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FAA BUDGET

1991 Funding Request for Computers and Communications Can Be Reduced





United States
General Accounting Office
Washington, D.C. 20548

Information Management and
Technology Division

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September 17, 1990

The Honorable Frank R. Lautenberg
Chairman, Subcommittee on Transportation
and Related Agencies
Committee on Appropriations
United States Senate

The Honorable William Lehman
Chairman, Subcommittee on Transportation
and Related Agencies
Committee on Appropriations
House of Representatives

In response to your request, we reviewed the Federal Aviation Administration's (FAA) fiscal year 1991 budget request to identify areas for potential reductions. For fiscal year 1991 FAA is requesting \$2.5 billion in facilities and equipment (F&E) funding. This funding is to finance improvements to the national airspace system by allowing FAA to procure and install new equipment, and construct and modernize air traffic control and airway facilities. Our review did not cover all aspects of FAA's budget request. Rather, we focused on funding reductions in selected computer and communications programs.

In May and June 1990, we presented preliminary results of our analysis of FAA's F&E budget request to your offices. The results of our final review are summarized below and discussed in more detail in appendix I. While this report identifies areas for possible budget reductions, there are other aspects of FAA's operations that we have previously reviewed, such as FAA's safety work forces and air traffic control modernization, where we have supported the agency's request for increased resources.

Results in Brief

We identified potential reductions of over \$196 million in FAA's fiscal year 1991 F&E budget request for computer and communications systems supporting both air traffic control and administrative functions. In the air traffic control area, we identified over \$147 million in potential reductions in seven programs. These reductions cover air traffic control computer systems; radar, voice, and data communications systems; and an air traffic control facilities program. The potential reductions are based primarily on program schedule delays that have removed the need for funding for equipment and contracts in fiscal year 1991. The majority of the amount we identified, over \$97 million, is for the Voice

positions at each center and are presently being developed under the Advanced Automation System (AAS). The success of FAA's plans to modernize the air traffic control system depends on VSCS because the new workstations cannot be fully tested or used until VSCS is operational.

Currently, two contractors (American Telephone and Telegraph Technologies and Harris Corporation) are designing and developing prototype systems. Completion of the prototype phase of the program was originally scheduled for November 1989 when the production contract was to be awarded. In our June 1989 report,² we noted that both prototype contractors had experienced difficulties designing and implementing a system capable of meeting performance requirements, and that the program had experienced cost, schedule, and technical difficulties dating back several years.

In fiscal year 1990 FAA was appropriated \$172.3 million to fund the first year of the production contract, technical support, and implementation costs. Although FAA had expected to award the production contract in November 1989, more time was needed in order to complete factory acceptance testing and resolve technical problems identified during this testing. As a result, FAA now plans to award the contract in November 1990.

Results of Analysis

FAA requested \$185.1 million in its fiscal year 1991 budget request to continue funding the acquisition phase of the VSCS program. This funding is for costs associated with the production contract, technical support, and implementation activities.

FAA officials have stated that the \$172.3 million appropriated in fiscal year 1990 will not be needed during the year for the production contract since the contract will not be awarded until fiscal year 1991. However, since the prototype phase of the program must be extended to complete critical factory acceptance testing, officials state that some additional funding will be required. The FAA program manager estimates that between \$55 and \$75 million of the \$172.3 million will be needed to complete funding of the prototype phase. Therefore, a minimum of \$97.3

²Air Traffic Control: Voice Communications System Continues to Encounter Difficulties (GAO/IMTEC-89-39, June 1, 1989)

Advanced Automation System (AAS)

AAS is the centerpiece of the National Airspace System modernization plan and is intended to replace aging air traffic control computer systems with new hardware, software, and controller workstations. FAA believes that AAS will increase controller productivity, reduce operating costs, save fuel and passenger time, and allow controllers to handle anticipated traffic increases more safely and efficiently.

On July 25, 1988, FAA awarded a \$3.6-billion contract to International Business Machines Corporation to complete the design of and produce AAS. The AAS contract calls for implementing the system in three steps. In the first step, the primary component and the largest portion of the contract is the initial sector suite system. This initial system is to supply new controller workstations at en route centers and automate related processes that are currently done manually. The second step of the contract is to provide additional hardware and software to support enhanced automation capabilities at smaller terminal radar approach control (TRACON) facilities. The third step is to provide additional automation support in airport towers and upgrade larger TRACON facilities.

Our July 1990 report⁵ noted that the initial system schedule had already encountered a 13-month delay. Two major reasons for the delay were (1) requirements issues scheduled to be resolved during the design competition phase were deferred to the acquisition phase without allocating any time to resolve the issues, and (2) FAA underestimated the time it would take to develop and test software. FAA and the contractor are currently negotiating modifications to the contract to address these issues. FAA anticipates that these modifications will be completed by December 1990.

Results of Analysis

For fiscal year 1991, FAA requested \$556.3 million for funding the AAS acquisition contract, technical support, expansion of the test laboratory at the FAA Technical Center at Pomona, New Jersey, regional implementation costs, and other costs at en route centers necessary to implement AAS and other modernization plan programs. Of the \$556.3 million requested, FAA estimates that \$238.5 million will be needed to fund regional implementation costs.

FAA officials state that the \$238.5 million for regional costs will provide funding for (1) preparing five sites for the installation of the initial

⁵Air Traffic Control: Continuing Delays Anticipated for the Advanced Automation System (GAO/IMTEC-90-63, July 18, 1990).

utilization and efficiency, provide the basis for future direct pilot to controller communication, and automate air traffic control functions currently performed manually.

FAA plans to implement the program in two steps to automatically transmit data generated from onboard systems via a satellite link to an air traffic control facility. The first step will be to develop software to receive aircraft identification, position information, and time. The second step will utilize a satellite link to provide controllers with direct two-way communication with aircraft. Included in this step is the development and implementation of data link communications software and workstation replacements. Currently, FAA plans to procure new workstations that will be different from those being developed under the AAS program. According to the program manager, FAA is proceeding with this new procurement because of time constraints associated with delays in the AAS program.

Results of Analysis

FAA requested \$6.8 million for step 2 of the program. This funding is to procure 22 workstations for the New York and Oakland en route centers and for implementation of the aircraft-controller data communications link. FAA is currently developing the specifications for this step, and anticipates awarding a contract in mid-1992. According to the Automatic Dependent Surveillance program manager, this anticipated schedule would result in FAA not needing any of the \$6.8 million requested in fiscal year 1991.

Aeronautical Data Link

The Aeronautical Data Link project, formerly called the Weather Communications Processor/Data Link, is to develop, evaluate, and implement a variety of weather and air traffic control data link services. These services include providing weather information such as surface observations, terminal forecasts, winds aloft forecasts, pilot reports, and hazardous weather advisories to pilots when requested. In addition, air traffic control services such as altitude confirmation, communications transfer, and en route minimum safe altitude warning are to be provided. According to FAA, the availability of data link communications will improve two-way air to ground communications and contribute to system safety and capacity by enhancing pilot accessibility to information, relieving congested voice frequencies, and reducing the work load of pilots, specialists, and controllers.

before the contract expires in January 1994. He added that a competitive procurement will add at least 18 months to the second segment's schedule.

Results of Analysis

FAA's fiscal year 1991 budget request of \$10 million is for funding the fourth year of the program. According to the program manager, the \$10 million consists of \$4.5 million for continued support and testing of the first segment, and approximately \$5.5 million to fund hardware and software development in the second segment. Specifications for the second segment are being developed and are expected to be completed in August 1990. According to the program manager, a fully competitive procurement for the second segment will add at least 18 months to the schedule and delay the contract award to approximately February 1992. Because a sole source procurement for the second segment has not been justified, \$5.5 million is not needed in the fiscal year 1991 request.

Air Traffic Control En Route Radar Facilities

According to FAA officials, the En Route Radar Facilities program consists of several on-going initiatives to improve and modify en route radar surveillance and beacon system facilities at various locations. This radar system provides the means for determining positions of aircraft in the national airspace system. According to FAA, this continuing effort will improve long-range radar operational performance and reliability, and resolve problems unique to certain radar sites and the entire radar system.

Results of Analysis

FAA requested \$14.9 million in fiscal year 1991 to improve radar coverage and maintenance of facilities. The improvements focus primarily on a multi-year program to replace radomes⁸ at en route radar facilities in order to accommodate larger Mode S en route antennas. FAA officials stated that about \$.9 million is not needed in fiscal year 1991 primarily because delays in the Mode S program will not permit the relocation of radar beacon sites during fiscal year 1991.

⁸A radome is a strong, thin shell used to house and protect a radar antenna from severe weather conditions.

Objective, Scope, and Methodology

The Chairmen, Senate and House Committees on Appropriations, Subcommittees on Transportation and Related Agencies, requested that we review FAA's fiscal year 1991 budget request. Our objective was to identify areas for potential reductions. Our review did not cover all aspects of FAA's budget request. Rather, we focused on funding reductions in select computer and communications programs.

To accomplish our objective, we reviewed FAA's 1991 F&E budget request for computer and communications systems. To obtain historical data on program funding and obligations, we reviewed prior years' FAA budget requests for computer and communications systems. We obtained and reviewed appropriated and obligated amounts for individual programs from FAA's budget office and program officials. We also met with program officials to discuss program status, current schedules, funding status, and to clarify budget and program information. To determine potential reduction amounts, we (1) analyzed prior years' appropriated and obligated amounts, and compared these amounts to fiscal year 1991 requested amounts, (2) updated and analyzed program status and determined if schedule slippage had or was likely to occur and what impact the slippage would have on the program's need for funding, and (3) determined if the justification for requested funding amounts was adequate.

We conducted our work between March and July 1990 at FAA headquarters in Washington, D.C.; FAA's New York air route traffic control center in Ronkonkoma, New York; and FAA's technical center in Pomona, New Jersey. We conducted our work in accordance with generally accepted government auditing standards.

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Administrative System

Computer Resources Nucleus (CORN)

The CORN project is FAA's largest and most complex general-purpose data-processing acquisition to date. The CORN contractor would be responsible for providing, maintaining, and operating the computer facilities, equipment, system software, and technical support services to meet FAA's general-purpose, data-processing needs over the next 10 years. The contract is also scheduled to include options for providing data-processing services to other elements of the Department of Transportation. The total estimated contract value of the CORN project is \$1.5 billion.

FAA was appropriated \$15 million in fiscal year 1989 and \$8.9 million in fiscal year 1990 to cover the project's initial funding. To date, according to the CORN program manager, none of these appropriated funds have been obligated and will not be until the contract has been awarded. In our May 1990 report,⁹ we determined that the CORN project had not been adequately justified or planned and had major unresolved problems. We therefore recommended that the Secretary of Transportation direct that the CORN contract not be awarded. In response to our recommendation, the FAA Administrator recently appointed an independent consultant to review the CORN project.

Results of Analysis

FAA requested \$25 million in fiscal year 1991 to fund the CORN software conversion, initial start-up, and operation costs. Based on our recommendation that the CORN contract not be awarded, the \$25 million is not needed. Further, prior years' appropriations of \$23.8 million are also not needed, providing for a total potential budget reduction of \$48.9 million.

⁹FAA Procurement: Major Data-Processing Contract Should Not Be Awarded (GAO/IMTEC-90-38, May 25, 1990).

Appendix I
Potential Reductions to FAA's F&E
Budget Request

According to the FAA Aeronautical Data Link program manager, the agency now views the program in two segments. The first segment is for data link software and processors capable of handling air traffic control and weather functions using the Mode S data link capability. The second segment will procure additional hardware and develop software to use the Aeronautical Telecommunications Network,⁷ ground data link, wind-shear alert, and automatic terminal information system.

The first segment was awarded to ARCON in February 1988 for software development and to CONTEL in July 1988 for hardware. A total of 24 data link processors are scheduled to be delivered. Currently, four processors have been delivered—two to the FAA Technical Center at Pomona, New Jersey, one to the FAA training academy at Oklahoma City, Oklahoma, and one to the software contractor. According to the FAA program manager, all 24 processors have been fully funded with prior years' appropriations. Beginning in early 1991 one processor will be delivered to en route centers per month. Because of continuing development problems with the Mode S program, these processors will be installed, tested, and turned off to be stored until the Mode S program is ready to use them. Current estimates for delivery of an interim Mode S system to the first operational site is March 1992. According to the program manager, FAA has studied whether delivery of the processors is the best alternative. The study addressed three alternatives: (1) delivering and storing the processors at the FAA Depot, (2) delaying delivery, and (3) continuing with delivery and installation of the processors at the en route centers. The study's results indicated that there was insufficient space to store the processors at the FAA Depot and because of contractual obligations the costs of delaying delivery of the processors would be more costly than delivering and installing them. As a result, FAA has chosen to continue with delivery and installation of the processors.

FAA plans to use an existing contract with Computer Sciences Corporation to develop the software for the second segment. However, FAA has performed no studies to show that a sole source procurement is justified. According to the Aeronautical Data Link program manager, there is a big push to complete specifications for this segment and direct the contractor to begin work within the next 3 months (July - September 1990) so that the estimated 36-month development schedule can be completed

⁷The Aeronautical Telecommunications Network is a data network being developed to provide a link between many United States and international airlines and FAA. The network is to allow the exchange of data such as flight plans, weather data, distress messages, and some administrative messages.

system of AAS, (2) procuring and installing new power systems, and (3) expanding and modifying buildings to house the new power systems. FAA estimates that each site will need \$3.6 million for the initial system site preparation of AAS, \$6 million for new power systems, and \$7.7 million for building expansion and modification for the new power systems.

Because of the 13-month delay AAS has experienced, FAA officials have stated that initial system site preparation work for AAS at three sites could be slipped to fiscal year 1992, resulting in \$10.8 million which will not be needed in fiscal year 1991.

Los Angeles Basin TRACON Facilities Consolidation

The Los Angeles Basin TRACON Facilities Consolidation project, now called the Southern California TRACON project, is designed to consolidate four TRACON facilities in the Los Angeles area by 1995. In our July 1990 report,⁶ we noted that the project involves designing and constructing a new building and moving the existing computer systems into the consolidated facility. FAA believes this consolidation will help it provide better service in the basin's congested and complicated airspace. FAA plans to locate the consolidated facility on the Miramar Naval Air Base in San Diego, California. For fiscal year 1990, FAA was appropriated \$18.9 million to procure equipment. According to FAA officials, this funding included \$1 million to obtain a lease for the new facility.

Results of Analysis

FAA's fiscal year 1991 budget request of \$76.1 million is to fund building construction and procure equipment. FAA estimated that \$9 million of the \$76.1 million was needed to procure real estate for the consolidated facility. However, because the consolidated facility is planned to be located on existing government-owned land, the \$9 million requested to procure real estate will not be needed. FAA officials agree that this \$9 million is not necessary for the project. In addition, since the \$1 million appropriated in fiscal year 1990 for obtaining a lease will not be needed, the fiscal year 1991 request can be reduced by \$10 million.

Automatic Dependent Surveillance

This program is a satellite surveillance and communications system that will be used to control aircraft in oceanic airspace. According to FAA, the project will increase safety in oceanic areas, promote greater airspace

⁶Air Traffic Control: Inadequate Planning Increases Risk of Computer Failures in Los Angeles (GAO/IMTEC-90-49, July 16, 1990)

million (\$172.3 million less \$75 million) of fiscal year 1990 appropriated funds would be carried over to future years.

FAA's fiscal year 1991 budget request of \$185.1 million plus the \$97.3 million carry-over would bring total available funding to \$282.4 million for the first year of the production contract. FAA officials stated that they estimate that \$184.9 million is needed to fund the first year of the production contract, technical support, and implementation costs. Therefore, \$97.5 million could be reduced from the fiscal year 1991 budget request amount.

Mode Select (Mode S)

The Mode S project is to provide more accurate aircraft location information and to allow controllers and pilots to exchange data. In 1984, FAA contracted to buy 137 Mode S systems to replace many existing beacon radars³ and provide data communications to the air traffic control system. In our May 1990 report,⁴ we noted that the Mode S program had encountered continued technical problems which have led to repeated schedule slippages. Further, we determined that 20 years after proposing the concept and over 5 years after awarding a \$221 million production contract to buy 137 Mode S systems, FAA had spent about \$145 million without receiving the first system. We also reported that, as a result of these problems, FAA and the joint venture contractor—Westinghouse and UNISYS—had modified the contract to extend the delivery schedule and allow the contractor to deliver interim systems which will not meet all FAA requirements. The first interim system is to be delivered to an operational site in March 1992. FAA expects that the first fully capable systems will be delivered in April 1993.

Results of Analysis

FAA's fiscal year 1991 budget request of \$37 million is to fund Mode S spares, contractor cost growth, and program support. Of this amount, \$15.8 million is to fund Mode S spares and repairs. However, because the Mode S project is not scheduled to have the first interim systems delivered until March 1992, the \$15.8 million requested to fund Mode S spares and repairs is not needed in fiscal year 1991.

³Beacon radars calculate aircraft location using an electronic signal sent to the aircraft and a return signal sent by the aircraft.

⁴Air Traffic Control: Ineffective Management Plagues \$1.7-Billion Radar Program (GAO/IMTEC-90-37, May 31, 1990).

Potential Reductions to FAA's F&E Budget Request

For fiscal year 1991 FAA is requesting \$2.5 billion in its facilities and equipment budget request. This funding will finance procuring and installing new equipment, and constructing and modernizing air traffic control and airway facilities as part of FAA's National Airspace System plan. We identified a potential budget reduction of \$196.1 million from this request for computer and communications systems in the following areas: \$147.2 million for air traffic control systems and \$48.9 million for an administrative system. Table I.1 shows these potential reductions by program.

Table I.1: Potential Reductions to FAA's Fiscal Year 1991 F&E Budget Request

Dollars in millions	
Air Traffic Control Systems	
Voice Switching and Control System (VSCS)	\$97.5
Mode Select (Mode S)	15.8
Advanced Automation System (AAS)	10.8
Los Angeles Basin TRACON Facilities Consolidation, now called Southern California TRACON	10.0
Automatic Dependent Surveillance	6.7
Aeronautical Data Link	5.5
Improve Air Traffic Control En Route Radar Facilities	.9
Subtotal	\$147.2
Administrative System	
Automated Data Processing Facilities Management, also known as Computer Resources Nucleus (CORN)	\$48.9 ^a
Total	\$196.1

^aThis amount includes \$23.9 million of prior years' appropriated funds which are not needed

Air Traffic Control Systems

Voice Switching and Control System (VSCS)

vscs is intended to provide a computer-controlled voice system for both ground-to-ground and air-to-ground communications that is flexible, expandable, and highly reliable. It is to be deployed at 23 en route centers¹ and is expected to provide communications for the new controller workstations. These workstations will serve up to 430

¹FAA currently maintains 20 Air Route Traffic Control centers in the continental United States and 3 offshore centers in Anchorage, Alaska; Honolulu, Hawaii; and a combined San Juan, Puerto Rico, and Guam center that control air traffic between airports.

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Abbreviations

AAS	Advanced Automation System
CORN	Computer Resources Nucleus
FAA	Federal Aviation Administration
F&E	facilities and equipment
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
TRACON	Terminal Radar Approach Control
VSCS	Voice Switching and Control System


Switching and Control System. FAA does not plan to award a production contract for this system—intended to provide a computer-controlled voice communications system for new air traffic controller workstations—until November 1990, about 1 year later than planned when the budget request was submitted.

In the administrative area, we identified potential reductions totaling almost \$49 million for the Computer Resources Nucleus (CORN) project. CORN is a planned general-purpose data-processing procurement intended to meet FAA's data-processing needs over the next 10 years. These reductions are based on our May 1990¹ report, in which we determined that the CORN project had not been adequately justified or planned and had major unresolved problems. We therefore recommended that the Secretary of Transportation direct that the CORN contract not be awarded.

We obtained the views of FAA officials on the key facts and analyses contained in this report, and have incorporated their comments where appropriate. Details regarding the objective, scope, and methodology of our work are described in appendix II.

As arranged with your offices, unless you publicly announce the report's contents earlier, we plan no further distribution until 30 days after the date of this letter. We will then send copies to interested congressional committees; the Secretary of Transportation; the Administrator, FAA; the Director, Office of Management and Budget; and other interested parties.

This report was prepared under the direction of JayEtta Z. Hecker, Director, Resources, Community, and Economic Development Information Systems, who can be reached at (202) 275-9675. Other major contributors are listed in appendix III.


for Ralph V. Carlone
Assistant Comptroller General

¹FAA Procurement: Major Data-Processing Contract Should Not Be Awarded (GAO/IMTEC-90-38, May 25, 1990).

