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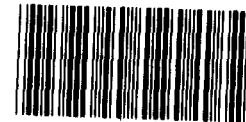
Testimony

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FAA Appropriation Issues

Statement of  
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Before the  
Subcommittee on Transportation  
Senate Committee on Appropriations



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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to comment on Federal Aviation Administration (FAA) appropriation issues. Over the past few years, our work has focused on how well FAA is ensuring aviation safety and the agency's efforts to modernize air traffic control (ATC) through the National Airspace System (NAS) Plan. The concerns we expressed to this subcommittee last year focused on FAA's schedule delays in developing major NAS systems. This year, many NAS Plan systems have entered a critical phase in which contractors are delivering equipment to FAA field sites. Accordingly, a major challenge facing FAA today is the integration and deployment of numerous NAS systems within budget and according to realistic schedules while also hiring adequate staff for its controller and maintenance work forces.

Our testimony today will center on four issues: (1) the work of FAA's systems engineering and integration contractor; (2) how much ATC modernization could ultimately cost; (3) when modernization will be completed; and (4) how many controllers and maintenance technicians will be needed. Overall, our work indicates that the cost of ATC modernization will be considerably more than FAA's current \$15.8 billion estimate and that corrective actions are needed if further schedule delays are to be avoided.

#### BACKGROUND

Introduced in December 1981, the NAS Plan is the nation's largest civilian technology project since the Apollo project. Air traffic control computers, radars, communications and facilities

are being modernized. Major benefits projected include the ability to safely handle traffic growth, reduced maintenance requirements, and enhanced air traffic controller productivity.

Six years into the NAS Plan, many contractual commitments have been made for NAS systems; however, of the 12 major NAS Plan systems, only one--the Host computer--is nearing completion. A comparison of operational readiness dates listed in the 1983 plan and the 1987 plan shows major system schedule delays ranging from 1 to 5 years. Development of systems has proven to be more difficult, time-consuming and costly than FAA expected. Consequently, anticipated benefits are being deferred.

#### SYSTEMS ENGINEERING AND INTEGRATION ASSISTANCE

The magnitude and complexity of integrating all ATC system components became apparent shortly after the NAS Plan was published in 1981. In 1984, FAA selected Martin Marietta Corporation as its systems engineering and integration contractor (SEIC) to assist it in implementing the plan. The contract is valued at over \$900 million over a period of 10 years and provides for the award of a semi-annual fee on the basis of FAA performance evaluations.

The SEIC has contributed to the progress of the NAS Plan; however, for the most part, its control over the design of the systems in the plan is limited. The SEIC must integrate thousands of ATC system components within the constraints imposed by FAA's contractual agreements in furtherance of the 1981 NAS Plan design. Although the SEIC has no contractual authority over other NAS Plan

contractors, it does technically monitor, support, or direct their activities. For example, it can advise FAA when a vendor's equipment is not meeting requirements or is falling behind schedule. In this respect, Martin Marietta's role is akin to a technical adviser.

The SEIC's contributions were viewed as valuable by FAA officials at headquarters and in the field. For example, the SEIC identified hundreds of incomplete or incorrect interfaces between systems. These problems were caused by FAA's initial design. As a result of the SEIC's work, corrective actions have been initiated or planned in the form of engineering changes and new projects.

We believe that FAA's ratings of the SEIC reflect the agency's overall satisfaction with the contractor's performance. Because FAA's evaluation criteria are highly subjective, it is not feasible for us to judge whether Martin Marietta exceeded objectives and deserved to receive a high rating justifying the fees awarded to date. There are, however, several matters that require prompt corrective action by FAA.

Use of SEIC employees. Some SEIC employees are under the day-to-day supervision and direction of FAA regional staff. The current arrangement places these SEIC employees in an improper employee-employer relationship with FAA. Although the number of SEIC employees working in this way is small relative to the total number of SEIC personnel involved with NAS Plan engineering and integration activities, FAA needs to take action to discontinue the

practice and ensure that its employees are not supervising any SEIC personnel.

Unresolved facility design work responsibilities. The SEIC has a major responsibility in developing architect and engineering plans for FAA's ATC facilities. However, the scope and timing of its contributions are in dispute.

Facility design work must begin about 2 years before scheduled equipment deliveries so that facilities can be ready when the equipment arrives. The SEIC's facility design subcontractor has not met milestones for site-specific design work at FAA's air route traffic control centers. A revised schedule to accomplish the work was unacceptable to FAA's structures program manager, and a default letter was drafted in February 1988 to notify the SEIC of non-delivery of scheduled work. Further, there is a dispute between FAA and the SEIC about the SEIC's responsibilities for doing site-specific design work at hundreds of other FAA facilities, such as airport towers and radar sites. FAA assigned the SEIC responsibility for site design at these facilities in 1987. However, SEIC officials believe that this work was beyond the scope of their responsibility. This design work will either have to be performed by the SEIC, another contractor, or FAA staff. In our opinion, resolution of this uncertainty is essential if further schedule delays are to be avoided.

NAS PLAN COST WILL

EXCEED PREVIOUS ESTIMATES

FAA's estimate of \$15.8 billion for the basic NAS Plan projects authorized by the Congress does not reflect all changes and projects needed to meet original NAS Plan goals and objectives. The SEIC has identified changes and projects that could raise modernization costs to about \$24 billion by the year 2000.

Cost Increases to Original NAS Projects. The SEIC has identified about \$2 billion in engineering changes and funding increases to existing NAS Plan projects.

Although all engineering changes were identified by FAA engineering review boards as needed to integrate various systems and to correct inadequacies in the current NAS Plan design, none are included in FAA's \$15.8 billion estimate of NAS Plan costs. Of the \$1 billion in engineering changes, about \$260 million have already been approved by FAA for inclusion in future funding requests. According to the SEIC, valid engineering change requirements totaling about \$740 million still require FAA funding approval.

The current \$15.8 billion NAS Plan cost estimate also does not include a \$1 billion "risk allowance," the purpose of which is to compensate for understated procurement costs. The SEIC views such understatements as likely to occur.

The NAS Program Director has asked the SEIC to develop proposals for cost reduction, or offsets, from existing NAS projects equal to the amount of these increases. Such reductions

are made possible by deferring activities or changing requirements. As of March 1988, \$104 million had been identified as possible offsets from deleting projects, of which about \$94 million has been approved. Therefore, if no additional offsets are found, basic NAS Plan costs could total \$17.8 billion--not \$15.8 billion.

Additional ATC Modernization Costs. FAA engineering review boards also identified new NAS projects and additional equipment needs that are classified as "other capital needs." These new projects and additional equipment needs did not appear in the original NAS Plan, so FAA has not included their costs in its \$15.8 billion NAS Plan estimate. However, they are clearly part of the ATC modernization effort and, hence, have a direct link to NAS Plan goals and objectives. The SEIC estimates that these additional requirements will cost about \$6.5 billion to implement. If FAA plans are not changed, NAS projects and additional equipment needs could cost about \$24 billion by the year 2000.

Examples of such equipment requirements that have been approved by engineering review boards include additional airport surveillance radars, long-range radars, and advanced surveillance and communications equipment. Examples of new projects include \$191 million for fuel storage tanks needed for emergency power generation and \$2 billion to extend and continue NAS support activities, such as facility relocations, beyond 1992.

Impact of Increased Modernization Costs. The near term budget impact of these engineering changes and new projects could require funding requests that exceed current authorized levels.

Specifically, the Airways and Airport Capacity Act of 1987 provided for authorizations of about \$2.2 billion for fiscal year 1990. According to the SEIC, implementing the additional approved engineering changes identified to date would exceed authorized facilities and equipment levels by \$275 million in fiscal year 1990. Appropriations for facilities and equipment for fiscal years 1989 through 1992 would have to increase by about \$2 billion over original estimates.

In our view, this suggests that now is an appropriate time for FAA to combine the "old NAS Plan" with "new" ATC modernization requirements, and to develop distinct project categories of required and funded, required and not funded, and deferrable. This analysis would permit the setting of priorities and the resulting funding schedule for the next 3 fiscal years and beyond. Currently, the cost distinction between NAS Plan and "other capital needs" clouds the issue of how much ATC modernization could cost and results in an incomplete picture of the magnitude of the modernization initiative.

#### PCOR PROJECTION OF REGIONAL RESOURCES

#### ADVERSELY IMPACTS NAS IMPLEMENTATION

Implementation of NAS Plan systems is underway. As more and more equipment is delivered to the field, the focus on meeting NAS Plan milestones is shifting from the project developers in headquarters to project implementors--FAA's nine regions. Regions have not been able to keep pace with system deliveries. While the



four regions we visited as part of our assessment of regional construction attributed the situation primarily to inadequate staffing, there are other contributing conditions.

Site-specific Project Implementation Plans. Project implementation plans are generated by headquarters to provide guidance on the implementation of specific systems. However, because these plans are general in nature, they must be made substantially more detailed before they can be used by a specific facility. According to FAA field staff, the personnel and time needed to do this is often not adequately considered in headquarters schedules and resource estimates. For example, the Seattle air route traffic control center staff had to add substantial detail to the national Host computer project implementation plan provided by headquarters before completing its site-specific plan. According to a center official, the headquarters document provided no guidance as to how the system was to be implemented. The center was able to meet the commissioning deadline for the Host computer only because of a 6-month delay experienced by the contractor. This delay allowed the center staff enough time to develop and implement site preparation, installation, and testing procedures.

Regional Project Management Tools. Regions currently lack an integrated project and resource management tool. They use a national facilities and equipment reporting system supplemented by locally-developed automated programs to help schedule NAS implementation. However, these tools cannot calculate regional

delivery dates, which are based on the installation work force available. To date, regions have not been able to install equipment when it is delivered. A recent SEIC report indicated that, of 248 equipment deliveries scheduled by FAA headquarters between February 1988 and July 1988, 44 percent involved significant discrepancies between headquarters and regional schedules. While to the regions the delivery date is when they are ready to install the equipment, to FAA headquarters the date marks when the vendor will deliver equipment to the field. When the regions cannot install this equipment, it is stored either in the field or at the FAA Depot in Oklahoma City. For example, one region has been storing navigational-aid equipment for as long as 16 months because of insufficient staff.

FAA headquarters is aware of the need for a project management system in the regions. The SEIC is now developing such a system--the Regional Project Management System (RPMS)--the purpose of which is to provide a firmer foundation for determining installation resource requirements and installation schedules. However, according to responsible SEIC staff, there is no requirement for reconciling equipment delivery date differences between regions and headquarters. Resolution of this matter is needed before the RPMS can be implemented.

Acquisition of Implementation Support. FAA plans to address regional staffing problems in implementing NAS systems with a technical support services contract (TSSC) to be awarded this summer. However, we found that the TSSC request for proposals

makes provision for about 2,000 fewer staff years than FAA's resource estimating system indicates would be necessary. We believe it would be prudent for FAA to account for this staffing disparity before the TSSC is awarded. This is important because, in practical terms, either sufficient resources are applied to meet the current headquarters schedule or the schedule must be extended to account for work force constraints.

#### CONTROLLER AND MAINTENANCE

##### WORK FORCE ISSUES

In addition to NAS Plan cost and scheduling problems, FAA cannot say with confidence how many people it needs to operate the current ATC system or a modernized NAS. Since last year FAA has made progress in increasing its controller and maintenance staffing to a level of 13,240 air traffic controllers--including 8,904 full performance level controllers--and 8,493 field maintenance employees, as of February 29, 1988.

Our work on FAA's rebuilding of the controller work force shows that while FAA has been increasing staffing since the 1981 strike, FAA has underestimated its controller requirements. In addition, FAA prematurely reduced its maintenance staffing by anticipating productivity savings from new systems which are only beginning to reach the field.

A key reason why FAA cannot confidently project its staffing requirements is that its internal staffing models are not reliable. FAA's controller staffing standards underestimate needs because, among other things, they do not provide sufficient staff to cover

peak traffic periods and have not been validated. The agency is currently reexamining its standard for airport terminal staffing.

Although better designed than the controller staffing standards, FAA's maintenance staffing standard has not been used as the basis for FAA's budget requests. We reported in September 1987<sup>1</sup> that FAA prematurely reduced its maintenance staffing in anticipation of productivity benefits which did not occur because of delays in NAS Plan projects. For example, from 1984 until this year's budget request, FAA had requested reduced field maintenance staffing because modernized systems were expected to reduce work load. The fiscal year 1989 budget is a step in the right direction because it reflects the first time that FAA has requested increases for all of its major work forces.

Both staffing standards also understate requirements because they do not provide for an adequate "pipeline" of trainees to (1) replace those who leave and (2) meet future work loads. FAA's controller and maintenance personnel require several years of training before they are able to carry full work loads. Many of these employees are currently eligible to retire, and to provide for smooth NAS operations, FAA needs to have enough individuals in training now so that fully trained personnel will be available to replace those who retire.

Once FAA has identified its staffing requirements, it needs to be able to bring employees on board as quickly as possible.

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<sup>1</sup>FAA Staffing: Challenges in Managing Shortages in the Maintenance Work Force, (GAO/RCED-87-137.)

Recognizing that its current hiring process is time-consuming and inefficient, FAA is streamlining its hiring process by doing its own testing of controller candidates and performing some pre-employment checks formerly done by the Office of Personnel Management. FAA's transition to a modernized NAS also has major implications for the types of people FAA recruits and the way FAA's major work forces are trained. At the request of the House Subcommittee on Investigations and Oversight and this subcommittee, we are examining FAA's programs for recruiting, hiring, and training its controller, inspector, and maintenance work forces.

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To summarize, we found that modernizing the ATC system will cost more and take longer than the original NAS Plan indicated. Modifications and additional projects identified by FAA's SEIC as necessary to meet established performance requirements could raise the total cost of NAS modernization to about \$24 billion by the year 2000. Furthermore, FAA may not have the necessary controller and maintenance work force--in terms of numbers, skills and abilities--needed to transition for the future ATC system.

Our findings suggest to us the need for a redefined NAS Plan that clearly reflects all projects and costs; an agency-wide schedule and the constraints on installation, such as maintenance work force shortages. We believe a redefined NAS Plan will enhance the basis for making future implementation decisions and permit the setting of priorities that may be needed in light of the significant increase in projected funding needs.

This concludes my prepared statement. I will be pleased to respond to any questions you may have.