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Federal Aviation Administration's
Acquisition of the Advanced
Automation System

Statement of
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Before the Subcommittee on
Transportation and Related Agencies,
Committee on Appropriations
House of Representatives



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Mr. Chairman and Members of the Subcommittee:

We appreciate this opportunity to comment on the Federal Aviation Administration's (FAA) plans to modernize its air traffic control system through the Advanced Automation System--commonly called the AAS. Our discussion today is based on our past work and interim results of our ongoing work for your Committee. In past reports and testimony on the AAS ^{1/}, we expressed concern that FAA had not adequately defined its requirements and that its acquisition strategy did not sufficiently reduce the risks of cost increases, schedule delays, and performance deficiencies. We also pointed out that FAA had not provided sufficient economic justification for this investment. Both House and Senate Appropriations Committees have also been concerned about these issues and have directed FAA to reduce risks by incorporating a development and test phase and simulating the advanced automation functions before buying the system. Further, the Appropriations Conference Committee directed FAA to provide Congress complete

¹ The past reports are: Interim Observations on FAA's Plans for Major Systems Acquisitions (GAO/IMTEC-84-14, May 4, 1984); Key Aspects of FAA's Plans to Acquire the Multi-billion Dollar Advanced Automation System (GAO/IMTEC-85-11, June 17, 1985); and FAA's Advanced Automation System Acquisition Is Risky (GAO/IMTEC-86-24, July 7, 1986). The past testimonies are: FAA's Advanced Automation System; Subcommittee on Transportation, House Committee on Appropriations, April 16, 1986; FAA's Advanced Automation System; Subcommittee on Transportation, Aviation, and Materials; House Committee on Science, Space, and Technology, April 23, 1986; and Potential Use of Satellite Technology for Air Traffic Control and Navigation, Subcommittee on Transportation, Aviation, and Materials; House Committee on Science, Space, and Technology, September 24, 1986.

results of an independent benefit/cost analysis, technical risk assessment, and cost estimate before requesting acquisition phase funds.

You asked us to discuss today the adequacy of the information available to support FAA's fiscal year 1988 request for funds to award the AAS production contract. Your Committee has been asking FAA for this information for several years, and FAA is preparing several studies, some in response to directions from your Committee. FAA plans to complete the last study in December 1987. The results of these studies should assist Congress in making a more informed decision about this \$4.6 billion investment. FAA's analysis indicates that its plan to award the AAS contract in fiscal year 1988 is optimistic, and a fiscal year 1989 award is more likely. Before I discuss these points in more detail, I will briefly summarize the program and its goals.

PROGRAM DESCRIPTION

The FAA intends that the AAS will replace the hardware, software, and air traffic controller workstations at airport tower, terminal area, and en-route air traffic control facilities. The program also includes development of advanced automation features called AERA. These functions will use sophisticated software to predict the future position of airborne aircraft, check for potential air traffic conflicts, and provide controllers with

alternate resolutions to potential conflicts. According to FAA, AAS should provide significant benefits to FAA, airlines and passengers by 1) increasing controller productivity and system availability, 2) saving airline fuel and passenger time, 3) automating many functions now performed by controllers, 4) reducing operating costs, and 5) enabling consolidation of en-route and terminal facilities. FAA plans to implement this program through a phased procurement and deployment over at least the next twelve years. Total acquisition costs are estimated at \$4.6 billion--up from \$3.2 billion last year.

INFORMATION TO SUPPORT AN ACQUISITION DECISION

During the next several months Congress will be considering FAA's request for \$180 million to complete the design phase, develop a test facility, and begin buying this system. Because this appropriation will fund the acquisition phase contract, it represents a major commitment by Congress. In its past reports, your Committee has stated that such a commitment should be supported by sufficient information to provide confidence that the investment is sound and the project is ready to proceed. However, several analyses remain to be completed.

1. Plans and reports requested by the House and Senate Appropriations Committees on the acquisition strategy, describing how FAA will mitigate risks, test the system,

and develop advanced functions. The Senate Committee requested these by May 1, 1987.

2. The final benefit/cost analysis, requested by the Committees, is supposed to validate requirements, analyze all feasible alternatives, and certify that the most cost effective alternative has been chosen. This study is not scheduled to be completed until December 1987.
3. The request for proposals, a terminal area facility study, and the final technical risk assessment. FAA plans to complete the first two in August 1987, and the risk analysis, requested by the Committees, in December 1987.

I will now discuss the acquisition strategy, economic justification, and the other information that is needed, in more detail.

Acquisition strategy information

We testified before this Committee last year that FAA's strategy to award a production contract before testing the system entailed unacceptably high risks, which could lead to significant cost increases, schedule delays, and performance deficiencies. As we proposed, the Appropriations Committees directed FAA to revise its strategy to incorporate a development and test phase before awarding a production contract, and to simulate the operational suitability and benefits of the advanced automation functions.

Although FAA revised the strategy, both Appropriations Committees recently stated that the revised strategy did not fully resolve their concerns. The new strategy did not provide for adequate system performance information before award of the acquisition phase contract, and did not require adequate workstation or AAS tests before authorizing workstation production. It also did not call for simulating the advanced functions before awarding the contract. As a result, both Committees directed FAA to further change its strategy. FAA was told to further reduce risks before buying the system by demonstrating specific technologies, including the local communications network, software compilers, time critical software functions, and fault detection and recovery mechanisms. It was also told to conduct full operational tests on the controller workstation and to test it with critical AAS hardware and software before authorizing its production.

Finally, FAA was directed to review the need to simulate the advanced automation functions. We note that FAA's recent preliminary technical risk analysis confirms the risk of developing these advanced functions and that the feasibility of these functions has not been established through adequate simulation or prototype testing and evaluation.

Economic justification information

In our testimony last April we also raised questions about whether the system, as currently defined, is a sound investment. We found that benefits might not exceed costs and questioned the significance of the small increments of passenger time savings that were used, in large part, to justify the investment. A December 1985 Appropriations Conference report had already directed FAA to conduct an independent benefit/cost analysis to support its request to buy the system. Preliminary results from the first phase of this analysis were just given to us, and may not yet have been provided to the Congress. FAA plans to use these preliminary results to support its fiscal year 1988 appropriation request, and to complete the analysis by December 1987. It plans to use the final results to support a request that the Department of Transportation approve the acquisition phase contract award. Based on a cursory evaluation of the preliminary results, we are concerned that the analysis still relies heavily on passenger time savings benefits and may not have considered all feasible alternatives.

About fifty percent of the total system benefits come from assigning value to passenger time savings. Seventy five percent of these savings (38 percent of total benefits) are related to time savings of several minutes or less per flight. The large total benefit is obtained, in effect, by accumulating all the small numbers of minutes expected to be saved by millions of passengers

over many years, and assigning them a value of \$25 an hour--the assumed value of time to all airline passengers. We question whether these small increments should be valued and valued at \$25 per hour. Last year we also noted that the Office of Management and Budget raised similar concerns. Further, the bulk of passenger time, fuel, and airline direct operating cost savings rely on the advanced automation features, which, as we pointed out earlier, involve significant risks. Thus, the extent to which benefits are obtained is dependent on successful implementation of these features.

The conference report required FAA to identify its objectives clearly and to analyze all feasible ways to achieve each one. The Committees recently reminded FAA to provide a complete economic justification, validating system requirements and certifying that other more cost-effective alternatives cannot satisfy requirements. Although the program office has reviewed some requirements, the benefit/cost study did not validate system requirements.

Further, in the preliminary benefit/cost analysis, only alternatives based on the currently defined AAS--with various acquisition strategy and consolidation plans--incorporate the advanced automation functions on which the bulk of the benefits depend. The study points out that the alternatives considered are only examples, or benchmarks, among a wide range of possibilities and it did not, however, identify a range of possibilities.

The final phase of the benefit/cost study will refine FAA's benefit estimates, including the benefits expected from advanced automation functions. As a result, the opportunity exists to explore whether other potential alternatives could perform these functions, and if so, whether they represent a more cost effective investment. A final report, therefore could provide a better basis for Congress to evaluate the program.

Other information

Other information which could be important to Congress' decision about the AAS investment will also become available during the next year. The AAS request for proposals, expected to be released in August 1987, should provide a detailed description of the program indicating the proposed system requirements and contract terms. The results of a terminal area computer capacity and sustainability study are also expected to be available in August 1987, and should provide information about the need to replace or upgrade computers at the busier terminal area facilities. Finally, the results of the final technical risk assessment should be available by December 1987, and should provide a more complete assessment of technical, operational, and transition risks which could affect system requirements and expected system benefits.

IMPACT OF DEFERRING ACQUISITION PHASE APPROVAL

An analysis of schedule risks conducted by an FAA support contractor shows FAA has only about a twenty percent chance of awarding the contract in June 1988 as planned. A high confidence schedule --providing an 80 percent chance-- would call for an October 1988 award date. An October award would occur at the beginning of fiscal year 1989, giving Congress time to evaluate additional information in the spring of 1988 when it considers the 1989 budget request.

SUMMARY

To summarize, FAA is requesting funds to begin buying the system, but important studies are not yet complete and will not be finished before Congress completes its consideration of FAA's fiscal year 1988 appropriation request. To date, FAA has not provided Congress with plans to further reduce risks before awarding the contract. Furthermore, FAA's preliminary benefit/cost analysis will be refined during the next year and could examine other feasible alternatives to the currently defined AAS. Finally, other relevant information regarding the request for proposals, terminal area computer equipment requirements, and the final technical risk assessment is not yet available.

This concludes my prepared testimony, Mr. Chairman. I will be pleased to answer any questions that you or others may have at this time.