to EMI problems, etc.

In some instances, change justifications are presented without any indication that appropriate analysis, simulation or trade-off studies have been conducted.

One suggested change, that of the Colored LED (Light Emitting Diode) Display, appears inappropriate as the question of display lighting color is a multi-technology question. As such, it should not be considered as a single EVS contractual change. If it is that important, an R.E. & D. program with a specialized contractor should be structured to handle the problem that would include the other equipments in the ATC maintenance areas using this type of display.

Some cost reductions are accomplished by making equipments that were previously the responsibility of the contractor, now GFE. Other techniques are the cost saving incurred by relaxing MIL-STD requirements.

Additional detailed comments are attached.

HAROLD B. COLEMAN.

3 Attachments.

ATTACHMENT "A"

CHANGES DUE TO REQUEST FOR WAIVER, CORRECTIONS CLARIFICATION

Many changes seem to indicate a reduction in the level of technical requirements:

Controller position deleted.

Modules not interchangeable.

Some equipments now GFE.

Meters no longer required.

Voice frequency circuit performance criteria no longer contains capability for interconnecting trunks.

Relaxation of reliability requirements.

Relaxation of specifications on grounding.

Relaxation of FAA-ER-650-021 Electronic Equipment, General Requirements.

Relaxation of humidity requirements.

Relaxation on specification for cabinet size.

Relaxation of reliability MTBF requirements.

Reduction in number of technical positions, channels and frequencies to be handled.

ATTACHMENT "B"

CHANGES DUE TO OPERATIONAL—MAINTENANCE CONSIDERATIONS

ATTACHMENT "C"

CHANGES DUE TO COST REDUCTION CONSIDERATIONS

EMI consideration—the proposed cost reduction plan appears to allow the contractor to walk away from all EMI problem responsibility. Instead of being responsible for EMI problem/solution, he intends to assist the government in identifying the problem but should not be responsible for design or implementation of the solution.

A second loop-hole is the change from "satisfactory performance of the following tests (MIL STD 461A) is required as a minimum" to a loosely defined, unspecific test configuration.

Several of the proposed cost reductions are achievable by removing the requirement to meet certain MIL Standards. Before being accepted, assurance should be provided by the contractor that EVS system reliability is not being compromised.

Several of the cost reductions appear questionable since items that were previously contractor developed are now GFE with the responsibility of func-

tion, specification, etc., that of FAA, which may ultimately cost more in the long run. GFE equipment also has the problem of interface responsibility.

ATTACHMENT "E"

DESCRIPTION AND JUSTIFICATIONS OF OPERATIONAL—MAINTENANCE ITEMS

Several change items are based on availability of the 9020 during scheduled maintenance down time and the possibility of automation outages during busy periods. If this is possible, then the problem appears more serious than just the EVS and should be remedied elsewhere. If the justification is weak, the change should be considered in further detail.

Justification in Item 3 is based on a "may not be adequate to cover combinations . . ." This justification appears weak unless substantiated by analysis or experience.

Justification in Item 5 appears based on a "human factor engineering" judgment rather than analysis.

Several items are of such a standard nature that they should have been considered previously. (Key to remove "beep" on non-recorded calls.)

The option to have requirements vary from center to center and appear inconsistent with ATC standardization practices. (Item 12, optional ZIP tone for override call.)

The Colored LED (Light Emitting Diode) Display, Item 14, is totally inappropriate to be considered as a contract change. If after a thorough review, it is determined that the color of the LED Display is a problem, a separate contract should be issued to select a vendor that is specialized in this human factors field. This display color relates to several other ATC maintenance functions and should be pursued as a separate technology effort.

Item 15, I/O Devices, should reflect a price reduction as two medium speed printers will now be GFE, and three Input-Output Typewriters (IOT) are eliminated.

EXHIBIT NO. 34

REASONS GIVEN BY PHILCO-FORD FOR TERMINATING UNIVAC COMMON CONTROL SUBCONTRACT

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., January 9, 1974.

In reply refer to: ALG-430/420.

Subject: Status of NAS Equipment.

From: Acting Chief, Industrial Division, ALG-400.

To: ARD-100/ARD-101/ARD-103/ARD-105/ARD-160/ARD-220.

Following is the status of the NASEQ contracts as of January 9, 1974.

ELECTRONIC VOICE SWITCHING (EVS), CONTRACT DOT-FA73WA-3202; PHILCO-FORD CORP., WILLOW GROVE, PA.

The Switching Element (SWEL) tests were started on January 7 and will take an estimated five (5) weeks to complete.

The contractor is awaiting response to their requests for consent of placement for three proposed subcontracts which were submitted on October 8, 31, and November 14. These subcontracts are for cabinets and power supplies.

Philco-Ford terminated the Univac subcontract (Common Control Equipment) for default on December 21, 1973. Reasons for termination were (1) failure to make timely delivery, (2) failure to meet quality requirements, (3) failure to meet performance requirements, (4) selection and use of components which were not in accordance with contract requirements, (5) failure to produce adequate software test routines, (6) failure to demonstrate equipment software. Philco-Ford formally notified FAA of this termination by letter dated January 2.

Philco-Ford is in the process of seeking and evaluating alternate sources for equipment and software which was to be provided by Univac. *The resident FAA/ORO estimates that termination of the Univac subcontract will result in a program delay of at least twelve months from the time an alternate source*

is selected. It is anticipated that selection of an alternate source will be completed by the end of February.

AUTOMATED RADAR TERMINAL SYSTEM (ARTS III), CONTRACT DOT-FA69WA-2071: UNIVAC, ST. PAUL, MINN.

Item 125—Assembly of the Ft. Rucker system remains unchanged, approximately 25% complete. Increased activity is expected to start about mid-January. System delivery is due April 11; however, the ACO anticipates early delivery will be accomplished by mid-March.

Acronyms: NASEQ (NAS Equipment); QRO (Quality and Reliability Officer); and ACO (Administrative Contracting Officer).

SYSTEM MAINTENANCE MONITOR CONSOLE (SMMC), CONTRACT DOT-FA69NS-177; ELECTRONIC LABORATORIES, INC., HOUSTON, TEX.

System No. 19 was production tested and shipped to the Houston ARTCC on January 8.

System No. 20 (Salt Lake) is 60% complete and is tentatively scheduled for shipment by the end of January.

System No. 21 (Minneapolis/St. Paul)—all material is in-house with exception of subcontractor supplied equipment.

MODIFICATION KITS FOR FPS-7 AND FPS-60 RADARS, CONTRACT DOT-FA72WA-2892; BENDIX CORP., COLUMBIA, MD.

Of the contract quantity of 38 modification kits, three FPS-60 modification kits and two retrofit kits remain to be shipped.

The two retrofit kits are scheduled to begin installation the week of January 28. Installation of all FPS-60 kits (with exception of the three unshipped FPS-60 modification kits) is expected to be finished by January 31.

The three unshipped kits can be installed in May, June and July respectively, provided a new contract can be issued soon. The kits are being held until some newly required work is covered by a contract. The prospective contract is being reviewed by the contract awards board.

POWER CONDITIONING SYSTEM (PCS), CONTRACT DOT-FA72WA-3008; AIRESEARCH MANUFACTURING CO., TORRANCE, CALIF.

Noise problems which caused interruption of first article testing of the Palmdale system were resolved. Testing was resumed on January 5 and is continuing with satisfactory results.

The ACO is still forecasting a 30 to 60 day delay in delivery of the Palmdale system because of the noise problems encountered during first article testing.

While work was in progress to reduce or eliminate the electrical noise problems, production personnel were assigned to other projects. With testing proceeding satisfactorily, personnel are being called back to the PCS contract on an as needed basis.

VOICE DATA MULTIPLEX (VDM), CONTRACT DOT-FA72WA-3124; GTE LENKURT, SAN CARLOS, CALIF.

By letter dated December 28, 1973 the Contracting Officer rendered a final decision pursuant to the Disputes clause of the contract regarding the "factory select components" problem. Thereby, the Contractor was directed to proceed diligently with the performance of the contract.

By letter dated December 13, 1973 the Technical Officer conditionally accepted the Manuscript Final Troubleshooting Manual; final acceptance to be made upon resolution of errors therein previously noted.

MODIFICATION KITS FOR ARSR RADARS, CONTRACT DOT-FA72WA-2853; CARDION ELECTRONICS, WOODBURY, N.Y.

Systems No. 9 and No. 10 will be shipped on January 14.

Installations No. 4 and No. 5 at Salem, Oregon, and Paso Robles, California, are complete.

System No. 6 installation at Cedar City, Utah, is rescheduled for completion by next week.

Installation of Systems No. 7 and No. 8 at San Pedro, California, and St. Louis are to start this week.

COMPUTER DISPLAY CHANNEL (CDC), CONTRACT DOT-FA67NS-27; RAYTHEON Co., NORTH DIGHTON, MASS.

CDC XV (SLC)

All Pre-Integration Tests have been completed.

Raytheon's system engineering evaluation is continuing and completion is now expected January 11.

Raytheon has encountered software problems which have caused a delay in performing the RKM expansion tests. This RKM testing and the SAT dry runs are scheduled to be conducted by January 14.

The formal FAA SAT is scheduled to start on January 14 and shipment of this system by January 22.

Acronym: RKM (Radar Keyboard Multiplexer); and SAT (System Acceptance Test).

CDC XVI (MSP)

Unit testing on the nineteen (19) logic cabinets required for this system is continuing.

Pre-Integration Tests (PITs) A and 2 have been completed. PITs B, 0, 3, 4, and 5 are in process.

CDC XVII (MIA)

The logic cabinets required for this system have been assembled and released to unit test.

PVD, DCVG, DG

Units completing electrical test are as follows:

	Tested to date	Required by Jan. 22, 1974	Contract quantity	RDS & CDC cumulative
PVD's.....	665	673	776	1,116
DCVG's.....	848	834	946	1,363
DG's.....	85	80	91	129

DANA E. LINDEN.

cc: ALG-1, ALG-2, ALG-340/400, ARD-1, ARD-2, AAF-20, AAF-500, AAV-200, AAF-300.

Acronyms: RDS (Radar Display Subsystem); CDC (Computer Display Channel); PVD (Plan View Display); DCVG (Display Control and Vector Generator); and DG (Display Generator).

EXHIBIT NO. 35

ESTIMATED COSTS FOR MITRE'S SERVICES ON EVS CONTRACT PAYABLE BY FAA

JUNE 18, 1974.

REMINDER MEMO

To: Mr. Sheridan.

Subject: MITRE Support of EVS.

In response to your request of June 17 the MITRE support costs for the EVS program are as follows:

1. Fiscal year 1973—12 Man-years support at \$47K-\$564K.
2. Fiscal year 1974—16 Man-years support at \$51K-\$816K.

The above costs are approximate. Also enclosed are TOS's 45 and 45A as you requested.

Enclosures.

DONALD W. TISDALE,

Technical Officer, Contract #DOT-FA69NS-162.

EXHIBIT NO. 36

FAA REPORT MONITORING STATUS OF UNIVAC SUBCONTRACT ON COMMON CONTROL SYSTEM

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., December 18, 1973.

Subject: Trip Report No. 2, Monitor Philco-Ford Visual/Mechanical Inspection of Univac Delivered Common Control Equipment Contract DOT-FA73WA-3202

From: Quality Assurance Specialist, ALG-422

To: Quality Reliability Officer, ALG-422

A second trip was made to Univac on December 12, 1973 to monitor Philco-Ford's visual/mechanical inspection activity as it relates to subcontracting. Inspection was completed on December 14, 1973.

This report is indexed as follows:

Paragraph:	<i>Subject</i>
A-----	AN/UYK-15 Processor.
B-----	AN/UYK-15 Memory (CMI).
C-----	Electronic Cross-Coupler.
D-----	Disc Controller.
E-----	Magnetic Tape Adapter.
F-----	Teletype Adapter.
G-----	Cables (Univac Manufactured).
H-----	Multiperipheral Controller.
I-----	Kennedy (9000) Magnetic Tape.
J-----	Kennedy (9217) Formatter.
K-----	KSR-37 Teletypewriter.
L-----	1710-04 Key Punch and Verifier.
M-----	Bridge Data Products Card Reader.
N-----	General Remarks.
O-----	Conclusion.
P-----	Recommendation.

The results of Philco-Ford's Visual/Mechanical Inspection of Univac delivered equipment:

A. AN/UYK-15 PROCESSOR, 3 EA.

1. No protective covers on power supply terminal boards to prevent personnel from accidental contact. Requirement is established in MIL-E-16400, page 29, para. 3.7 and FAA-ER-650-021 page 10, para. 3.3.13 and 3.3.13.1.

2. 20% of the input/output connector markings were missing or not legible. Requirement is established in MIL-E-16400 page 42, para. 3.14.4.1 and 3.14.3.5 also in FAA-ER-650-021 page 42, para. 3.8.

3. Bootstrap, PCB P/N 7116860 in location A2-41 was found to have no conformal coating and no part number stamped on the connector. A requirement for conformal coating is established in MIL-E-16400 page 21, para. 3.4.37.3 and FAA-ER-650-021, page 34, para. 3.5.19 and in the Philco-Ford/Univac Purchase Order. Marking, same as A.2.

4. Cooling fans B1, B2, and B3 are not marked on chassis. Same as A.2.

5. The following PCB's were found to have wire straps and cut circuit paths, the wire straps were not terminated in their own individual pads as required by MIL-E-16400 page 21, para. 3.4.37 and FAA-ER-650-021 page 34, para. 3.5.19:

7126800-01 had 1 ea. wire strap.

7126790-01 had 2 ea. wire straps and 2 cut circuits.

7126390-01 had 4 ea. wire straps and 2 cut circuits.

6. The Univac equipment that was designed for EVS has front control panel fuses with a brief description of their purpose. The AN/UYK-15 has the same fuses but no description of their purpose. Equipment should be standardized to facilitate serviceability and maintainability.

7. Conformal coating on 5% of the PCB's were unacceptable. The requirement for conformal coating is established in MIL-E-16400 page 21, para. 3.4.37.3 and FAA-E-650-021 page 34, para. 3.5.19.

B. AN/UYK-15 MEMORY (CMI), 3 EA.

1. No protective covers on power supply terminal boards to prevent personnel from accidental contact. Same as A.1.
2. PS-2 power supply is upside down and the terminal board is obscured. A requirement which states "visible for purposes of maintenance" is found in MIL-E-16400 page 42, para. 3.13.4.1 and FRR-ER-650-021 page 42, para. 3.8.
3. PCB P/N 714856-1G had bubbles in the conformal coating. Same as A.7.
4. PCB P/N 714856-1G had warpage of 2 thicknesses which exceeds Univac requirements.
5. PCB P/N 714856-1G had two wire straps that were not terminated in their own individual pads as required. Same as A.5.
6. CMI requires a specific procedure to extract their core memory stacks. It is felt that to divert damage to the stack card connectors, a CAUTION label should be present to warn maintenance of this procedure.
7. Connector markings not acceptable. Same as A.2.

C. ELECTRONIC CROSS-COUPLER, 1 EA.

1. No connector keying, this is required by the Philco-Ford-UNIVAC Purchase Order.
2. No conformal coating on PCB's. Same as A.7.
3. All PCB's P/N 7126775-00 have 17 ea. wire straps. Same as A.5. -00 PCB's found in the unit should be -01 PCB's, a misinterpretation of the purchase order.

D. DISC CONTROLLER, 2 EA.

1. Power supplies have both PS-1 and T-1 markings as identification. The "T" markings as identification of a power supply is in error. Same as A.4.
2. PCB's were not conformal coated. Same as A.7. This comment refers to the Singer-Librascope PCB's only.
 - a. All PCB printed circuit paths were discolored. This condition is unacceptable per the workmanship requirements of MIL-E-16400 and FAA-ER-650-021.
3. Lambda PS-3 and PS-2, terminal lugs have discoloration, apparently the cause of poor wetting of solder connections. Same as D.2.a.
4. Capacitor under Disc chassis has no identification marking. Same as A.4.
5. The following PCB's were found to have wire straps and cut circuitry. Same as A.5:
 - 7126750-01 had 3 wire straps and 2 cut circuits.
 - 7126850-01 had 1 wire strap.
 - 7126870-01 had 12 wire straps and 7 cut circuits.
 - 7126865-01 had 18 wire straps and 6 cut circuits.

E. MAGNETIC TAPE ADAPTER, 2 EA.

1. No conformal coating on PCB's. Same as A.7.
2. The following PCB's were found to have wire straps and cut circuitry. Same as A.5:
 - 7126750-01 had 2 wire straps and 2 cut circuits.
 - 7126845-01 had 10 wire straps and 5 cut circuits.
 - 7126835-01 has 3 wire straps and 5 cut circuits.

F. TELETYPEWRITER ADAPTER, 1 EA.

1. No connector keying as established in the Philco-Ford/Univac Purchase order.
2. Cable clamps missing to adequately tie down cables. Unacceptable per workmanship requirements of the Purchase Order.

G. CABLES (UNIVAC MANUFACTURED)

1. No discrepancies found.

H. MULTIPERIPHERAL CONTROLLER, 1 EA.

1. No protective covers on PS-2 terminal board.
2. No connector keying J1 thru J8.
3. This unit lacked the correct quantity of cable clamps.

I. KENNEDY (9000) MAGNETIC TAPE UNIT, 4 EA.**

1. The PCB in position #4 has an edge connector, due to the lack of connector keying there is a strong possibility that the attaching plug could be reversed.
2. Assembly A-15 has two connectors and plugs with the above problem.
3. Marking on plugs do not match receptacles.

J. KENNEDY (9217) FORMATTER, 2 EA.**

1. Wire straps and cut circuits on all PCB's.
2. All PCB's were warped beyond commercial standards.

K. KSR-37 TELETYPEWRITER, 3 EA.**

1. S/N 1 needs a top cover adjustment.
2. S/N 2 has no serial number plate on the card cage.

L. UNIVAC 1710-04 KEY PUNCH AND VERIFIER, 1 EA.**

1. No connector keying, same as I.1.
2. Yellow tape used as wire ties.
3. No component identification.

M. BRIDGE DATA PRODUCTS CARD READER (8034), 1 EA.**

1. No component identification.
2. Wire straps.

N. GENERAL REMARKS

1. 100% parts validation has yet to be performed by Philco-Ford on the following equipment:

1. AN/UYK-15 Memory (CMI).
2. AN/UYK-15 Power Supplies.
3. Singer-Librascope L107A Magnetic Disc.
4. KSR-37 Teletypewriter.
5. Bridge Data Products Card Reader.
6. UNIVAC 1710-04 Key Punch and Verifier.
7. Kennedy Tape Units and Formatters.

Validation will be performed by Philco-Ford when adequate prints and parts lists become available.

2. Computer timing:

During the software check-out of the AN/UYK-15, Univac representatives indicated that the 750ns computer memory access time could not be maintained as required by the Purchase Order. Univac representatives explained that the added EVS requirements were the cause of an approximate 80ns extension.

3. High reliability parts:

As first reported in trip report dated November 12, 1973, high reliability -05 parts were being used in place of -01 parts on approximately 29 different PCB's. No attempt to exchange the -05 parts had been made.

4. Electronic crosscoupler:

On the November 12, 1973 trip report this unit was reported as having -01 level PCB's. (Required by the Purchase Order.) As indicated in para. C.3 of this report all of the -01 level PCB's had been exchanged with -00 level PCB's, the commercial version.

5. People participating in this inspection were:

FAA: D. Sherwood.

Univac: W. Weiser, L. Wrede, and D. Hair.

Philco-Ford: A. Pinney, A. Adellizi, and A. Thompson.

Univac Quality Control Representatives were present during this inspection and all discrepancies found by Philco-Ford were discussed.

** (Philco-Ford inspected all of the following equipment to best commercial practice.)

O. CONCLUSION

The major departures from Prime Contract requirements which are Philco-Ford's responsibility follow:

1. *Safety* as specified in MIL-E-16400 and FAA-ER-650-021.
2. *Workmanship* as specified in MIL-E-16400 and FAA-ER-650-021.
3. *Parts Selection* as specified in the Purchase Order.
4. *Computer Timing* as specified in the Purchase Order.

P. RECOMMENDATION

It is recommended that a representative from Philco-Ford's Quality Control section be assigned to the Common Control subcontract to insure that the requirements of the Purchase Order are met and to eliminate any departures from the Prime Contract.

DAVID L. SHERWOOD,
Quality Assurance Specialist, ALG-422.

EXHIBIT NO. 37

PHILCO-FORD LETTER TO FAA CRITICIZING FAA'S DISENGAGEMENT IN THE
ADMINISTRATION OF THE EVS CONTRACT

PHILCO-FORD CORPORATION,
COMMUNICATION SYSTEMS DIVISION,
Willow Grove, Pa., July 3, 1973.

In Reply Refer to: FC:73-190.

FEDERAL AVIATION ADMINISTRATION,
Systems Purchase Branch,
Washington, D.C.

Attention: Mr. S. Flsbe, Contracting Officer ALG-340.

Subject: Contract No. DOT-FA73WA-3202 Philco-Ford No. 2077.

Reference: Contracting Officer letter dated 25 June 1973, re: "FAA Action Items"
Arising from the PDR.

GENTLEMEN: From a reading of your subject correspondence, it appears that your office wants reassurance and/or reconfirmation that Philco-Ford is aware of the provisions of Clause 24, "Interpretation of Modification" as contained in the General Provisions of the contract. You may be assured that in consonance with these provisions, as further confirmed to your office by our letter of 1 June 1973 (73-167), that Philco-Ford will not implement what is considered as effort beyond stated contractual requirements prior to either receiving specific Contracting Officer approval or by first documenting the situation by formal correspondence to your office.

However, we do take serious issue with that portion of your letter, which appears contrary to actions taken to-date, which essentially suggests Governmental disengagement to the point that the providing of required information by the Government may essentially be construed as a gratuitous gesture and is of no consequence to the mode of operation by which the contractor goes forward in this Schedule I system development phase. Vital responses by the Government to PDR Action Items will indeed, in many instances, establish conditions for the performance by Philco-Ford of its contractual obligations.

The PDR, a contractual requirement, presents the forum for initial evaluation of design compliancy to specifications. In many cases, cited specifications are open to more than one reasonable interpretation and also there may be government preferences, from an operational basis, for the approach to be taken in meeting requirements. In any event, Government responses, whether it take the form of supplying requested enabling information and/or direction relative to confirmation of intent, which may have significant impact on our design approach (s), represents Governmental obligations to be concluded within a reasonable turn-around time to assure program progress during the critical system developmental phase.

Article XVI, the Technical Direction Clause, as set forth in the contract document, provides for the timely exchange of facilitating technical data. Consequently, we emphasize the extreme urgency related to obtaining immediate responses to Action Items already forwarded. Your firm technical statement of

intent/direction will be the basis of our subsequent action(s). Consequently, while Philco-Ford assumes total responsibility for system design, the Government does have a continuing critical obligation which is to supply direction and/or information to nurture the contractor's developmental efforts and for the taking of appropriate and proper steps to facilitate general progress.

We regret the necessity for responding in this manner, however, we must face up to the realities of the situation and recognize that in a developmental effort of this magnitude that we share a mutual responsibility. To provide a system which will be operationally acceptable to the user will require continuous technical clarifications of intent from the Government to make certain that there are no false design starts and that we have received the most for every program dollar expended.

Your past cooperation is appreciated and a timely exchange of direction throughout the remainder of Schedule I is mandatory.

FRANK COHEN,
Contract Manager.

EXHIBIT NO. 38

LETTER FROM UNIVAC TO FAA ADMINISTRATOR BUTTERFIELD EXPLAINING PHILCO-FORD'S BREACH OF CONTRACT WITH UNIVAC OVER THE COMMON CONTROL SYSTEM, AND RESPONSE FROM FAA

SPERRY UNIVAC,
COMPUTER SYSTEMS,
St. Paul, Minn., June 6, 1974.

Mr. ALEXANDER P. BUTTERFIELD,
*Administrator, Federal Aviation Administration,
Washington, D.C.*

DEAR MR. BUTTERFIELD: Philco-Ford, prime contractor for your EVS systems under DOT-FA73WA-3202, terminated our subcontract for computers and peripherals for alleged default.

Unable to generate any satisfactory communication with Philco-Ford, we were forced to initiate suit for breach of contract, and to challenge the alleged default.

We are confident Philco-Ford cannot sustain the burden of proof it has on default. There was substantial compliance on our part, and the inconsequential items specified in the default notice were due either to changes, lack of cooperation, and delays on the part of Philco-Ford. Our interest, of course, is not damages, but participation in the program. Since you are the real party in interest, ultimately, it seems appropriate to let you know of this situation.

We understand that major specification changes are about to issue. We have been unable to obtain any definitive data from Philco-Ford as to changes in the components covered by our subcontract. We would hope that the Federal Aviation Administration might furnish us such data directly, and, in furtherance of its own interests, review this situation carefully as to whether Sperry Univac should be reinstated in the project or whether litigation should be allowed to take its course.

Sincerely,

ERNEST D. HAMS,
*Vice President and General Manager,
Defense Systems Division.*

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., June 25, 1974.

Mr. ERNEST D. HAMS,
*Vice President and General Manager,
St. Paul, Minn.*

DEAR MR. HAMS: The Administrator has asked us to respond to your letter of June 6 regarding your terminated subcontract for computers and peripherals under the Philco-Ford Electronic Voice Switching (EVS) Contract DOT FA 73WA-3202.

With respect to your request for the "major specifications (which) are about to issue," we consider that request to have been made under the Public Information Act. Accordingly, we are enclosing Attachments A, B, C, and F to Modification

No. 3 dated June 14, under Contract DOT FA73WA-3202. These attachments encompass all the specification changes to this contract.

You also request us "to review this situation carefully as to whether Sperry Univac should be reinstated in the project . . ." As prime contractor Philco-Ford is responsible for selection of subcontractors and administration of subcontracts. Accordingly, it would be improper for the FAA to become involved in the dispute between your company and Philco-Ford.

Sincerely,

R. F. FRAKES,
Director, Logistics Service.

Enclosures.

EXHIBIT NO. 39

LETTER FROM UNIVAC TO CONGRESSMAN JACK BROOKS, CHAIRMAN, GOVERNMENT ACTIVITIES SUBCOMMITTEE, OUTLINING NEGOTIATIONS BETWEEN PHILCO-FORD AND UNIVAC ON THE COMMON CONTROL SYSTEM SUBCONTRACT

MORGAN, LEWIS & BOCKIUS,
COUNSELORS AT LAW,
Washington, D.C., August 9, 1974.

HON. JACK BROOKS,
Chairman, Government Activities Subcommittee, House of Representatives,
Washington, D.C.

Subject: Investigation of FAA EVS Program Contract DOT FA73WA-3202 with Philco-Ford.

DEAR MR. CHAIRMAN: The Sperry Univac Division of the Sperry Rand Corporation submits this statement in connection with the investigation of the Electronic Voice Switching (EVS) program under Contract DOT-FA 73 WA-3202 with Philco-Ford Corporation. Sperry Univac was a supplier of processors, peripherals, and software to Philco-Ford under this contract. We understand that substantial information concerning Sperry Univac's role in the program has been received from sources other than Sperry Univac. This statement is submitted to present Sperry Univac's description of its role in the program.

Sperry Univac had a very limited role in EVS. In December, 1971, Sperry Univac no-bid to the FAA. In February, 1972, Sperry Univac no-bid the common control subsystem to Philco-Ford. On March 3, 1972, Philco-Ford asked for a quotation on Sperry Univac's commercial 1616 computer. Between March-June 1972, Philco-Ford negotiated Sperry Univac's price from \$15.5 to \$6.9 million by insisting on the lowest price available commercial peripherals (Enclosure No. 1). When Sperry Univac accepted this reduction in price, it also negotiated exceptions to the specifications. Litcom, Division of Litton Industries, another competitor for EVS prime contract, also asked Sperry Univac for a quotation on the 1616 computer. Litcom, however, immediately revised their request to include the Sperry Univac ARTS III input/output processor, with full MIL spec peripherals, for the EVS application.

Some of the problems experienced by Sperry Univac may have had their genesis in the fact that Philco-Ford contracted with the FAA to meet Specification FAA-ER-650-021, while contracting with Sperry Univac to furnish standard product line equipment that does not meet this Specification. The purchase order issued by Philco-Ford to Sperry Univac (Enclosure #2) lists the many deviations from Specification FAA-ER-650-021 mutually agreed to by Philco-Ford and Sperry Univac.

Another factor affecting Sperry Univac's participation in the program may have been that expanded EVS program requirements exceeded the capacity of

the equipment Philco-Ford contracted to purchase from Sperry Univac. On July 24, 1973, Sperry Univac, at Philco-Ford's request, quoted prices for increased common control subsystem capacity to handle EVS expansion. These changes, as they affected our purchase order, were never communicated to us, and Sperry Univac was never given an effective opportunity to propose on the new requirements. Instead, Philco-Ford terminated the purchase order.

Sperry Univac fully performed its purchase order, but was terminated December 21, 1973 for alleged "default". A major reason given by Philco-Ford for the default was the alleged poor quality of Sperry Univac's product. Sperry Univac has denied these charges and is contesting them in a suit filed in a Minnesota state court.

Attached hereto is a more detailed statement of Sperry Univac's position entitled, "Sperry Univac's Statement on the EVS Problem".

Sincerely yours,

LOREN K. OLSON,
Attorney for Sperry Univac.

Enclosures.

EVS PRICE QUOTES TO PHILCO-FORD

Proposal	No.	Date	Description	Phase I	Phase II	Total
1		Feb. 4, 1972	Verbal quote.....			\$12,900,000
2		Mar. 10, 1972	do.....			15,532,560
3		Mar. 22, 1972	Telegram, 1st system only.....	\$707,438		707,438
4		Mar. 30, 1972	TWX.....	707,438	\$12,231,198	12,938,636
5		Apr. 10, 1972	TWX.....	707,438	12,231,198	12,938,636
6		May 22, 1972	Technical description and prices, AN/UYSK-15's.....	751,752	13,441,656	14,193,408
7		June 9, 1972	Pricing package.....	663,450	10,779,907	11,443,357
8		June 16, 1972	BuCode magnetic tape option.....	110,000	200,000	310,000
9		June 29, 1972	New R. & M. prices.....	181,295		7,181,295
10		June 30, 1972	Presented prices.....	862,922	6,518,399	7,381,321
11		do.....	Negotiated prices.....	(1)	(1)	6,900,000
12		Oct. 6, 1972	Additional memory.....	21,357	(1)	21,357
13		Nov. 22, 1972	Price time extension.....	(1)	(1)	6,900,000
14		Mar. 8, 1973	9 item computer only.....	238,800	(1)	(1)
15		Mar. 14, 1973	Revised equipment compliment.....	817,769	6,093,354	6,911,123
16		Apr. 4, 1973	RADC handbook plus cable key.....	86,000	17,000	
17		Apr. 6, 1973	Unlimited rights to AN/UYSK-15.....	(1)	(1)	6,000,000
18		Apr. 19, 1973	Blackboard presentation.....	983,455	6,223,587	7,207,042
19		Apr. 27, 1973	Card processor (1710 plus bridge).....	45,350	(2)	(2)
20		May 4, 1973	Contract prices.....	945,800	6,139,587	7,085,387
21		May 30, 1973	Suggested systems improve- ments.....	31,500	0	31,500
22		June 14, 1973	Training schools.....	7,600		7,600
23		June 20, 1973	Field support for loaner.....	(1)	(1)	210
24		July 5, 1973	Additional loaner memory.....	(1)	(1)	4,150
25		July 9, 1973	Training school changes.....	(1)	(1)	1,175
26		July 24, 1973	Core and disc expansion.....	838,690	7,625,734	8,464,424
27		Aug. 1, 1973	256 disc system.....	190,000	2,050,000	2,240,000
28		Aug. 17, 1973	Option items.....	186,480	1,149,271	1,335,751
29		Sept. 28, 1973	Memory expansion.....	670,000	4,045,000	4,045,000
30		Oct. 30, 1973	Enhancements.....	46,000	0	46,000

¹ Not available.

² Not quoted.

³ Man per day rate.

⁴ Per month.

COMMUNICATIONS AND TECHNICAL SERVICE DIVISION
HEADQUARTERS
3900 WELSH ROAD
WILLOW GROVE, PA. 19090

PHILCO-FORD CORPORATION, BUYER, HEREBY AGREES
TO PURCHASE AND RECEIVE AND

Sperry Rand Corporation
Univac Division
Univac Park, P.O. 3525
St. Paul, Minn. 55101

SELLER AGREES TO MAIL AND DELIVER SUPPLIES OR SERVICES SPECIFIED HEREIN UNDER THE TERMS AND
CONDITIONS ON THE FACE OF THIS ORDER AND THOSE INCORPORATED BY REFERENCE IN THE ADDITIONAL
TERMS AND CONDITIONS BLOCK AT THE BOTTOM OF THIS PAGE.

SHIP VIA See Attached	SHIPPING POINT See Attached
FORM <input checked="" type="checkbox"/> CARRIER'S PLANT <input type="checkbox"/> DESTINATION	TRANSPORTATION TERMS <input checked="" type="checkbox"/> PREPAID & CARRIAGE <input type="checkbox"/> PREPAID <input type="checkbox"/> COLLECT

DOT-FA/3WA-3202

SUPPLIER NO. S10586	PAID PAYMENT TERMS B See Attached	VEHICLE PROTYPE LATE 05-02-7
GOVERNMENT SOURCE INSPECTION APPLICABLE IF CHECKED <input checked="" type="checkbox"/> St. Paul		
INSPECTION CODE K	ATTACHMENTS - COMPLETE THOSE INDICATED AND ATTACH TO SHIP AND PAPERS 1. TEST DATA 2. TOOL ATTACHMENT	FORM SHIP TO (SEE INSTRUCTIONS ON REVERSE) 1. GENERAL 2. SPECIAL 3. CONTRACT 4. CERTIFICATE OF COMPLIANCE
INSPECTION DATA	DATA	CONTRACT NO. OH 2977

Philco-Ford Corp
3900 Welsh Rd.
Willow Grove, Pa. 19090

20467
DEW

QUANTITY	UNIT PRICE DOLLARS	CENTS	PART NUMBER	DESCRIPTION	REQUISITION NUMBER	POINT NO.	
				A firm fixed price subcontract agreement No. 902185, hereafter referred to as the "Order", is hereby entered into between the Philco-Ford Corporation, Communication Systems Division, hereafter referred to as the "Buyer", and the Sperry Rand Corporation - Univac Division, hereafter referred to as the "Seller". Pursuant to the terms and conditions of this Order, the Seller will have the responsibility to furnish the equipment, data, and services of the Common Control Subsystem for Phase I and II of the Electronic Voice Switching System for which the Buyer is the prime contractor to the Federal Aviation Agency (F.A.A.) under contract DOT-FA73WA-3202. Total firm fixed price for Phase I of the Order is \$796,510 and the total firm fixed price for Phase II of the Order is \$5,392,122.	860575	5100	

Continued Page 2

VOICE TO ACCOUNTS PAYABLE (ATTACH PROOF OF SHIPMENT, POSTAL RECEIPT, BILL OF LADING, ETC.)	BY	TO
<input checked="" type="checkbox"/>	BY	PHILCO-FORD CORPORATION
ADDRESS	BY	<i>P. A. Young</i>
BUYER'S ADDRESS WHEN DIFFERENT FROM HEADQUARTERS ADDRESS	BUYER	R. J. Gasper
REQUESTER M. URIS	MANAGER	EXP. CLASS 2300
ACCOUNT CLASSIFICATION 20320000	EXP. CLASS 2300	
<input type="checkbox"/> THOSE PRINTED ON THE BACK HEREOF <input type="checkbox"/> THOSE CALLED FOR IN PHILCO-FORD FORM CORP. 331A, 4-72 <input checked="" type="checkbox"/> THOSE CALLED FOR IN Part 4.0 A FOLDED SHEET OF FOUR PRINTED PAGES.		

ETS 1008
11/72

PLEASE RETURN ACKNOWLEDGEMENT TO THE BUYER WITHIN 5 DAYS

PRINTED IN U.S.A.

1

Bootstrap FORMAT
For
Magnetic Tape and Paper Tape

TM	# Transfers		
Base Address			
Program Entry Address (PEA)			
		2 ¹	2 ⁰
		X	Y
Data (even number of words)			
∅			
CKSUM			

TM = ∅ ∅ No Transfer
 = ∅ 1 Byte Transfer (8 bits)
 = 1 ∅ Word Transfer (16 bits)
 = 1 1 Double Transfer (32 bits)
 Y = 0 last record
 = 1 more records
 X = 0 stop
 = 1 transfer control to PEA

COMMUNICATIONS AND TECHNICAL SERVICES DIVISION
HEADQUARTERS • 3900 WELSH ROAD
WILLOW GROVE, PA. 19090

PHILCO-FORD CORPORATION BUYER HEREBY AGREES TO PURCHASE AND RECEIVE AND

Sperry Rand Corporation
Univac Division
Univac Park, P.O. 3525
St. Paul, Minn. 55101

IF BUYER TO SELL AND DELIVER SUPPLIES OR SERVICES SPECIFIED HEREIN UNDER THE TERMS AND CONDITIONS ON THE FACE OF THIS ORDER AND THOSE INCORPORATED BY REFERENCE IN THE ADDITIONAL AND CONDITIONS BLOCK AT THE BOTTOM OF THIS PAGE

QUANTITY	UNIT	ITEM	UNIT PRICE	AMOUNT

FORM NO. 1 (REV. 1-64)	PHILCO-FORD CORP. ORDER FORM
ORDER NO. DOT-FA73WA-3202	ORDER DATE 05-02-73
SUPPLIER NO. S10686	BUYER'S ORDER NO. B See Attached
GOVERNMENT SOURCE INSPECTION APPLICABLE IF CHECKED	
NO <input checked="" type="checkbox"/> St. Paul	
ATTACHMENTS - COMPLETE THOSE INDICATED AND ATTACH TO SHIPPING PAPERS	
INSPECTION DATA	INSPECTION CODE
	K

Philco-Ford Corp
3900 Welsh Rd.
Willow Grove, Pa. 19090

QUANTITY	UNIT	ITEM	UNIT PRICE	AMOUNT	DESCRIPTION	REQUISITION NUMBER	POINT NO.
					A firm fixed price subcontract agreement No. 902185, hereafter referred to as the "Order", is hereby entered into between the Philco-Ford Corporation, Communication Systems Division, hereafter referred to as the "Buyer", and the Sperry Rand Corporation - Univac Division, hereafter referred to as the "Seller".	860575	5100
					Pursuant to the terms and conditions of this Order, the Seller will have the responsibility to furnish the equipment, data, and services of the Common Control Subsystem for Phase I and II of the Electronic Voice Switching System for which the Buyer is the prime contractor to the Federal Aviation Agency (F.A.A.) under contract DOT-FA73WA-3202.		
					Total firm fixed price for Phase I of the Order is \$736,510 and the total firm fixed price for Phase II of the Order is \$5,392,122.		

Continued - Page 2

INVOICE TO ACCOUNTS PAYABLE. ATTACH PROOF OF SHIPMENT, POSTAL RECEIPT, BILL OF LADING, ETC.)	BY	TO
<input checked="" type="checkbox"/> HEADQUARTERS		PHILCO-FORD CORPORATION
<input type="checkbox"/> BUYER'S ADDRESS WHEN DIFFERENT FROM HEADQUARTERS ADDRESS		<i>P. A. Young</i>
BUYER	BUYER	BUYER
LURIE	MANAGER	MANAGER
ACCOUNT CLASSIFICATION	EXP. CLASS	
2C320000	2300	
THOSE PRINTED ON THE BACK HEREOF	THOSE CALLED FOR IN PHILCO-FORD FORM CORP. 331A, 4-72	THOSE CALLED FOR IN
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Part 4.0
		2
		2
SIGNED ACCEPTS AND ACKNOWLEDGES RECEIPT OF A COPY OF TERMS AND CONDITIONS APPLICABLE TO THIS ORDER		
W. B. Wald, Treasurer and Controller Univac Defense Systems Division 2 May 1973		

COMMUNICATIONS AND TECHNICAL SERVICES DIVISION



 Sperry Rand Corp
 Univac Division

NO: 902185

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QUANTITY	REV	DESCRIPTION	PART NUMBER	DESCRIPTION	REVISION NUMBER	PCNT/AC	EX
Upon acceptance of this Order by Seller, Seller is authorized to proceed with Phase I, only. Authorization by Buyer to proceed Phase II will be subject to the conditions set forth below.							
This Order is subdivided into the following parts:							
1.0 - Scope of Work and Delivery Schedule Phase I							
2.0 - Scope of Work and Delivery Schedule Phase II							
3.0 - Special Terms and Conditions - Phases I and II							
4.0 - General Terms and Conditions - Phases I and II							
Part 1.0 - Scope of Work and Delivery Schedule - Phase I							
1.1 - Phase I - Scope of Work							
Item	QTY	DESCRIPTION					
A	3	✓ Central Processor, in accordance with Buyer's Specification No. 2077-20H007 Rev C					
B	2	✓ Magnetic Tape Element, in accordance with Buyer's Specification No. 2077-20P001 Rev. B					
C	2	✓ Mass Storage Element, in accordance with Buyer's Specification No. 2077-20H008 Rev. B					
D	3	✓ Input/Output Typewriter Element, in accordance with Buyer's Specification No. 2077-19U009 Rev. B					
E	5	✓ Interface Switching Element, in accordance with Buyer's Specification No. 2077-51D005 Rev. B					
F	1 Lot	Quality Assurance Provisions, in accordance with Buyer's Specification No. 2077-Attachment A Rev. B					
G	1 Lot	Documentation and Logistics Data-in accordance with Buyer's Specification No. 2077-Attachment L Rev β					
H	1 Lot	Reliability and Maintainability Requirements, in accordance with Buyer's Specification No 2077-Attachment C Rev B					
I	1 Lot	Milestone Schedule Reporting, in accordance with Buyer's Specification No. 2077-Attachment D Rev β					
J	1 Lot	Equipment Data Requirements, in accordance with Buyer's Specification No. 2077-Attachment E Rev β					
K	1 Lot	Common Control Software Specification, in accordance with Buyer's Specification No. 2077-20J003 Rev. A					

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COMMUNICATIONS AND TECHNICAL SERVICES DIVISION

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QUANTITY	UNIT INCL	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	REVISION NUMBER	PCATNO	DE
ITEM	QTY	DESCRIPTION						
L	1 Lot	Installation and Checkout Spares in accordance with Seller standard documentation practice #104-1. These spares will be sufficient to support 30 days operation.						
1.2	Item C	shall include addressing capability for 60 heads in the Adapters (Controllers).						
1.3		The following tasks required in Buyer's specification Nos. 2077-Attachment C, Rev. B shall be considered options. Buyer reserves the right to exercise the options within 90 days after receipt of the Order. Any commencement of effort by the Seller for these options, prior to the formal exercising of the options will be done at the Seller's risk. Impact on delivery schedule upon exercising option in 1.3.1 below will be negotiated between Buyer and Seller.						
1.3.1		Maintainability Demonstration Test referenced in paragraphs 3.2.1 and 3.4.2 - Option Price Not to Exceed \$49,805.						
1.3.2		Reliability Analysis and Predictions in accordance with RADC Reliability notebook, Volume 1, Chapter 9, Paragraph 8 referenced in paragraph 3.3.2. Option Price Not to Exceed \$52,460. Seller will have the responsibility however, as part of this Order, to perform the Reliability Analysis and Predictions referenced in paragraph 3.3.2 in accordance with Seller's Base Failure Rate Data.						
1.4		The following task required in Buyer's specifications 2077-20R007 Rev. C 2077-20P001 Rev. B, 2077-20R008 Rev. B, 2077-19U009 Rev. B shall be considered an option. Buyer reserves the right to exercise this option within 30 days after receipt of the Order. Any commencement of effort by the Seller, prior to the formal exercising of the option will be done at the Seller's risk.						
1.4.1		Connector Keying in accordance with paragraph 3.5.8 subparagraph C of specification FAA-ER-650-021. Option Price - Not to Exceed \$51,000.						
1.5		The requirement for a card processor subsystem functionally defined in Buyer's specifications 2077-20A011 Rev. B and 2077-20L001 Rev. A will be considered an option to be exercised by Buyer within 15 days after receipt of the Order by Seller. Total Option Price - Not To Exceed \$45,350. The option price is based on utilizing the Univac #1710-04 key punch, the Data Products #8330 Card Reader, and adapters, to be supplied either by Seller or Seller's vendors. IF option is exercised within 15 days after receipt of Order by Seller, there will be no change in the delivery schedule defined in 1.6.1.						
See Page 4								

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COMMUNICATIONS AND TECHNICAL SERVICES DIVISION				PURCHASE ORDER					
Sperry Rand Univac Division				NO: 902185					
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QUANTITY	UNIT MEAS.	ITEM	UNIT PRICE	PART NUMBER	DESCRIPTION	PRODUCTION NUMBER	PLANT NO.	TAX	
1.6		<u>Delivery Schedule</u>							
1.6.1		Items A thru E and L - On or before 6 months after receipt of the Order.							
1.6.2		Items F thru K - As defined in the applicable Buyer's specifications.							
1.7		Interim System - In addition to the requirements listed in 1.1 above the Seller shall furnish to the Buyer on a loan basis at no cost and for a period of 6 months, the following equipments 30 days after receipt of the Order.							
1.7.1				<u>QTY</u>	<u>DESCRIPTION</u>				
				1	Central Processing Unit (AN-BYK-15 or equivalent)				
				(1)	Uniscop #100				
				(1)	Magnetic Tapes and Controllers (Bucode #2045 or equivalent)				
Part 2.0		<u>Scope of Work and Delivery Schedule Phase II</u>							
2.1		Phase II is sub-divided into (4) production releases. Each production release shall be considered as an option, which may be exercised in whole but not in part, on or before the respective release dates noted in 2.2 below. No effort shall commence by the Seller on any production release of Phase II until the option is formally exercised by the Buyer. Any commencement of effort on Phase II by the Seller prior to the Buyer's formal exercising of the option(s) will be done at the Seller's risk.							
2.1.1		Following is a listing of the equipment required under Phase II and their respective quantities by release.							
		<u>Description</u>				<u>Production Release</u>			
						<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
2.1.1.1		Central Processor Unit, in accordance with Buyer's Specification No 2077-20H007 Rev. C	15	15	15	15	18		
2.1.1.2		Magnetic Tape Element, in accordance with Buyer's Specification No. 2077-20F001 Rev. B	5	5	5	5	6		
2.1.1.3		Mass Storage Element, in accordance with Buyer's Specification No 2077-20H008 Rev. B	10	10	10	10	12		
2.1.1.4		Input/Output Typewriter Element, in accordance with Buyer's Specification No 2077-19U009 Rev B	15	15	15	15	18		
		See Page 5							

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QUANTITY	UNIT	ITEM	DESCRIPTION	DESCRIPTION	RELEASE	POINT NO.	DATE
Description			Production Release				
			I	II	III	IV	V
2.1.1.5			Interface Switching Element, in accordance with Buyer's Specification No 2077-51D005 Rev. B	25	25	25	30
2.1.1.5			Reliability and Maintainability Requirements in accordance with Buyer's Specification No 2077 Attachment C Rev. B	1 lot	1 lot	1 lot	1 lot
2.2			Following is a schedule of production releases for Phase II, including delivery requirements.				
				<u>Date of Release</u>	<u>Start Date of Delivery</u>	<u>Rate of Delivery</u>	
2.2.1			Production Release I	35 Mos. ARO	41 Mos. ARO	20% on "Start date" and 20% every 10 weeks thereafter.	
2.2.2			Production Release II	47 Mos. ARO	53 Mos. ARO	(Same as above)	
2.2.3			Production Release III	59 Mos. ARO	65 Mos. ARO	(Same as above)	
2.2.4			Production Release IV	71 Mos. ARO	77 Mos. ARO	16-2/3% on "Start date" or 16-2/3% every ten weeks thereafter.	
2.3			The reference to "Mos. ARO" in 2.2.1 to 2.2.4 above refers to months, after receipt of the Order.				
2.4			Total fixed Option pricing for Phase II production releases is as follows:				
			2.4.1 - Production Release I			\$1,371,726	
			2.4.2 - Production Release II			\$1,253,139	
			2.4.3 - Production Release III			\$1,255,835	
			2.4.4 - Production Release IV			\$1,511,423	
2.5			In the event the option in 1.4 of the Order is exercised for Phase I, the same requirements will apply to Phase II of the Order for a total option price of \$22,400.				
2.6			In the event the option in 1.5 of the Order is exercised for Phase I, the same requirements will apply to Phase II of the Order for a total not to exceed option price of \$725,025 for the production releases defined in 2.2. Pricing for each production release will be definitized when the Option is exercised.				
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COMMUNICATIONS AND TECHNICAL SERVICES DIVISION		NO: 902185	
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QUANTITY	UNIT WEIGHT	ITEM	DESCRIPTION
3.0			<u>Special Terms and Conditions</u>
3.1.1			The following waivers are granted to the Federal Aviation Agency's specification #FAA-ER-650-021 included in the Buyer's specification 2077-10A066 Rev. B, 2077-20L001 Rev. A, 2077-20H007 Rev. C, provided that these same affected hardware items are utilized as integral parts of the AN-UJK-15 product line design and will be qualified under MIL-E-16400 prior to the commencement of Part 2.0 of the Order. The waiver list consists of the following paragraphs in #FAA-ER-650-021: 3.5.28, 3.3.18.6, 3.3.19.2.2, 3.3.19.2.4, 3.3.1.3.5.12, 3.5.29, 3.5.19 subparagraph e), 3.7.4, 3.3.7, 3.5.14, 3.5.10.7, 3.5.29, 3.12.1.5, 3.3.16.2.1 (except Condition 1, Table A 3.3.16.2.2, 3.3.16.2.5, 3.3.16.2.6, 3.3.17.1
3.1.2			The following waivers are granted to the Federal Aviation Agency's specification #FAA-ER-650-021 included in the Buyer's specification listed in 3.1.1 of the Order, provided that Seller supplies to the Buyer engineering data relating to noise, thermal characteristics and EMI parameters. This waiver list consists of the following paragraphs of FAA-ER-650-021 3.3.5, 3.3.10, 3.3.10.1, 3.3.10.2, 3.3.13.5, 3.3.27.1, 3.3.4, 3.3.10.3
3.1.3			The following waivers are granted to the extent noted below to the Federal Aviation Agency's specification #FAA-ER-650-021 included in the Buyer's specifications listed in 3.1.1 of the Order:
3.1.3.1			FAA-ER-650-021 Paragraph Ref. 3.3.21 - Separation of signal and chassis ground will be accomplished in accordance with paragraph 3.6.2.2 of the Order.
3.1.3.2			FAA-ER-650-021 Paragraph Ref. 3.3.22 - This paragraph will be met only for the adapters (controllers) required in Buyer's specifications 2077-20P001 Rev. B, 2077-20H008 Rev. B, 2077-19U009 Rev. B, but exclude power supplies which will meet MIL-E-16400.
3.1.4			The following clarification is provided relative to Federal Avionic Agency's specification FAA-ER-650-021 in the Buyer's specifications listed in 3.1.1 of the Order.
3.1.4.1			FAA-ER-650-021 Paragraph Ref. 3.3.26 - Buyer considers the wiring side of the interface connector plate assembly to be back plane wiring.
3.1.4.2			FAA-ER-650-021 Paragraph Ref. 3.5.15 - Buyer has determined that the running time meter in the AN-UJK-15 is satisfactory.
3.1.4.3			FAA-ER-650-021 Paragraph Ref. 3.8.2.2 - Buyer considers the dyed anodized finish utilized by the Seller on the control panels to be equal to that of the Wrinlay process.
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QUANTITY		UNIT	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	REVISION NUMBER	POST NO.	INTL
3.1.4.4				FAA-ER-650-021 Paragraph Ref. 3.8.2.3 - Buyer considers the Seller's method of rubber stamping and coating with a clear lacquer or rubber stamping with epoxy based ink is considered superior to stenciling.					
3.2				A waiver is granted Paragraphs 3.4.6, 3.5.17 subparagraphs a) and c) and Appendix II of the Federal Aviation Agency's specification #FAA-ER-650-021 included in the Buyer's specifications Nos. 2077-20H007 Rev. C, 2077-51D006 Rev. B, 2077-20L001 Rev. A and 2077-10A066 Rev. B, and 2077-Attachment A, Rev. B and this waiver is granted if the equipments are being qualified under MIL-E-16400 and MIL-STD-749A.					
3.3				The following waiver and change is granted to Buyer's specification No. 2077-20L001 Rev. A.					
3.3.1				A waiver is granted to Paragraph 4.0 to the extent that the off-line equipments are excluded from the requirement to be General Services Administration (GSA) listed.					
3.3.2				All references to the (Card Processor) sub-system (Punch/Reader/Controller) in Paragraphs 1.1.D, 3.0, 3.1, 3.2.1, 3.2.3.3, 3.2.3.4 and 4.0 are not applicable.					
3.4				A waiver is granted to the requirements of F.A.A. Specification No. FAA-ER-650-021 to the extent noted in 3.1 and 3.2 inclusive above for the adapters (controllers) in Buyer's specifications Nos. 2077-20P001 Rev. B, 2077-20H008 Rev. B and 2077-19U009 Rev. B provided that this equipment is not newly designed and meets the requirements of MIL-E-16400 to the same extent as the AN-UYS-15. In this regard, the Seller shall provide a Certification of Compliance. It is understood that these equipments will require repackaging to meet the Buyer's specifications.					
3.5				The following modifications are applicable to Buyer's specification No. 2077 - Attachment C, Rev. B.					
3.5.1				Paragraph Reference 3.1 Sheet 3, Sixth line from bottom: Change "Mass Storage and Mass Storage Control 1000" to "Mass Storage and Mass Storage Control 2,000".					
3.5.2				Paragraph Reference 3.3.1 Sheet 6, first line: Delete "from failure rate analysis and functional". Sheet 6, third and fourth lines below center: Change "120" and "250" to "100" and "230" for the AN-UYS-15 and "100" and "250" for the balance of the equipment.					
3.5.3				Reference Paragraph 3.3.2					

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QUANTITY	UNITS	ITEM	REVISED	DATE	PART NUMBER	DESCRIPTION	RELATION	FORMING	QTY
						award of contract for the AN/UYK-15 and 150 days after the award of contract for the balance of the equipment". An interim submission shall be provided for all equipment except the AN-UYK-15 within 100 days after award of contract."			
3.5.6						Paragraph Reference 3.3.2 - Add the following sentence at the top of sheet 7 after "(AD-921640)": "Univac failure rate data from Univac document PX4388-3, Failure Rate/Stress Data, 3rd Edition may be employed for Univac designed equipment in lieu of RADC Notebook failure rate data. This sentence does not apply if option in 1.3.2 of Order is exercised.			
3.6						The following modifications and agreements reached between Buyer and Seller are applicable to the following Buyer's specifications:			
3.6.1						Specification No. 2077-102066 Rev. B.			
3.6.1.1						Reference Paragraph 2.4.5 The separation of signal and chassis ground in the AN-UYK-15 Computer would be accomplished as part of the IOC parity included in this Order.			
3.6.1.2						Reference Paragraph 2.5 In sections 2.5 through 2.5.4 "unattended operation" is not required for equipment procured through Seller. In addendum 1 to the specification add "Attended Operation Only" under the notes column for paragraphs 2.5 through 2.5.4.			
3.6.1.3						Reference Addendum 1 Delete note 5 "Not applicable".			
3.6.2						Specification No. 2077-20L001 Rev. A.			
3.6.2.1						Reference Paragraph 1.1 Change paragraph 1.1B to read as follows: "(2) Magnetic Disc Elements consisting of one upgraded Librascope L107A-17-2050 Magnetic Disc and one Univac three part disc controller each. The disc shall be upgraded through the use of ceramic integrated circuits screened to level B of MIL-STD-883, and be similar for the EVS application to the L107MA disc. The predicted MTBF of the upgraded disc unit in the environment specified in paragraph 4.0 shall be the same as the MTBF for the Librascope L107MA-17". In paragraph 1.1C replace "Bucode 2045" with "Kennedy 8108" and replace "Datum Formatter 5091" with "Kennedy Formatter 8208".			
3.6.2.2						Reference Paragraph 4.3 Seller will isolate the grounds on the Teletype adapter, the CPU, the magnetic tape adapter and the disc controller only.			
3.6.2.3						Reference Paragraph 4.6.A Change the first sentence of paragraph 4.6.A to read as follows: A means shall be provided to enable the removal or insertion of any module or printed circuit card within the off-line disc controller without interrupting any logic or electronic disturbance.			

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QUANTITY		UNIT	ITEM	DESCRIPTION	REVISION NUMBER	PART NO.	DATE
3.6.2.4				affect the on-line system operation. Reference Paragraph 5.4.1. In paragraph 5.4.1 change the words "Test Jig" appearing in the third from the last sentence to "Card Extender".			
3.6.2.5				Reference Paragraph 5.5. Buyer approves the use of the 56 pin connector and printed circuit card as defined in Seller drawing 7901665 for use in AN/VYK-15 Computer, mass storage adapter, magnetic tape adapter and I/O adapter.			
3.6.2.6				Reference Paragraph 5.6. Buyer approves the signal, ground and voltage pin assignments and connection on the Seller manufactured equipments to the extent that they are identical to the printed circuit cards used in the AN/VYK-15 Computer and defined in Seller V drawing 7901655.			
3.6.2.7				Reference Addendum 1 Matrix Change "AM" to "NM" in Addendum 1 Matrix, paragraph 4.6.A, for all equipment and "M" for the disc controller.			
3.6.2.8				Reference Addendum 1 Item 1 Delete the second sentence under Item 1 of Addendum 1.			
3.6.2.9				Reference Addendum 1 Note 5 Delete note 5 and change all references to "NA" in the matrix to "I".			
3.6.3				Specification No. 2077-20H008 Rev. B			
3.6.3.1				Reference Paragraph 3.0 In paragraph 3.0 change the MTBF of the mass storage element from "5,000" hours to "2,000" hours.			
3.6.3.2				Reference Paragraph 3.1 and Addendum 1 Item 1 All discs will require 60 operational data heads.			
3.6.3.3				Reference Paragraph 3.2.2 Change paragraph 3.2.2 "Access Time" from "33 milliseconds" to "36 milliseconds".			
3.6.3.4				Reference Addendum 1 Item 2 Change the first sentence to read as follows: "Replace sections 3.2.5.1 through 3.2.5.6 with the following paragraph".			
3.6.3.5				Reference Addendum 1 Item 2 In Addendum 1 Item 2 change 10 microseconds to 12 microseconds as measured from the time the controller receives an acknowledge from the IOC.			

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QUANTITY	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	QUANTITY	POSTAGE	EXR
3.6.3.6		Reference Paragraph 3.4.4 Change the first sentence to read as follows: "As a minimum word parity on its equivalent, must be maintained throughout the mass storage element".					
3.6.3.7		Reference Paragraph 5.1.2 Change the depth requirement of paragraph 5.1.2 from "20 inches deep" to "28 inches deep including cable connectors and space necessary for cables required to interface the IOC via overhead cables".					
3.6.3.8		Reference Paragraph 5.4 The selection of integrated circuits in the disc controller shall be in accordance with UNIVAC (-01) microelectronics devices. These devices shall have an operating range of 0°C to +70°C and shall meet the Class C requirements of MIL-STD-883 Notice 2, Methods 5004 and 5005 as defined by the individual suppliers method for compliance with MIL-M-38510 in accordance with the Seller letter dated 7 March 1973 Serial #82 that provides justification and data for the selection of parts.					
3.6.3.9		Reference Paragraph 5.6 Paragraph 5.6 is a system design guideline. Seller will not be required to meet the audible noise requirements of paragraph 5.6.					
3.6.3.10		Reference Paragraph 5.8 Paragraph 5.8 is a system design guideline. Seller will not be required to meet the EMI requirements stated in the last sentence of paragraph 5.8.					
3.6.3.11		Reference Paragraph 5.10 Non-Standard parts submission shall be in accordance with MIL-STD-749A in accordance with the Seller letter dated 7 March 1973 Serial #82 that provided justification and data relative to non-standard parts submission.					
3.6.3.12		Reference Paragraph 5.11 Change the paragraph referenced in the last sentence of paragraph 5.11 from "paragraph 2.3" to "paragraph 2.3.1".					
3.6.3.13		Reference Paragraph 8.3 Delete paragraph 8.3 "Design Documentation".					
3.6.3.14		Reference Paragraph 3.2.1 Delete in its entirety and substitute with, "The mass storage controller shall be capable of addressing a minimum of 40 data tracks (heads), and shall be modularly expandable in addressing capability, in 20 increments, up to a maximum of 80 data tracks (heads)."					
3.6.3.15		Reference Paragraph 3.2.4 and Note: 1 Delete in their entirety and substitute with, "The disc unit shall be formatted into 64 sectors per track and 64, 16 bit data words per sector. Control information shall be included additionally, and as necessary, to comply with paragraph 3.4.4".					

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COMMUNICATIONS AND TECHNICAL SERVICES DIVISION				PURCH. JE ORDER					
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QUANTITY	UNIT MEAS.	ITEM	REFERENCE SOURCE	FIGURE	PART NUMBER	DESCRIPTION	REVISION NUMBERS	POINT NO.	NOTE
3.6.3.16			Reference Paragraph 4.2.1			Change the second sentence of paragraph 4.2.1 to read as follows: Appropriate sequencing of D C power supply shall be automatically initiated in such a manner as to protect all components. A visual indicator shall be provided to indicate the availability of +5 Volt D C Voltage.			
3.6.4			Specification No. 2077-19U009 Rev. B						
3.6.4.1			Reference Paragraph 3.0			Delete "GSA listed" from the second sentence of paragraph 3.0 "Requirement - General".			
3.6.4.2			Reference Paragraph 5.1.2			Change the height in paragraph 5.1.2 "Teletype Adapter" from "6" inches high" to "8 3/4 inches high".			
3.6.4.3			Reference Paragraph 5.4			Change paragraph 5.4 to read as follows: "The I/O teletype adapter shall be constructed using convection cooled printed wiring assemblies. Dual-in-line packages shall be used to provide all logic elements of the adapter. The selection of these integrat circuits shall be in accordance with UNIVAC (-01) microelectronic devices. These devices shall have an operating range of 0° to +70° and shall meet the Class C requirements of MIL-STD-883 Notice 2, Methods 5004 and 5005 as defined by the individual suppliers method for compliance with MIL-N-38510 in accordance with the Seller letter dated 7 March 1973 Serial #82 which provides justification and data for the selection of parts.			
3.6.4.4			Reference Paragraph 5.5			Change paragraph 5.5 to read "the I/O typewriter adapter shall meet the following paragraphs of specification FA3-E-2479: 3.12.1, 3.12.1.1, 3.12.1.2, 3.12.1.2.1, 3.12.1.2.2, 3.12.1.3, 3.12.1.4(a) & c), 3.12.1.5, 3.12.1.5.1, 3.12.2.2, 3.12.2.3, 3.12.1.7, 3.12.2, 3.12.2.5. Paragraphs 3.12.2.2, 3.12.2.3, are for information of purposes only.			
3.6.4.5			Reference Paragraph 5.6			Paragraph 5.6 is a system design guideline. Seller will not be required to meet the audible noise levels of paragraph 5.6.			
3.6.4.6			Reference Addendum 1			Add new Item #3. "Delete the last sentence of paragraph 4.2.1 and substitute the following: Appropriate sequencing of D C power supplies shall be automatically initiated in such a manner as to protect all components. A visual indicator shall be provided to indicate the availability of +5 voltage D.C. voltage."			
3.6.5			Specification No. 2077-20H007 Rev. C						
3.6.5.1			Reference Paragraph 3.3.2 Page 10			The following six instructions should be deleted from Table 1.			

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QUANTITY	UNIT MEAS	ITEM	REFERENCE SYMBOLS	SYMBOL	PART NUMBER	DESCRIPTION	REGISTER NUMBER	POINT NO. USE
				PCX		Processor Command out		
				PTX		Processor Transfer		
				PTC		Processor Transfer or Command		
				AC		Activity Control		
				RC		Read Control Memory		
				WC		Write Control Memory		
3.6.5.2						Reference Paragraph 3.5 Page 15 Delete the Privileged Instruction Error Interrupt from the list of interrupts. This interrupt is being deleted because no privileged instructions are available with the AN/UYK-15 Processor.		
3.6.5.3						Reference Paragraph 3.6 and 3.6.1 Add the following sentence to paragraph 3.6. The CP shall be capable of communicating with one Input/Output Controller (IOC). The CP shall be expandable to permit communications with up to four IOC's. Delete paragraph 3.6.1		
3.6.5.4						Reference Paragraph 3.7.1 Page 17 The fourth sentence of this paragraph should be changed to read, "I/O channel word length shall be 16 bits plus 2 parity bits". The above change makes the IOC/peripheral interface compatible with the memory parity implementation.		
3.6.5.5						Reference Paragraph 3.7.1 Page 18 In figure 1, which describes the I/Ochannel Interface lines, increase the number of data parity lines for the output channel and input channel from one line each to two lines each.		
3.6.5.6						Reference Paragraph 3.7.2 Page 19 Table 2. IOC to CP Interface Delete the binary code 10 corresponding to a hardware error and delete the work (option) from the binary code 11 = I/O data parity error.		
3.6.5.7						Reference Paragraph 3.7.4 Pages 20 and 22 Delete subparagraph 3.7.4.B. Also delete the letter W in figure 4 on page 22 beneath bit 2 ¹³ of location zero.		
3.6.5.8						Reference Paragraph 5.4 The selection of integrated circuits shall be in accordance with UNIVAC (-01) microelectronics devices. These devices shall have an operating range of 0° to + 70° C and shall meet the Class C requirements of MIL-STD-883 Notice 2, Methods 5004 and 5005 as defined by the individual supplier's method for compliance with MIL-M-38510 in accordance with the Seller letter dated 7 March 1973 Serial # 82 which provides justification and data for the selection of parts.		

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QUANTITY		UNIT	ITEM	DESCRIPTION	FIGURE NUMBER	POINT NO.
3.6.5.9				Reference Paragraphs 5.6 and 5.8 It is Buyer's intent to purchase the AN/UYK-15 Computers legs - cabinets. Buyer will mount the AN/UYK-15 chassis in a standard 19 inch rack. The audible noise and RFI characteristics of the computer will depend to some extent on the cabinet selected, method of packaging and RFI isolation techniques employed. These two paragraphs are included in this procurement specification as system design guidelines, and the Seller will not be required to meet audible noise requirement of 5.6 or the EMI requirements stated in the last sentence of 5.8.		
3.6.5.10				Reference Paragraph 5.11 Nonstandard parts submission shall be in accordance with MIL-STD 749A in accordance with the Seller letter dated 7 March 1973 Serial #82 that provided justification and data relative to non-standard parts submission.		
3.6.6				Specification No. 2077-20P001 Rev. B		
3.6.6.1				Reference Paragraph 1.0 and 3.3 Change Items A and B under paragraph 1.0 "Scope" to read "A. Kennedy Magnetic Tape Transport 8108" and "B. Kennedy Formatter 8208". Replace the reference to "Datum formatter" in the first sentence of paragraph 3.3. with "Kennedy formatter".		
3.6.6.2				Reference Paragraph 4.2.1 Change the second sentence of paragraph 4.2.1 to read as follows: Appropriate sequencing of D.C. power supply shall be automatically initiated in such a manner as to protect all components. A visual indicator shall be provided to indicate the availability of + 5 Volt D.C. voltage.		
3.6.6.3				Reference Paragraph 5.4 Delete the second sentence in paragraph 5.4 and insert the following: "Dual-in-line packages shall be used to provide all logic elements of the tape adapter. Selection of these integrated circuits shall be in accordance with UNIVAC (-01) microelectronics services. These devices shall have an operating range of 0°C to 70°C and shall meet Class C requirements of MIL-STD-883 Notice 2, Methods 5004 and 5005 as defined by the individual suppliers method for compliance with MIL-M-38510 in accordance with the Seller letter dated 7 March 1973 Serial #82 which provides justification and data for the selection of parts".		

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QUANTITY	UNIT	ITEM	UNIT PRICE	EXT. PRICE	PART NUMBER	DESCRIPTION	REVISION NUMBER	PCNT NO	USE
3.6.6.4						Reference Paragraph 5.6 Paragraph 5.6 "Audible Noise" is a system design guideline. Seller will not be required to meet the audible noise level.			
3.6.6.5						Reference Paragraph 5.7 Paragraph 5.7 "RFI/EMI is a system design guideline. Seller will not be required to meet these RFI/EMI requirements.			
3.6.6.6						Reference paragraph 5.3 Delete the paragraph 5.3 and substitute the following: There shall be sufficient interface connectors and signal cables to permit the connection of the magnetic tape element to each other as well as the IOC via a 1 x 3 electronic switch matrix. The 1 x 3 electronic switch matrix shall contain the registers necessary to remember the configuration status of the magnetic tape element. The 1 x 3 electronic switch shall permit communications only between the processor and magnetic tape element as specified by the configuration commands. The configuration commands shall be sent to the 1 x 3 electronic switch by the monitor switch controller over three (3) interface lines. One of these interface lines shall be a control signal and the other two (2) lines shall be data signals. Whenever the control signal goes to the one (1) state, the 1 x 3 electronic switch shall clear the configuration register and the magnetic tape controller electronics and strobe the data lines into the configuration register. The following codes on the data lines shall be interpreted as follows:			
			MSB		LSB	ACTION			
			0		0	Clear the Switch			
			0		1	Configure to Proc # 1			
			1		0	Configure to Proc # 2			
			1		1	Configure to Proc # 3			
			These external signals shall be a do signal compatible with Univac interface Levels. An open line with prohibit switching of the 1 x 3 electronic switch as defined by paragraph 4 of specification 2077-20L001, Rev. A.						
			See Page						

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QUANTITY	UNIT	ITEM	DESCRIPTION	REVISION	DATE	FIG. NO.	SIZE
3.6.7.5			Reference paragraph Note 1, General Sheet 14, line 6 change "...subsequent field modification..." to read "...subsequent Univac generated field modifications..."				
3.6.7.5			Reference paragraph Note 2				
3.6.7.5.1			Sheet 16, line 6 Delete words "flow charts"				
3.6.7.5.2			Sheet 16, Paragraph <u>Test Procedure</u> Change title to: <u>Method of Acceptance</u> Replace first sentence with: "An acceptance demonstration of each Test Program will be performed. The demonstration will include 20 physically simulated faults which will be selected and provided by Philco-Ford, along with the procedure for simulating the faults."				
3.6.7.5.3			Sheet 17, paragraph <u>Other Requirements</u> Replace lines 10 through 13 with "personnel to make use of the diagnostics, or to modify them as necessary for use in further analysis of failures. Two complete sets of appropriate logic diagrams will be made available to Buyer 30 days prior to the scheduled acceptance of the Seller supplied test programs. These diagrams will be adequate for use by Philco-Ford in selecting the simulated faults previously referenced."				
3.6.7.7			Add Addendum 2 as follows: This addendum has been prepared as a result of Buyer/Seller discussions and is intended to offer clarification and/or alteration of this specification in areas mutually agreed upon.				
3.6.7.7.1			<u>Item 1</u> The definition of the term "code edit", abbreviated as "CE", is equivalent to that of "Program listing" abbreviated as "PL".				
3.6.7.7.2			<u>Item 2</u> Documentation quantity requirements for manuals, handbooks, and study guides, as defined in Table 1, may be satisfied in either of two ways: 1) by supplying the quantity listed in Table 1; or 2) by supplying at least 4 copies along with a copyright release to make additional copies for each item where the required number of copies is not being supplied.				
3.6.7.7.3			<u>Item 3</u> The requirement for Programmer's reference manuals as indicated in Table 1 is deleted.				
3.6.7.7.4			<u>Item 4</u> It is understood that the acceptance tests of the Test programs will take place in the Seller's facility. Acceptance will be by 1) submission of program to Buyer for review and approval, 2) acceptance in St. Paul on a unit test basis as defined in Note 2 of this specification.				

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			BASE	EXTS					
3.6.7.7.5		Item 5							
<p>It is understood that the support software will be demonstrated at the Buyer's facility by Seller following installation by Buyer. The demonstration shall show that the software required by this specification has been delivered, and that the modifications to the standard AN/UYR-15 software are operable and have not degraded the performance of the standard software.</p>									
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QUANTITY	UNIT	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	QUANTITY	UNIT	DESCRIPTION
3.6.8			The following comments and/or modifications are applicable to Buyer's specification No. 2077-51D006, Rev. B.					
3.6.8.1			Paragraph Reference 5.3 Add the following sentence: "A total of 50 feet of signal cable is required between the teletype adapter, the switches and the teletype unit".					
3.6.8.2			Paragraph Reference 5.4 Replace the reference to specification "FAA-ER-650-021" with "MIL-E-16400 to the extent indicated in Seller's Report PX72000-5500 and PX72000-5623"					
3.6.8.3			Paragraph Reference 5.5 Change this paragraph to read as follows: The Seller's 1299C interconnection panel and associated switches, connectors and cabling shall be capable of operating over a temperature of +10°C to +50°C, a relative humidity of 10% to 80% and an altitude of 0 to 10,000 feet above sea level. This equipment shall also be capable of withstanding nonoperating and storage conditions of a -50°C to +70°C temperature, up to 100% humidity including condensation, and or altitude of 0 to 50,000 feet above sea level".					
3.6.8.4			Paragraph Reference 5.7 Seller will not be required to meet the RFI/EMI requirements of this paragraph. This requirement is for information purposes only.					
3.6.8.5			Paragraph Reference 5.10 Seller will not be required to meet the requirements of this paragraph. The cabinet construction shall be consistent with best commercial practices.					
3.6.8.6			Paragraph Reference 5.11 Buyer and Seller will mutually agree to the labeling which will be furnished by Seller.					
3.6.8.7			Change paragraph 3.2.1 with the following: The operation of the switches in moving the switch from an IOC connection to an off connection, to the next IOC connection and so on, will produce no transients or parity faults to interrupt or disturb the ongoing operation of the processors to which the peripherals are connected whenever the IOC channel for these devices are inactive. Open positions shall be inactive positions with appropriate shielding to protect against noise pick-up which could be interpreted as a signal to an inactive IOC channel.					
					See Page 20			

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							SEE PAGE 21		
3.6.9							The following comments and/or modifications are applicable to Buyer's specification 2077-Attachment L, Rev. 0:		
3.6.9.1							Paragraph References 3.1 to 3.1.5 These paragraphs are clarified as follows:		
3.6.9.1.1							Seller shall provide diagnostics and manual procedures to "trouble shoot" failures to the board level for the AN-UYN-15, only. In addition Seller shall provide a list of maintenance support equipment to be used in conjunction with the diagnostics and manual procedures.		
3.6.9.1.2							On all other equipment furnished by Seller, Seller shall provide a list of maintenance support equipment that when used in conjunction with Seller supplied manuals, by the recommended persons skill levels, will enable Buyer to isolate failures to the P.C. board level.		
3.6.9.1.3							Seller shall provide the factory acceptance test procedures and test results for all equipment furnished in this Order by Seller, except the Teletype equipment.		
3.6.9.2							Paragraph References 3.3 and 3.4 Delete these paragraphs in their entirety.		
3.6.9.3							Paragraph Reference 3.5 Seller will provide a reasonable quality reproducible of the printed wiring, which will be fully adequate for maintenance purposes.		
3.6.9.4							Paragraph Reference 3.6 Seller will provide engineering drawings for adapters (controllers Seller will also provide engineering drawings from Seller's vendors, whenever available.		
3.6.9.5							Paragraph Reference 3.7.3.2 (Delete subparagraphs a) and c), only.		
3.6.9.6							Paragraph Reference 3.7.3.3 Seller provided commercial manuals for all equipment furnished by Seller will be acceptable to meet the requirements of this paragraph.		
3.6.9.7							Paragraph Reference 3.7.3.4 Seller provided commercial manuals for all equipment furnished by Seller will be acceptable to meet the requirements of this paragraph.		

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QUANTITY	UNIT (IF APPLICABLE)	ITEM	UNIT PRICE (IF APPLICABLE)	DESCRIPTION	REDUCTION MULTIPLE	ACQ. DATE	DEL.
3.6.9.8				Paragraph Reference 3.7.3.5 Seller will provide data to Buyer to enable fault isolation to P.C. Board level only on the UYK-15. On all other equipment maintenance data will be provided by Seller as it exists in the manuals to be supplied.			
3.6.9.9				Paragraph Reference 3.7.3.5.2 Seller will provide data related to test prints with constant levels.			
3.6.9.10				Paragraph References 3.7.3.5.3 and 3.7.3.5.6 Seller will meet the requirements of these paragraphs by providing data required in paragraph 3.6.9.1.3 of the Order.			
3.6.9.11				Paragraph Reference 3.7.3.5.5 Delete this paragraph in its entirety			
3.6.9.12				Paragraph Reference 3.7.3.5.7 Delete this paragraph in its entirety.			
3.6.9.13				Paragraph Reference 3.7.3.7 and 3.7.5.1 Identification of piece parts by means of line drawings in parts lists in Seller provided manuals are an acceptable substitute for photographs.			
3.6.9.14				Paragraph Reference 3.7.5.2 Seller grants permission to Buyer to reproduce all data contained in Seller provided commercial manuals, except for Teletype equipment which may be given upon request from Seller at time of procurement. Seller agrees that all data in subject manuals will be legible and camera reproducible.			
3.6.9.15				Paragraph Reference 3.9 Seller agrees to meet the requirements of this paragraph for a period of 5 years after delivery of equipment furnished in this Order, with the exception of the Disc, which will be 2 years and the Teletype equipment which is unknown.			
3.6.9.16				It is understood, notwithstanding any requirements included elsewhere in the Order, Seller shall not be required to provide repair data to the piece part level.			
3.6.10				The following comments and/or modifications are applicable to Buyer's specifications 2077-Attachment A, Rev. B:			
3.6.10.1				A waiver is granted to Seller's vendors not used in the manufacture of Seller's equipment to meet the requirements of 2077-Attachment A, Rev. B; however, this specification will apply to Seller's manufactured equipment and the vendors used in the manufacture of Seller's equipment with the following deviations:			

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QUANTITY		UNIT	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	REVISION NUMBER	PART NO.	SIZE
3.6.10.1.1				Paragraph Reference 2.4-Page 6 Next to last sentence beginning "Philco-Ford Product Assurance approval" will be deleted.					
3.6.10.1.2				Paragraph References 6.1 and 6.3 Delete the reference to "FAA-ER-650-021" to "comparable requirements of MIL-E-16400 and MIL-STD-749A.					
3.6.10.1.3				Paragraph Reference 6.2 Delete this paragraph and substitute the following: "Standard and non-standard parts and materials do not require Buyer approval; however, in order to provide Buyer with objective evidence that parts and materials meet the requirements of applicable MIL specifications, it will be necessary for Seller to make available for Buyer review, copies of invoices which verify QPL sourcing. Non standard parts and materials require Buyer's approval under the provisions of MIL-STD-749A".					
3.6.10.2				In addition to Buyer's specification 2077-Attachment A, Rev. B the following paragraphs as modified on 19 April 1973 of Buyer's form CTS 243, dated 3/73 entitled "Supplier Product Assurance Requirements" apply: SPAR-1, 1B, 2, 2A, 4, 4A, 6, 6B, 7, 13, 14, 2					
3.6.11				In addition a waiver is granted to III A 1 of CTS 243. A waiver is granted to all of the paragraphs contained in sections 4, 5 and 6 of F.A.A. specification #FAA-ER-650-021.					
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QUANTITY	UNITS	ITEM	UNIT PRICE DOLLARS	EXTD	PART NUMBER	DESCRIPTION	RES. QUANT. ALLOWED	ACQ. INQ. DATE
3.7						The above noted waivers and deviations in 3.1 thru 3.6 inclusive shall be the extent of the exceptions that will be taken by the Seller to the Buyer's specifications and applicable F.A.A. referenced specifications.		
3.8						In addition to the Buyer's specifications referenced in Parts 1.0 and 2.0 the following general specifications as modified in 3.6 above shall also apply to Parts 1.0 and 2.0:		
						<u>DESCRIPTION</u>		<u>BUYER'S SPECIFICATION NO.</u>
						Common Control Software		2077-20J003 Rev. A
						General Equipment Contract Specification		2077-10A066 Rev. B
						Common Control Subsystem Specification		2077-20L001 Rev. A

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QUANTITY	UNIT	ITEM	LOT/PRICE REVISION	DATE	PART NUMBER	DESCRIPTION	PLANT/STATION NUMBER	POINT NO. (3)
1.0						<u>General Terms and Conditions for Phases I and II</u>		
1.1						<p>In addition to the terms, conditions and specifications noted in Parts 1.0, 2.0 and 3.0 above, Parts I and II inclusive and clause 5 of Part III of the general terms and conditions Corp 331 dated 4/72, also apply to Phase I and II of this order with the following exceptions:</p> <p>Clause 2 - Deleted in its entirety</p> <p>Clause 3 - Add "Provisions of this clause apply equally as well to the Buyer when its employees, agents subcontractors (other than Seller) and/or lower tier subcontractors (other than the Seller's) enter premises occupied by or under the control of Seller in the performance of this Order"</p> <p>Clause 4 - Deleted in its entirety</p> <p>Clause 5 - Add: "(a) Supplies will be shipped FOB Seller's plant or plants; b) transportation charges will be paid by Buyer; c) Inspection and acceptance will be at the Place of Manufacture, utilizing a mutually agreed upon Factory Acceptance Test"</p> <p>Clause 6 - Add: Line 9, after the word "are" insert the phrase "Independently developed by Seller".</p> <p>Clause 7 - Add: "Buyer agrees to furnish Seller, upon request, all applicable certificates of exemption".</p> <p>Clause 9 - Delete the second and third sentences of paragraph (c).</p> <p>Clause 12- Delete the sentence "No provision herein of acceptance shall exclude any warranty or constitute a waiver thereof.</p> <p>Clause 14- Delete in its entirety and substitute the following clause "Seller warrants that the prices of the items of its manufacture do not exceed those charged by Seller to any other customer purchasing the same items in like quantities under substantially the same circumstances and conditions."</p> <p>Clause 17- Add to paragraph d): "Seller's liability for latent defects in all items delivered by Seller shall extend for the same period as any express warranty/guarantee that is applicable in this order.</p>		

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QUANTITY	UNIT	ITEM	DESCRIPTION	REVISION	DATE
			<p>Clause 19 - Delete Paragraph (f) and substitute the following: "Seller shall be liable only for direct damages resulting from its default provided that the direct damages do not exceed the total value of Phase I and II of the Order as it may be hereafter amended and in no event for consequential damages.</p> <p>Seller shall be liable for excess costs incurred by Buyer in procuring similar supplies or services subsequent to the date of Buyer's notice of default to Seller hereunder provided that the reproced supplies or service are required to meet a substantially similar statement of work, specifications, terms and conditions and delivery requirements as it's applicable to this Order. For purposes of this clause excess costs of reprocedment shall be considered direct damages".</p> <p>Clause 24 - Add: Audit rights granted pursuant to paragraph (k) of the above clause shall be exercised by Government officials only". Delete the provision which authorized an audit by a mutually acceptable independent audit agency.</p> <p>Clause 32 - Substitute the rate of withholding from 10% to 1% or \$10,000 whichever is less.</p> <p>Clauses - 41, 42, 46, 47, 48, 49 - Delete in their entirety</p> <p>Clauses 53 - Delete in paragraph (a) (ii) the words "the" "default" "or" and delete paragraph 8) in its entirety.</p> <p>NOTE: It should be understood by the Seller that although the "Stop Work" clause does not provide for default after a Stop Work Order, the Buyer retains full freedom to default Seller in accordance with and subject to Clause 19.</p>		
4.2			The following additional clauses shall also apply to Phase I and II of this Order.		
4.2.1			Philco-Ford Certification "A", Stabilization of Prices, Rents and Wages.		
4.2.2			DOT P4, clause 20-Entitled "Notice of Delays". change the words "Contracting Officer" to read "Buyer" in paragraph a)		
			See Page 26		

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QUANTITY	UNIT	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	REVISION	DATE
4.2.3		DOT P4,	Clause 37 - Entitled "Rights in Data (See details in pages 26 A & B)				
4.2.4		FPR Temporary Regulation #28 - Entitled "Price Certification".					
4.2.5		FPR 1-132/8 - Entitled "Notice of Maximum Permissible Escalation in Wage and Price Control".					
4.2.6		Univac Standard Hardware Warranty Clause (May 1971), except that the warranty period is 12 months instead of 6 months.					
4.2.7		ASPR 7-104.35 (Jan 72) Entitled, "Progress Payments for other than Small Business Concerns". Billing and liquidation rate to be 80%.					
4.2.8		Seller agrees to furnish to the Buyer and government at no cost, updated copies of the Commercial Technical manual for the RM-UVK-15 during the life of the Electronic Voice Switching Program.					
4.2.9		Seller agrees to furnish to the Government their "U" drawings identifying the component, its characteristics and the manufacturer, in the event a component contained in the Seller's manufactured equipment is identified as a high failure rate component.					
4.2.10		Seller agrees to furnish to the Government data adequate to procure and/or manufacture replacement components, in the event the Seller discontinues marketing its product line equipment. Cost for this data will be limited to compilation and reproduction prices.					

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QUANTITY	UNIT	ITEM	UNIT PRICE	EXT. PRICE	PART NUMBER	DESCRIPTION	PROVISION NUMBER	PCAT. NO.	USE
		Ref. 4.2.3				Item G (1) Lot documentation and logistics as listed below;			
		*1				Central Processor Element PX6725-0-4 Technical Manual PX7845-0-3 Maintenance PX6475-0-3 Diagnostics			
		2				Magnetic Tape Elements a. Operation Maintenance Manual System 8000 Model 8208 NRZI Format Control Unit b. Operation Maintenance Manual System 8000 Model 8107, 8108 and 8109 synchronous digital magnetic tape recorder			
		3				Mass Storage Element Instruction and Maintenance Manual Series L 107A Disc Memory Model L107A-P170000305			
		4				Card Processor Element Open			
		5				Input/Output typewriter element a. 295 B Motor Manual b. 317 B Volume 1 & 2 Operation assembly and adjustment manual c. 1209B Parts manual			
		*6				Interface switching element a. NAV-ship manual 0967-315-4010 b. PX3123-0-2			
		*7				Magnetic Tape Element Controller Manuscript Manual in accordance with Univac Standard Practice Manual 106-2-4 Type I B for Phase I. Phase II manuals will be in accordance with Univac Standard Practice 106-2-4 Type I A.			
		*8				Mass Storage Element Controller Same as 7 above			
		9				Card Processor Element Controller Open			
						See Page 26 B			

HILCO-FORD CORPORATION

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NSperry Rand
Univac Division

NO: 902185

PAGE 26 B OF 26 B PAGES

QUANTITY	UNITS	ITEM	UNIT PRICE	TOTAL	PART NUMBER	DESCRIPTION	REVISION	DATE
						<p>*10 - Input/Output typewriter element controller Same as 7 above</p> <p>11 - Engineering Data Librascope Will provide Standard Spare parts list to component level with individual standard type number and original manufacturer cross reference.</p> <p>Datum Will provide standard parts list to components level with individual standard type number and original manufacturer cross reference.</p> <p>Will also provide schematic and drawings necessary for installation.</p> <p>Kennedy Will provide Bill of Material and engineering drawings.</p> <p>Teletype No other data will be provided.</p> <p>Data items listed above that are marked with an asterisk (*) are subject to 4.2.3 Rights and Data clause.</p> <p>All other data furnished has unlimited data rights for logistics and maintenance purposes. For all other purposes the data has limited rights.</p>		

PHILCO-FORD CORPORATION

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PHILCO Philco-Ford Corporation	SUPPLIER PRODUCT ASSURANCE REQUIREMENTS	PURCHASE ORDER NO. 922185
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I. PURPOSE

This document establishes basic product assurance requirements to assure that products delivered by suppliers are of the required quality and reliability levels. It presents general information and requirements applicable to all purchase orders, and special requirements (SPAR's) applicable as directed in purchase orders.

II. DEFINITIONS AND ABBREVIATIONS

Purchase order means any purchase order, subcontract or other written agreement with Equifax (Supplier) to deliver to materials, supplies, services or equipment.

"Buyer" and "Seller"

The term "Buyer" or "Philco-Ford" shall mean Philco-Ford Corporation acting by and through the division whose name is specified on the purchase order.

The term "Seller" shall mean the individual, partnership or corporation obligated to furnish the articles and services as described in the purchase order.

III. GENERAL REQUIREMENTS

Unless otherwise specified in the purchase order, the following general requirements apply to this purchase order.

A. PROHIBITED PRACTICES

- 1. Unsanitized Working:** Seller may not repair by welding, brazing, soldering or other means, parts damaged or found to be faulty during fabrication without Buyer's prior approval. Defects in practice or workmanship shall not be repaired by any method unless authorized by the Buyer in writing.
- 2. Change or Approval Processes or Procedures:** Seller shall not change any process or procedure without prior approval of such processes or procedures were originally subject to and approved by the Buyer.
- 3. Indirect Responsibility:** Articles repaired by the Buyer may not be reshipped without clear and proper identification as reshipped articles, indication of the cause for Buyer rejection, and statement of action taken by the Seller to correct the deficiencies.
- 4. Unsanitized Submittal of Production Parts:** Seller shall not submit parts from a production run for Buyer inspection prior to Buyer's acceptance of first article sample when required by the purchase order.

B. RESPONSIBILITY FOR COMPLIANCE

As to the surveillance, inspection and/or tests made by the Buyer or his representatives at either the Seller's or Buyer's facilities, nor the Seller's compliance with all Supplier Product Assurance Requirements (SPAR's) listed within the Seller's responsibility to furnish items which conform to the requirements of the purchase order.

C. DOCUMENTATION

The Buyer may refer to accept items delivered under the purchase order if the Seller fails to submit the certification, documentation, test data or reports specified in the purchase order.

D. CERTIFICATE OF COMPLIANCE

Certifications furnished under the terms of the purchase order shall be supported by test records and data and are subject to audit by the Buyer.

E. LOT SAMPLING

The Buyer reserves the right to use MIL-STD-105 or equivalent sampling plan for the acceptance or rejection of supplies.

F. CORRECTIVE ACTION REQUESTS

When a quality problem exists, the Buyer will request corrective action from the Seller. Such requests require timely responses and should include the following information: Analysis of the cause of the problem, statement of the action taken, and the efficiency of the action. When corrective action is required for Government Source interested items, the supplier shall coordinate such action with the Government Quality Assurance Representative assigned to his plant.

IV. SUPPLIER PRODUCT ASSURANCE CLAUSES

The following Product Assurance Clauses are a requirement of this purchase order when specified by number in the purchase order.

 SPAR-1 BUYER SOURCE INSPECTION

Items to be delivered under this purchase order require inspection, tests or surveillance by the Buyer's Quality Representative at the Seller's plant. Sufficient advance notice (48 hr. for local plus travel time for distant locations) must be given the Buyer to permit scheduling of source inspection. The Seller shall notify the Buyer's Purchasing Department when the product is ready for source inspection. Source inspection does not relieve the Seller of the responsibility for compliance with all requirements of this purchase order. Evidence of Buyer source inspection will be shown on the shipping documents. The Government Quality Assurance Representative assigned to his plant shall coordinate such action with the Government Quality Assurance Representative assigned to his plant.

A. In-process and final inspection or tests or both as required. Detailed test of assemblies and processes are subject to inspection or tests or both by the Buyer's Quality Representative prior to assembly.

D. Final inspection or tests or both required.

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 SPAR-2 SELLER'S QUALITY CONTROL SYSTEM

The Seller shall maintain a quality system which conforms to a minimum requirement, with the required specification. The Seller's system also, in the event of a Buyer's Representative, visitors to quality system, records must be obtained on existing from the Buyer.

- A. MIL-9-45200 (latest revision as of the date of purchase order) returned.
- B. MIL-Q-9850 (latest revision as of the date of purchase order) returned.
- C. Order as specified.

 SPAR-3 CHEMICAL AND PHYSICAL ANALYSIS

The Seller shall submit a report as indicated below "Actual, Typical or both" for all with each lot of material shipped. In the case of "Actual analysis" to cover most Buyer's plants, the reports shall include submission along with a copy of the report to the Buyer.

- A. Actual Value Test Report. The test report shall list actual test results obtained from analysis of representative samples of each lot of material used to fill this order.
- B. Typical Value Test Report. The test report shall list the type of values within which the material properties fall.
- C. Certificate of Compliance. A statement, signed by a responsible representative of the Seller, certifying that the materials used conform to the requirements of the purchase order and that written evidence of that effect is available to the Buyer upon request.

 SPAR-4 CERTIFICATION OF COMPLIANCE

A. With each shipment of items covered by this purchase order, Seller will submit a certificate of compliance, signed by a responsible representative, which shall constitute a representation by the Seller that:

1. Materials used are those which have been specified by Buyer, and that the items delivered were produced from materials of the same quality and quantity as those specified in the purchase order.
 2. Processes used in the fabrication of items delivered were in compliance with applicable specifications as referred to in the purchase order.
 3. Specifications and all other requirements applicable to the items delivered have been complied with by Seller.
- B. By making shipment under this purchase order, the Seller irrevocably certifies that the materials (except when the materials are furnished by the Buyer) and processes used in the articles shipped conform with this certificate of compliance and specifications. The Seller agrees to retain records of production records of the inspectors and tests performed in the course of manufacturing, testing, packaging, preserving, packaging, and packing of said articles. These records shall be made available for review upon request.

 SPAR-5 GOVERNMENT SOURCE INSPECTION

Government inspection is required only to shipment from your plant. Upon receipt of this purchase order, promptly notify the Government Representative with normally services your plant, in order that appropriate planning for Government inspection can be accomplished. If the representative of the Government inspection office cannot be located, the Buyer should be notified immediately.

 SPAR-6 SERIALIZATION

With each shipment, the Seller shall submit a serial number stamp on all serialized parts or assemblies. By each number, each number, each name and serial number of each article being these characteristics identified by the purchase order and the actual lot number found during inspection or test. Records shall be kept by the Seller in a Government Quality Assurance Representative.

- A. The serial numbers to be assigned by each number are included with this purchase order.
- B. The supplier shall assign the serial numbers.

 SPAR-7 INSPECTION TEST REPORT

Seller shall submit with each shipment a report for the finished and/or items or assemblies identified by part number, part name and serial number of each article being these characteristics identified by the purchase order and the actual lot number found during inspection or test. Records shall be kept by the Seller in a Government Quality Assurance Representative.

 SPAR-8 FIRST ARTICLE INSPECTION

Buyer acceptance of first article samples is required prior to the production run. The first article sample shall be identified as such, including the purchase order number, part number and part name. The Seller is required to:

- A. Submit a first article sample for which inspection shall be conducted at the Seller's facility by the Buyer. SPAR-1B is in effect on this lot.
- B. Submit a first article sample to the Buyer's facility in compliance with the purchase order.
- C. Submit a first article sample to the Buyer's facility in compliance with the purchase order.

 SPAR-9 SELLER SUPPLIED INTERVIEW

With the initial shipment, the Seller shall furnish to the Buyer the Government Quality Assurance Representative, when required, prior to assembly or starting samples sufficient to inspect and/or use the product of inspection on the purchase order.

30

COMMUNICATIONS AND TECHNICAL SERVICES DIVISION

HEADQUARTERS

3900 WELSH ROAD

WILLOW GROVE, PA., 19090

PHILCO-FORD CORPORATION, BUYER HEREBY AGREES TO PURCHASE AND RECEIVE AND

Sperry Rand Corp
Sperry Univac Defense Systems Div
Univac Park, P.O. Box 3525
St. Paul Minn. 55165

ALLER AGREES TO SELL AND DELIVER SUPPLIES OR SERVICES SPECIFIED HEREIN UNDER THE TERMS AND CONDITIONS ON THE FACE OF THIS ORDER AND THOSE INCORPORATED BY REFERENCE IN THE ADDITIONAL MARK AND CONDITIONS BLOCK AT THE BOTTOM OF THIS PAGE.

SHIP VIA See Original	SHIPPING POINT See Original
F.O.D. <input checked="" type="checkbox"/> CARRIER SELLER'S PLANT <input type="checkbox"/> DESTINATION	TRANSPORTATION TERMS <input checked="" type="checkbox"/> PREPAID & CHARGE <input type="checkbox"/> PREPAID <input type="checkbox"/> COLLECT

QUANTITY	UNIT	ITEM	UNIT PRICE	AMOUNT	PART NUMBER	DESCRIPTION	BUYER'S NUMBER	POINT NO.
						CHANGE ORDER AMENDMENT "A"		
						Change Purchase Order As Follows	860575	5100
1)		Reference Para. 1.4 of Purchase Order: Change 30 days to 21 days						
2)		Reference Para 1.4.1 of Purchase Order: Change Option price to read \$51,480.00						
3)		Reference Para. 2.5 of Purchase Order: Change Option Price to Read \$22,440.00						
4)		Reference Para. 3.2 of Purchase Order: End sentence after "2077 - Attachment A, Rev. B" and replace the remaining words in that paragraph with, "This waiver is granted if the equipment described in Buyer's specification numbers 2077-20H007 Rev. C and 2077-51D006 Rev. B are being qualified under MIL-E-16400 and MIL-STD-749A."						
5)		Reference Paragraph 3.6.2.1 of Purchase Order: Change word "part" to "port" in fourth line.						
6)		Reference paragraph 3.6.3.2 of Purchase Order: See Page Two						

BY PAGE 1 OF 5	VOICE TO ACCOUNTS PAYABLE (ATTACH PROOF OF SHIPMENT, POSTAL RECEIPT, HEADQUARTERS ADDRESS)	BY J. L. Mandie	TO PHILCO-FORD CORPORATION
	BUYER'S ADDRESS WHEN DIFFERENT FROM HEADQUARTERS ADDRESS	BUYER R. J. Gasper	PURCHASING OFFICE V
REQUESTER C. Berkheiser	MANAGER	ACCOUNT CLASSIFICATION 2C320000	EXP. CLASS 2200
<input type="checkbox"/> THOSE PRINTED ON THE BACK HEREOF <input type="checkbox"/> THOSE CALLED FOR IN PHILCO-FORD FORM CORP. 331A, 4-72 <input checked="" type="checkbox"/> THOSE CALLED FOR IN Original A FOLDED SHEET OF FOUR PRINTED PAGES			

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DOT-PA73WA-1202 MAY 31 1972

SUPPLIER NO. S10686 B See Attach See below 05-19-72

GOVERNMENT SOURCE INSPECTION APPLICABLE IF CHECKED

St. Paul, Minn

ATTACHMENTS - COMPLETE THOSE INDICATED AND ATTACH TO THIS ORDER

1. TEST & INSPECTION DATA 2. TOOL ATTACHMENT 3. CHECK R. PHYSICAL EVAL.

INSPECTION CODE DATA CODE CONTRACT OR

PROJECT NO. 2077

Philco-Ford Corp
3900 Welsh Rd.
Willow Grove, Pa. 19090

RBR
20467

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COMMUNICATIONS AND TECHNICAL SERVICES DIVISION

Amendment "A"
NO. 902185-W

Sperry Rand Corp

PAGE 2 OF 6 PAGES

QUANTITY	UNIT UNITS	ITEM	DESCRIPTION	PART NUMBER	DESCRIPTION	QUANTITY ORDERED	QUANTITY ON HAND
			Disc Data Head requirements are further clarified and agreed to as follows:				
			<u>For Phase I</u>				
			Singer Librascope Discs, Model L107A-17-2060 Modified, will be supplied equipped with sixty (60) data heads. Univac supplied Disc Controller/Adapters will be supplied equipped with all necessary hardware to address all sixty (60) of the Disc Data Heads.				
			The Disc Controller/Adapters will also contain wiring, connectors, or other hardware that will enable field expansion of the Controller/Adapter to address a maximum of eighty (80) data heads. The field change is expected to require the addition of printed circuit cards plus some modification to existing wiring in the Controller/Adapter. Additional parts and procedures required for accomplishing the field change are not a part of this contract.				
			<u>For Phase II</u>				
			Singer Librascope Discs, Model L107A-17-2060 Modified, will be supplied equipped with sixty (60) data heads. Univac supplied Disc Controller/Adapters will be supplied equipped with all necessary hardware to address only forty (40) of the Disc Data Heads, but will contain wiring, connectors, or other hardware that will enable field expansion of the Controller/Adapter to address all sixty (60) data heads of the supplied disc, as well as wiring, connectors, or other hardware, to enable further field expansion of the Controller/Adapter to address a maximum of eighty (80) data heads. Expansion of addressing capability above the original forty (40) data heads is expected to require the addition of printed circuit cards plus some modification of wiring in the Controller/Adapter. Additional parts and procedures required for accomplishing the expansion are not a part of this contract.				
7)			Reference Para 3.6.3.6 of Purchase Order: Change the word "on" to "or" in the third line.				
8)			Reference Para 3.6.4.4 of the Purchase Order: Remove the word "of" in the next to the last line.				
9)			Reference Para 3.6.5.6 of the Purchase Order: Delete the word "work" in the fourth line and replace with the word "word." Delete the symbol I/O and replace with I/O in the fourth line.				
10)			Reference Para 3.6.10.1 of Purchase Order Delete the first part of this paragraph to and including 2077 - Attachment A, Rev. B, and substitute in its place the following:				

PHILCO-FORD CORPORATION

See Page Three

CODE

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COMMUNICATIONS AND TECHNIC. SERVICES DIVISION

Sperry Rand Corp.

Amendment "A"
NO: 902185-W

PAGE 3 OF 6 PAGES

QUANTITY	UNIT	REQ. NO.	DESCRIPTION	PART NUMBER	DESCRIPTION	REVISION NUMBER	AGENT NO.
			Seller and Seller's vendors are relieved from the requirements of 2077 - Attachment A, Rev. B for the Seller's vendor supplied major subassemblies listed below:				
			a) Singer Librascope Disc, Model L107A Modified				
			b) Kennedy Tape Transports, Model 8108				
			c) Kennedy Tape Formatter, Model 8208				
			d) Teletype, Model XSR37				
			e) Option Item, Card Reader				
			f) Option Item, Card Reader Control/Adapter				
			g) Option Item, Card Punch				
			h) Option Item, Card Punch Control/Adapter				
11)			Reference Para 3.6.9.15.1 of Purchase Order - paragraph reference 3.9.1, add the following: It is agreed that the Seller will sell spare parts that are interchangeable and functionally equivalent to parts contained in the delivered equipment, and Seller will obtain similar agreements from Seller's vendors. These spare parts will be sold to either Philco-Ford Corporation or to the Government in accordance with paragraph 3.6.9.15 of this subcontract. The requirement for spare parts "identical in configuration to parts contained in the delivered equipment" is waived. Any non-identical, interchangeable board furnished must meet the design criteria of board originally furnished.				
12)			Add a new paragraph 3.6.9.5 to Purchase Order as Follows and Change Paragraph Number 3.6.9.5 to 3.6.9.5.1 - paragraph reference 3.7.1 Seller provided <u>commercial manuals</u> for all equipment furnished by Seller will be accepted as meeting the requirements of this paragraph.				
13)			Reference paragraph 3.6.10.2 of Purchase Order: Add after the last sentence, "This paragraph applies only to equipment manufactured by Seller."				
14)			Reference paragraph 4.1, Clause 12 of Purchase Order: Add the words, "concerning the inspection or conclusiveness" after the word "herein."				
15)			Reference paragraph 4.2.6 of Purchase Order: Replace this paragraph in its entirety with: Univac Standard Hardware Warranty Clause (May 1971).				
			See Page Four				

PHILCO-FORD CORPORATION

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COMMUNICATIONS AND TECHNIC, SERVICES DIVISION

Amendment "A"

NO: 902185-W

Sperry Rand Corp.

PAGE 4 OF 6 PAGES

QUANTITY	UNIT	ITEM	SYMBOLS	UNIT	PART NUMBER	DESCRIPTION	QUANTITY	UNIT
16)						Reference paragraph 4.2.6 of Purchase Order: Remove words "updated copies of" from second line and replace with "update revisions to."		
17)						Reference page 26A of 26 pages in Purchase Order: Add "B" after "of 26."		
18)						Reference Item 11 on page 26B of 26B of the Purchase Order: Remove the second and third paragraph starting with the word "Datum" and "Will" respectively in their entirety.		
19)						Reference the last paragraph on page 26B of the Purchase Order: Remove the paragraph in its entirety and add: "All other data required to be delivered hereunder shall be furnished with limited rights and will be used only for logistics and maintenance purposes."		
20)						Change the name that now appears in the address block to read: Sperry Rand Corporation Sperry Univac Defense Systems Division Univac Park, P.O. Box 3525 St. Paul, Minnesota 55165		
21)						Add the following new provision: <u>"3.9 EXERCISE OF OPTIONS</u> In order to effectively exercise any option (s) granted by Seller to Buyer herein, Buyer shall, through its authorized Purchasing agent, transmit written notice of the exercise of the option(s) which must be received by Seller prior to the time (s) set forth in Parts 1.0 and 2.0 above. Unless otherwise agreed to by Seller in writing, any option(s) not exercised shall lapse."		
22)						Reference 3.7.3.6 of Buyer's specification 2077, Attachment L, Rev. J. Add the sentence: "Seller will furnish a 100% parts list down to the piece part level for Seller developed equipment."		
23)						Reference Para 3.6.2.5 of Purchase Order: Change symbols "I/O to "TTY" in next to the last sentence		

PHILCO-FORD CORPORATION

See Page Five

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Sperry Rand Corp.

Amendment "A"
NO. 902185-W

PAGE 5 OF 6 PAGES

QUANTITY	UNIT QTY	ITEM	QUANTITY ORDERED	QUANTITY ORDERED	PART NUMBER	DESCRIPTION	REVISION NUMBER	QUANTITY ORDERED
24)		Reference Para 2.1.12 of Purchase Order: Change quantities under Production Release I, II, III and IV from 5,5,5&6 respectively to 10,10,10&12 respectively.						
25)		Reference Para 3.6.9.6 of Purchase Order: Change Words "Acceptable to Meet" to "Accepted as Meeting".						
26)		Reference Para 3.6.9.7 of Purchase Order: Change words "Acceptable to Meet" to "Accepted as Meeting".						
27)		The following are further clarifications and understandings to Buyer's Specification 2077 Attachment L, Revision 0. Paragraph 3.1 purchase order comments - 3.6.9.1.1, 3.6.9.1.2, and 3.6.9.1.3 will be furnished to meet this requirement for all equipment furnished on this order except for: 1) Teletype Equipment 2) If available on the card processor equipment Paragraph 3.5-Seller will furnish for Seller's newly repackaged equipment only. Paragraph 3.6 new Seller repakaged controllers and Kennedy equipment will comply with this paragraph, Librascope, Datum (if the vendor) and seller (for AN/UYX-15) will provide drawings down to the card level. Teletype equipment will not comply. Parts list comment (Two Paragraphs 3.6.5 and 3.7.3.6)-on all Seller furnished equipment, Librascope, Kennedy, Datum (if the vendor) will comply. Teletype will provide a manual and not comply with these paragraphs.						
28)		Reference Paragraph 3.6.9.5 of Purchase Order: Change "A) and C)" in second line "A) and E)".						
29)		The three (3) Central Processors for Phase I and as otherwise specified in Buyer's Specification No. 2077-20H007, Rev. "C" shall contain a memory size of 48,000 16 bit words.						
30)		Reference Para. 1.5 of the Purchase Order: Change Card Reader to Bridge Data Products Model 8000.						

See Page Six

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COMMUNICATIONS AND TECHNICAL SERVICES DIVISION

Sperry Rand Corp.

Amendment "A"
NO: 902185-W

PAGE 6 OF 6 PAGES

QUANTITY	UNITS	ITEM	QUANTITY	PRICE	PART NUMBER	DESCRIPTION	REVISION NUMBER	PRICE NO. PER
						Total Order Price Prior to this Change		\$796,510.00
						Price of this Change Order		-0-
						Revised Price of Total Order		\$796,510.00
All Other Terms and Conditions Remain Unchanged								

J. P. Frost
 J. P. Frost, Manager, Contract Administration
 Sperry Univac Defense Systems
 6 June 1973

PHILCO-FORD CORPORATION

By J. L. Mandia

PURCHASING

BUYER R. J. Casper

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EXHIBIT NO. 40

LETTER FROM PHILCO-FORD TO FAA INDICATING THAT TERMINATION OF UNIVAC COMMON CONTROL SYSTEM SUBCONTRACT AND FAA'S EXPANDED PROCESSOR REQUIREMENTS WERE NOT INTERRELATED

PHILCO-FORD CORPORATION,
COMMUNICATION SYSTEMS DIVISION,
Willow Grove, Pa., May 17, 1974.

FEDERAL AVIATION ADMINISTRATION,
Systems Purchase Branch,
Washington, D.C.

Attention: Mr. S. Fishe, Contracting Officer ALG-340.

Subject: Contract No. DOT-FA73WA-3202 Philco-Ford No. 2077.

Reference: TWX from Contracting Officer dated May 1, 1974, re: P/F 102/ATC-021 Processor Selection.

GENTLEMEN: Consider this submission as Philco-Ford's response to your above referenced communication and also as a corollary to the technical investigation described in our correspondence to your office dated January 2, 1974 (74-453). From this perspective, we hereby transmit full disclosure relating to the selection of, and the proposed utilization, of the Philco-Ford 102/ATC-021 Processor.

We too regret the previously documented occurrences which occasioned the necessity for redesign of the Common Control Subsystem, with its companion program delay. However, this departure to a larger processor from the type intended and scheduled for implementation, was nurtured by the Government's expanded system requirements, which direction coincided with that time interval during which it was determined that Univac was in Default and could not fulfill their Purchase Order obligations. Had Univac responded to their P.O. commitments, we may have been confronted with a technical investigation of whether the delivered AN/UYK-15 processors could, with expansion modification, have been employed, however, due to non-performance by this supplier it did not become necessary to grapple with this type problem. On point, is the recognition that the necessity for a change in processor and the Univac termination action are noninterrelated events and seeking out a larger capacity processor was the effect of the Government's expanded requirements as formally communicated on September 28, 1973 and since, expanded.

It had been our intention to include as part of our response package, to your solicitation of May 13, 1974, the data requested in your above referenced telegram of May 1, 1974. However, as we have processed the summary of the source selection for the P/F 102/ATC-021, we hereby forward the requested justification for its utilization at this time.

This enclosure, entitled, "Report on Processor Selection for EVS Program", should reflect the basis for Philco-Ford's determination that program implementation of the 102/ATC-021 Processor is in the best interests of the Government. We trust that you will appreciate the sensitive nature of the enclosed documentation and accordingly restrict the dissemination of its content on a need-to-know basis. Specific cost data, as received from the various sources, is on file and is available for your inspection upon request.

We have attempted to forward the relevant data pertaining to the selection of the 102/ATC-021 Processor and request that your concurring action be forwarded at the earliest date. For any additional technical details and/or clarifications, feel free to contact the undersigned at your convenience.

Very truly yours,

FRANK COHEN, *Contract Manager.*

REPORT ON PROCESSOR SELECTION FOR EVS PROGRAM

FAA, in their correspondence to Communication Systems Division, dated 28 September 1973, provided direction which to accomplish would require increased disc size, core memory size and processing capacity of the Common Control Subsystem of the EVS Program. Thus this direction critically impacted the then current subsystem being supplied by Univac under subcontract to Philco-Ford which would require a major redesign to accommodate these expanded require-

ments of FAA. More specific, the AN/UYK-15 Processor would require a major modification to address 128K words of memory to meet the expansion and thruput requirements of FAA-E-2479. Further, the disc mass storage device and its controller would require expansion from 100 tracks to 250 tracks to accommodate the increased storage requirements.

CSD, as a result of this new direction, performed a detailed study of the impact on the EVS Common Control and presented the results of this study and our planned course of action to FAA at Buzzard's Point on 26 October 1973. This briefing was subsequently formalized in a TWX to FAA, ref. FC:73-383, dated 29 October 1973.

In November 1973, consistent with the plan briefed to FAA, Philco-Ford prepared Purchasing Information Requests (PIR) for a Common Control which would satisfy the revised requirements of FAA. These PIR's were sent to Control Data, Interdata, Xerox, Burroughs, ModComp, COMTEN, Collins, DEC and IBM. In addition, a PIR was prepared for Univac for an enlarged Common Control based upon the use of the AN/UYK-15 but release was delayed since Philco-Ford and FAA were in the process of finalizing arrangements for acceptance of the first deliverable AN/UYK-15 system from Univac. It was deemed advisable to have the current purchase order remain intact to permit delivery by Univac of a complaint baseline system prior to proceeding into further technical discussions for an expanded system. Philco-Ford and Univac had previously discussed the possibility of a Common Control expansion in late summer of 1973, and Univac had provided budgetary pricing at that time which permitted us to proceed with our planning without immediately consulting with Univac and thereby possibly causing a disturbance or preoccupation from their pursuing of commitments under the prevailing purchase order. Subsequently, Univac failed to demonstrate compliance with the quality, performance and testing requirements for the baseline system under test, a fact that was also duly noted by FAA quality representatives and officially reported to Philco-Ford by the FAA Contracting Officer on 16 November 1973. Because of this and their failure to correct the discrepancies, Univac was terminated on 21 December 1973 for default pursuant to ASPR Clause 7-103.11, Default (modified), incorporated into the Univac contract. FAA's local representatives were so advised of this fact on December 21, 1973, FAA Headquarters were advised by telephone on December 26, 1973 (as attempts to reach FAA on the afternoon of December 21, 1973 prior to the Christmas holiday weekend were unsuccessful) and again in writing on January 2, 1974.

Several vendors' responses to the PIR promulgated during early November were received in late November, but the interest shown was less than expected probably because it was commonly known throughout industry that Univac was under contract to Philco-Ford for the EVS Common Control Subsystem. The PIR was modified to elaborate on the technical requirements of the new EVS Common Control, and the revised issue was sent to prospective vendors early in January 1974 with responses requested for February 1974. Considerably more interest was shown in this PIR by suppliers of processors, perhaps due to the termination of the Univac subcontract by Philco-Ford in December. Of the 16 companies solicited, 11 offered "No Bids" and five vendors offered proposals for the computer. A summary of the FAA EVS computer system solicitation is provided as Attachment A. Concurrently, Philco-Ford in-house efforts were taking place to provide an estimate to repack the Philco-Ford 102 processor used on the Overseas AUTODIN Program. The purpose behind repackaging of the 102 Processor was to upgrade it to current state of the art for components and to make it compliant with FAA-ER-650-021 since the expanded FAA requirements now demanded a processor of enhanced capability from that which was in the original design. Thus, the Philco-Ford 102 processor which originally was too powerful and hence expensive now became a viable cost-effective contender.

A program was initiated by Philco-Ford in late January 1974, with active participation by a MITRE representative to meet with vendors, discuss their products, and provide guidance to them, particularly in the area of FAA-ER-650-021 since they all lacked experience with this specification. Once the formal vendor responses were received, the technical proposals were distributed to five different internal Philco-Ford committees, each having the responsibility for evaluating a particular area of the proposal. These areas were defined as (1) Conformance with FAA-ER-650-021, (2) Schedule, (3) Risk Factor, (4) Technical and (5) Support. The Purchasing Procedure and evaluation criteria used

to conduct the source selection are provided as Attachments C and D, respectively. A separate top management committee was established to evaluate the financial proposals. To ensure complete objectivity in the selection processes, Ford Motor Company provided the services of a computer specialist from its staff to be a member of the Technical Committee and two senior staff officers from Aerospace and Communications Operation were assigned to the Senior Evaluation Committee.

The decision of the Senior Evaluation Committee, after an exhaustive evaluation of the findings of the technical and financial committees, was that the Philco-Ford 102A processor, which identifies a repackaged AUTODIN 102 processor, would be the most compliant device of all the processors evaluated (Attachment B) and would also present the most cost-effective approach. This decision was subsequently announced to the FAA in a briefing presented by Mr. Ray Hinton, Director of Communications Switching Operations, on 13 March 1974.

A program plan was developed within Philco-Ford to document the owner by which the 102A processor would be integrated into the EVS program. A mechanical redesign must occur before a repackaged 102 processor can be made available to EVS, yet the EVS Program must move forward with all possible momentum to prevent further schedule delay. Therefore, it has been concluded that the basic framework of the program plan would be to show utilization of available 102 processors within the EVS Common Control Subsystem until such time as the EVS 102A processors are fabricated to the new design. This action would permit total equipment integration, software development and functional testing of the EVS System, while Philco-Ford 102A processors are being developed and tested. The first system complement of three 102A's will be available at the end of the 34th contract month for integration into the preproduction model/NAFEC configuration.

EXHIBIT NO. 41

LETTER FROM FAA TO NORTH ELECTRIC COMPANY DECLINING LETTER'S OFFER
TO ASSIST IN DEVELOPING THE EVS PROGRAM

DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, D.C., May 2, 1974.

Mr. C. A. CONRY,
Vice President, North Electric Co.,
Galion, Ohio.

DEAR MR. CONRY: Thank you for your letter to the Administrator of April 16, 1974, and your offer to assist the FAA with the Electronic Voice Switch Program. He has asked me to reply to you regarding this program.

I read with considerable interest the proposals that you made in your letter, but must say to you at the outset that the FAA intends to continue the contract with Philco-Ford and therefore we are not in a position to accept the offer that you made.

The selection of Philco-Ford to do the Electronic Voice Switch was made after careful consideration of all the factors associated with such a selection. The selection was carefully reviewed and all technical risks were assessed before the decision was made. Since that time, the performance of Philco-Ford on the contract has been acceptable, and in the cases where we had assessed technical risk, they have demonstrated the capability to surmount these risks. It is true that there have been changes in the program, but these changes were the result of a change of requirements by the FAA and not resulting from any failures or incompetency on the part of Philco-Ford.

I will not comment on the details of the proposal that you made to Philco-Ford concerning the computer and switching system since that was a matter between Philco and yourselves. It is true, however, that the FAA has subcontract approval. Our independent assessment of the computer selection was the basis for approving the Philco-Ford recommendation.

Again, thank you very much for your interest in our program. I appreciate the effort that you have gone to, but as I indicated earlier, we are not in a position to take advantage of the offer that you have made.

Sincerely,

SPENCER S. HUNN,
Director, Systems Research
and Development Service, ARD-1.

EXHIBIT NO. 42

LETTER FROM PHILCO-FORD TO FAA SUMMARIZING PROPOSED NEGOTIATED
CHANGES IN EVS CONTRACT

PHILCO-FORD CORPORATION,
COMMUNICATION SYSTEMS DIVISION,
Willow Grove, Pa., July 8, 1974.

FEDERAL AVIATION ADMINISTRATION,
Systems Purchase Branch,
Washington, D.C.

Attention: Mr. S. Fishe, Contracting Officer ALG-340.

Subject: Contract No. DOT-FA73WA-3202, Philco-Ford No. 2077.

GENTLEMEN: During our telephone discussion held on 26 June 1974, the several matters presented in Mr. E. L. Montgomery's letter of 27 June 1974 were reviewed. This is to respond to the issues raised in the most recent correspondence on this subject, dated 28 June 1974, from the Director, Systems Research and Development Service. Our response is keyed to the paragraph numbering of that letter as follows:

1. The Philco-Ford proposal for Schedule 1 is as stated in paragraph 1 of the 28 June 1974 letter. Our willingness to accept a contract revision on this basis is on the understanding that the contract requirements are as set forth in Attachments A through D and F, enclosed with your RFP of 13 May 1974, as amended by the P/F errata sheets to be submitted. Aside from corrections and clarifications to the Attachments, the errata sheets will document technical agreements concluded during the extended discussions held over the period January through May, 1974. These errata sheets, together with the technical impact of your 14 June 1974 EPABX deletion, will be included within our proposal response, due to your office on or before 15 July 1974, and shall constitute the contract requirements.

2. It had been Philco-Ford's original intent to comply with FAA's request for a change in the contract language whereby the initial Schedule II option date is extended from month 35 to month 42. We hereby again confirm this arrangement. In this regard we have enclosed the copy of the milestone schedule, dated 31 May 1974, as presented to General Hunn and Staff at the 7 June 1974 briefing which depicts the projected test program for Schedule I. Should there be a slippage in this schedule of testing effort caused solely by Philco-Ford, Philco-Ford will absorb such delay costs that may impact on the production design should the Government exercise the first production option at month 42.

3. The fee-sharing arrangement is as follows:

Maximum fee which could be earned under this contract revision from CPFF to CPIF would amount to \$1,000,000.

The 50%/50% fee sharing starts when total program costs exceed \$24.4 million. At \$24.4 million Philco-Ford will have earned \$1 million and the Government's total obligation will amount to \$25.4 million.

Every dollar of cost incurred between \$24.4 million and \$26.4 million will be funded 50% by the Government and 50% by Philco-Ford through an appropriate fee reduction. For example, should total program costs amount to \$25.4 million, Philco-Ford will have earned \$500,000 in fee which, when added to the \$25.4 million total cost, amounts to \$25.9 million and would represent the Government's total obligation.

Should total costs amount to \$26.4 million or more, Philco-Ford will earn no fee and the Government's total obligation would be \$26.4 million.

4. We confirm that your assumptions are correct, however, the errata sheets apply to the RFP Attachments as indicated under paragraph 1 above.

5. The \$10.4 million total increase for Schedule II provides for implementation of the FAA generated operational changes which, when added to the Schedule II funding of \$65.3 million, equates to the new Target Price of \$75.7 million for all production options. This revised Schedule II total Target Price is based upon total material release for all options on a concurrent basis by month 42. Aside from the funding adjustments confirmed herein, the type of contract structure for Schedule II shall remain unchanged.

6. Your understanding pertaining to the acquisition of all production material in a single buy mode is correct. The amount required is estimated to be in the range of \$35-\$40 million as indicated. Pertaining to the advance procurement of long lead items of material, Philco-Ford will, in our proposal response, set forth

the related funding, by fiscal years, of the value of these required advance releases.

7. Philco-Ford has included a 6% material escalation factor within the \$75.7 million Target Price. This escalation is based on total material release (for all options) occurring during month 42, so that the total material commitment can occur by month 45, during which outside date all orders will have been placed.

It is to be understood that any directed changes to baseline program content (that which is described in paragraph 1 and including Philco-Ford's utilization of the ATC-021 Processor) shall be subject to an equitable adjustment under the provisions of the Changes clause, to Schedules I and II, as appropriate with related revisions to scheduling, fee-sharing starting point, and cost ceiling herein confirmed.

We hope that we have adequately clarified and confirmed the several issues presented and we are prepared to cooperate to the fullest in facilitating the early issuance of a contract modification. Please do not hesitate to contact me if you should require any additional information.

Very truly yours,

FRANK COHEN,
Contract Manager.

EXHIBIT NO. 48

LETTER FROM PHILCO-FORD TO FAA SUMMARIZING PROPOSED NEGOTIATED
CHANGES IN THE EVS CONTRACT

PHILCO-FORD CORPORATION,
COMMUNICATION SYSTEMS DIVISION,
Willow Grove, Pa., July 12, 1974.

Attention: Mr. S. Fische, Contracting Officer, ALG-340.

Subject: Contract No. DOT-FA73WA-3202 Philco-Ford No. 2077.

References: (a) Request for Proposal dated, 13 May 1974; (b) TWX from Contracting Officer dated, 14 June 1974, re: Deletion of EPABX.

FEDERAL AVIATION ADMINISTRATION,
Systems Purchase Branch,
Washington, D.C.

GENTLEMEN: In responding to your Request for Proposal of 13 May 1974, as revised by your telegram of 14 June 1974, we wish to reconfirm the validity of the contents of our 8 July 1974 letter to your office (74-585) and to state that it is intended for this submission to be in complete agreement and in consonance with the provisions documented within this 8 July 1974 correspondence.

Our review of the Attachments which accompanied your Proposal Request has prompted the issuance of our enclosed Technical Response (TR-1), which is anticipated will facilitate the subsequent formalizing of the technical requirements, as well as the companion schedule adjustments. Our Schedule I Cost Data (enclosure 2) has accordingly been based upon the requirements of your Attachments A, B, C, D and F, which were forwarded with your RFP dated, 13 May 1974, as revised by the EPABX deletion of 14 June 1974 and as supplemented by Philco-Ford's Technical Response, forwarded as enclosure (1) herein.

The enclosed cost data will reflect the arrangement by which Philco-Ford shall underwrite the development costs of the P/F processor up to \$2,000,000, as originally presented to General Hunn in our letter of 24 June 1974. It is intended for such costs to be segregated and reported to the Contracting Officer along with our monthly invoicing. Should the processor developmental effort go beyond \$2.0 million, these costs over the \$2.0 million mark will be charged to the contract, and would be reimbursable, providing such costs are within the absolute Cost Ceiling for Schedule I, the total confirmed in our above referenced 8 July 1974 letter.

It is to be understood that aside from Philco-Ford's proposal for conversion to a hybrid CPIF arrangement, that all other contractual terms and conditions relating to Schedule I shall remain unchanged. In this regard, line item numbers 25, 35a, 38, 42 and 44 remain as option items at their contractually stated value, to be exercised by the Government at some future date, and accordingly the performance of these optional requirements are not provided for within the firm cost proposal forwarded herein.

We are presently processing our firm proposal response for Schedule II, which shall be submitted to your office on or before 24 July 1974. We emphasize that

Philco-Ford is going forward with the redirected program effort for Schedule I, as formalized by Modification No. 3, and will cooperate to the fullest with your office so that required funding releases can be effected to assure continuity of effort. As reported, Schedule I fund depletion should occur on or about 15 July 1974. With the confirmations of intent, as transmitted within our 8 July 1974 letter, relating to firm understandings pertaining to Schedules I and II funding and delivery requirements, it is anticipated that an incremental funding release can now be processed by your office.

Should any questions arise, do not hesitate to contact Mr. Frank Cohen, Area Code 215, 659-7700, extension 2288, at your earliest convenience.

Very truly yours,

K. L. ROSE,
Vice President and General Manager.

EXHIBIT NO. 44

TWX FROM FAA TO PHILCO-FORD QUESTIONING CERTAIN ASPECTS OF PHILCO'S
PROPOSED NEGOTIATED CHANGE IN THE EVS CONTRACT

FRANK COHEN,
Contract Manager, Philco-Ford Corp.,
Willow Grove, Pa.

Regarding contract DOT-FA73WA-3202, this office has received your proposal for Schedule I, dated July 12, 1974 and your letter dated July 8, 1974 (74-585), in response to Gen. Hunn's letter dated June 28, 1974. Review of your proposal is proceeding and will be completed shortly. Pending such completion there are certain basic overriding matters unacceptable to the Government, as stated below:

1. Production release (Schedule II) is shown in your scheduling at the 42nd month, not after completion of the milestone set forth in paragraph No. 2 of Gen. Hunn's letter dated June 28, 1974.
2. The Government will not proceed without a firm \$26.4 million ceiling for Schedule I tied to definitive specifications. Many of the items in your technical proposal are not merely "errata" but are substantive changes which have not been agreed to by this office such as items A18-24. Other new items will be definitively stated in notifications to you as soon as possible as our review proceeds.
3. Your proposal for Schedule II must not exceed \$75.7 million, including escalation, as you were advised in the letter dated July 11, 1974, from Gen. Hunn.
4. Your proposal for a "Single Buy Mode" cannot be considered, as you were advised in the same letter in paragraph 3 above.
5. Contractor engineering support is contractually required during the test period at NAFEC and is not acceptable as an option as stated in your letter dated July 12, 1974 (74-587).
6. Existing subcontract consent requirements under GP38 will not be waived.
7. The above are some of the obvious objections to your proposal and letters though there are other proposed unacceptable departures from the contract requirements.

STEPHEN FISHE,
Contracting Officer, ALG-340.

EXHIBIT NO. 45

PHILCO-FORD'S FIRM PROPOSED CHANGES IN PRICES AND TERMS OF THE EVS
CONTRACT

PHILCO-FORD CORP.,
COMMUNICATIONS SYSTEMS DIVISION,
Willow Grove, Pa., July 23, 1974.

FEDERAL AVIATION ADMINISTRATION,
Systems Purchase Branch,
Washington, D.C.

Attention: Mr. S. Fishe, Contracting Officer, ALG-340.

Subject: Contract No. DOT-FA73WA-3202 Philco-Ford No. 2077.

Reference: Philco-Ford Proposal—Schedule I, dated 12 July 1974 (74-587).

GENTLEMEN: Consider the enclosed submission as Philco-Ford's firm response to the Schedule II portion of your 13 May 1974 Request for Proposal. As with our above referenced Schedule I response, it is also intended for our Schedule II pricing to be reviewed and evaluated on the basis of the confirmations and understandings as presented to the Contracting Officer in Philco-Ford letter dated 8 July 1974 (74-585).

We acknowledge the receipt of both General Hunn's letter of 11 July 1974 and the Contracting Officer's TWX of 16 July 1974, which sets forth the Government's position on extremely critical matters, affecting both the costing and pricing efforts relating to Schedules I and II, however, in the interests of concluding our formal response to your solicitation by the date previously scheduled, we are compelled to condition our proposals to the provisions of our 8 July 1974 letter, with the understanding that these key issues will be fully discussed during the ensuing negotiations.

Within enclosure (1), we have set forth line item pricing consistent with your \$75.7 million total Target Price limitation for Schedule II. Within this pricing there is recognition of the Philco-Ford cost reduction items, as set forth in enclosure (3), which makes possible the withdrawal of all claims processed to date.

The cost details relating to the \$10,400,000 proposed increase to the contract Target Price are currently being processed and shall reflect the costing specifics relating to the operational changes directed for program implementation by Modification No. 3. We are developing site equipment lists and detailed bills of material for the redefined system configuration baseline and this data will be transmitted at the earliest date possible to facilitate your in-depth review and evaluation.

Within the \$75.7 million Target Price we have included a 6% material escalation factor solely for the first option year order placement; scheduled to occur during month 45. On the basis that Philco-Ford will be released to acquire all production material in a single buy mode, for the subsequent three (3) options, at the same time that option 1 is exercised, there is projected material escalation avoidance approximating \$9.6 million which has been excluded from our proposal.

To achieve the system delivery forecast as set forth in the master milestone schedule for Option I requirements, will necessitate advance releases for the long lead items as set forth therein. It is estimated that the initial release will be required during month 32 in the amount of \$300,000; during month 34 in the amount of \$450,000; during month 36 in the amount of \$400,000; and, during month 40, \$3,900,000. In keeping with the provisions and intent of our telegram of 16 July 1974 (74-590), wherein the option date shall be keyed to the successful achievement by the contractor of a selected milestone event, it is understood that appropriate revision to the above release dates can be effected as may be required.

Philco-Ford has been seriously reviewing the various issues surfaced during the last few months relating to the basis for concluding an equitable contract adjustment at the earliest possible time. We thank you for your cooperation in discussing the remaining technical actions on 22, 23 July 1974 and you may be assured of our willingness to reach a complete accord during subsequent negotiations which we hope will be scheduled at the earlier date.

Very truly yours,

K. L. ROSE,
Vice President and General Manager.

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