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# *Office of the Inspector General*

# *Audit Report*

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*Management Advisory Memorandum  
on Resource Requirement Planning for  
Operating and Maintaining the  
National Airspace System*

*Federal Aviation Administration*

*Report Number: AS-FA-7-004*

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## INTRODUCTION

This is our Management Advisory Memorandum on Resource Requirement Planning for Operating and Maintaining the National Airspace System (NAS) in the Federal Aviation Administration (FAA). The objective of our review was to evaluate FAA's resource requirement planning system to ensure it accurately projects funding requirements for operating and maintaining the NAS.

### Background

Within the FAA, Airway Facilities is responsible for the operation and maintenance of all facilities and equipment used by Air Traffic in the movement of aircraft. The purpose of the systems maintenance activity within Airway Facilities is to provide for the maintenance, repair, and engineering of over 32,000 facilities and pieces of equipment comprising the NAS. This includes air traffic control equipment, navigation and landing aids, automation systems, communication equipment, and support of FAA plant facilities. Field maintenance technicians and contractors are responsible for maintaining and repairing facilities and equipment at 6 general NAS sector offices, 27 system management offices, and 21 air route traffic control centers (ARTCC).

To cope with the increases in facilities and services provided, FAA is implementing management initiatives to accomplish NAS maintenance requirements. These initiatives include identifying areas where periodic maintenance, shift coverage, and facility restoration can be reduced; increasing overtime use in restoring failed facilities and services; increasing original

equipment manufacturers contract augmentation; and continuing to request staff increases in the maintenance technician workforce.

### Scope and Methodology

The review was conducted from April 1995 through September 1996 at FAA Headquarters; FAA's Eastern and Southern Regions; and the ARTCCs located in Atlanta, New York, and Washington. We reviewed the Fiscal Years (FY) 1996 and 1997 Airway Facilities funding requests which were prepared during FYs 1994 and 1995, respectively. Where available, we reviewed the Airway Facilities' FYs 1992 through 1997 statistics on maintenance technician staffing, overtime, system outages, and contract maintenance.

We reviewed the process used by Airway Facilities to determine resource requirements needed to operate and maintain the NAS. Specifically, we reviewed the Airway Facilities resource requirement planning process which identifies funding needs for Capital Investment Plan (CIP) projects transitioning from Facilities and Equipment (F&E) to Operations funding. In addition, we obtained and analyzed overall Airway Facilities field maintenance staffing, contract maintenance, overtime usage, and system outages to determine trends. Further, we held discussions with FAA officials in Headquarters and regional and ARTCC personnel responsible for resource requirement planning and maintenance of the NAS.

We did not evaluate the acquisition decision or maintenance method selected by CIP project offices, nor did we validate the staffing standards used by Airway Facilities in determining the staffing needs.

### RESULTS OF REVIEW

Based on our concern about FAA's ability to maintain the NAS with reduced funding, we reviewed FAA's process for determining resource requirements needed to operate and maintain the NAS. We determined that Airway Facilities has identified the resource requirements needed to transition projects from F&E funding to Operations funding. However, because the system to track actual costs was still under development, we were unable to verify the accuracy of these requirements. We also found that, until FY 1996, FAA had experienced significant funding constraints, staffing reductions, and cost increases in overtime and contract maintenance. In FY 1996, Congress provided increased funding for the maintenance of the NAS. Further, FAA performed two internal studies on maintenance of the NAS and is implementing numerous initiatives.

## Discussion

In the hearings before the House Committee on Appropriations for the FY 1993 budget and again for the FY 1994 budget, the Committee and the General Accounting Office (GAO) expressed concerns over FAA's ability to maintain the Air Traffic Control (ATC) System. The Committee and GAO were concerned that existing equipment would need to be maintained while technicians received training needed to install, test, and commission new systems; the workforce remained well below the staffing standard level; and one-third of the maintenance workforce would be eligible to retire by 1995. The Committee also expressed concern with the increases in contractor maintenance costs. Our review concluded that those concerns were justified.

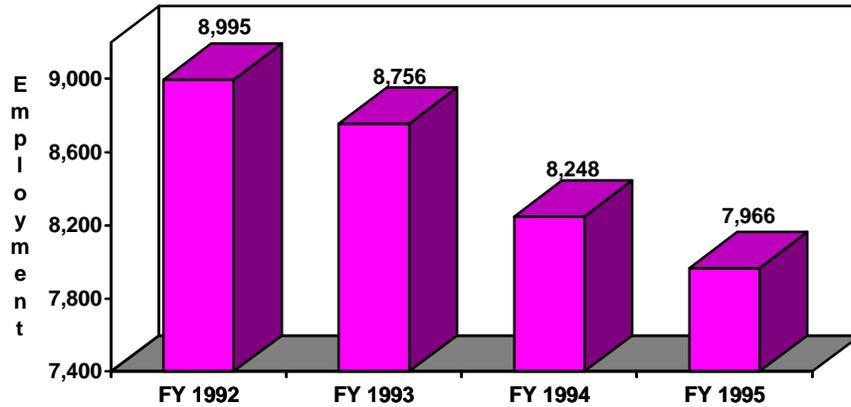
FAA's annual Operations funding for the maintenance of the NAS decreased from FYs 1993 to 1995<sup>1</sup> and the Office of Management and Budget projected a \$400 million decrease in FAA's overall Operations funding by FY 1999. At the same time, maintenance requirements were greater than anticipated because of slower than expected replacement of old equipment and an increase in the number of facilities and services provided by the maintenance staff. For example, since FY 1994, the Southern Region added nine major systems to its four ARTCCs. In the Eastern Region, the New York ARTCC had 25 systems installed since 1990, including 17 new systems. While new equipment and systems are added to the NAS, the old equipment has not been removed resulting in the need for concurrent maintenance on both. The installation of Voice Switching and Control System (VSCS) demonstrates how the workload has not decreased when the new systems were installed. VSCS replaces an older switching system which requires continuous maintenance. Until VSCS is fully operational, technicians will continue to maintain the existing system and concurrently certify the repairs completed by the contractor on the new equipment.

Along with funding constraints and increased workload, FAA's end-of-year staffing level for field maintenance technicians decreased substantially from FY 1992 through FY 1995, as shown on the following graph.

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<sup>1</sup>From FYs 1993 to 1994 the funding increased from \$846 million to \$856 million and, in FY 1995, decreased to \$840 million.

**Field Maintenance Workforce  
End-of-Year Employment**

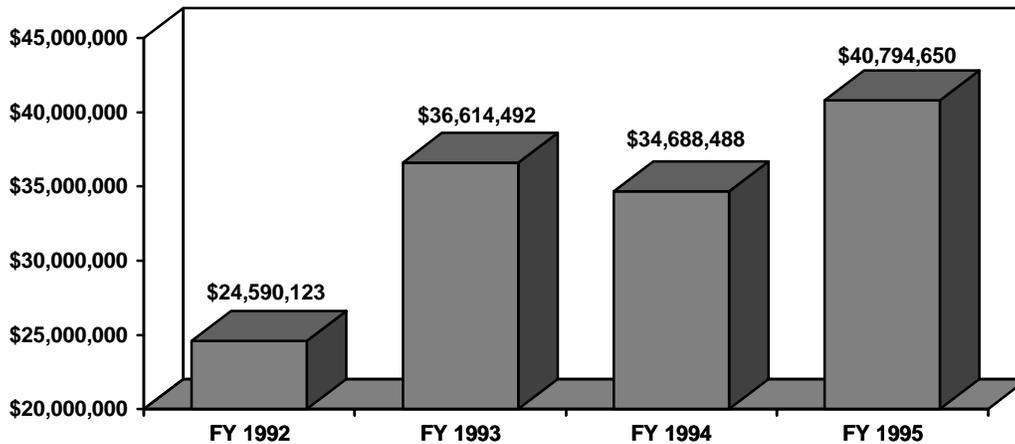


Airway Facilities staffing has also been significantly impacted by early retirements and buyouts. During FYs 1994 and 1995, FAA offered these incentives to supervisory, managerial, administrative/clerical, and logistics positions at Airway Facilities Regional and Sector offices. For example, at the New York ARTCC alone, there were 16 Airway Facilities retirements in 1994 and an additional 17 retirements in 1995. ARTCC retirements had a direct impact on technician staffing as technicians were removed from maintenance duties to fill positions left vacant by retirements and buyouts. Although FAA has hired additional technicians, staffing shortages will continue due to the extended length of time to train and certify technicians. The certification process for technicians requires training, experience, successful completion of a written examination, and may take 3 to 5 years to complete.

As a result of increased workload and staffing shortages, Airway Facilities Operations-funded overtime usage increased. Operations overtime is overtime used to repair equipment and systems. Nationally, Operations overtime usage increased from \$6.3 million in FY 1993 to over \$7.3 million in FY 1995, an increase of over 16 percent.

To compensate for staffing shortages, FAA is placing increased reliance on contractor maintenance. As a result, hardware contract maintenance increased over 65 percent between FYs 1992 and 1995, as shown on the following graph.

### Total Operations Appropriation Funds Spent on Contract Hardware Maintenance



### Resource Requirement Planning System

Although Airway Facilities had funding and staffing constraints, it did identify the resource requirements needed to transition projects from F&E funding to Operations funding. FAA has also initiated development of a software package which will assist in the determination of funding needs.

Beginning in FY 1996, FAA established a resource requirement process called the NAS Plan Hand-Off (Hand-Off). The Hand-Off is Airway Facilities' process to identify and request the increase, over the prior year's funding, for the maintenance of systems transitioning from F&E to Operations. The Hand-Off lists each CIP project transitioning to Operations funding and is broken down by the various elements needed to maintain the NAS. The responsible offices within Airway Facilities provide budget estimates for contract maintenance, in-house maintenance, logistics and leased telecommunications. These requests are validated by Airway Facilities and forwarded for inclusion in FAA's budget submission. Beginning with the FY 1997 budget formulation process, the Logistics Funding Requirements Document (LFRD) was utilized as a computerized mechanism to capture, validate, and collate the data. The LFRD is a computerized software package which supports the development of the budget requirements and tracks funding throughout the budget cycle.

To test FAA's process for determining resource requirements, five CIP projects were selected that represented new equipment and upgrades of equipment to the ARTCCs. These projects were VSCS, Traffic Management System (TMS),

Back-Up Emergency Communication (BUEC) System, Multichannel Voice Recorders (MVR), and Long Range Radar (ARSR-4).

In the FYs 1996 and 1997 Hand-Offs, Airway Facilities identified various funding requirements for the projects, such as systems maintenance, leased telecommunications, NAS logistics, and training. Of the five projects, only VSCS and ARSR-4 were scheduled to be placed on-line during FY 1996. The FY 1996 Hand-Off identified systems maintenance, leased telecommunications and training for both the VSCS and ARSR-4. Also, for the ARSR-4, NAS logistics funding was requested. In the FY 1997 funding determination, all five projects were included in the Hand-Off and systems maintenance was identified for all five projects.

Although Airway Facilities identified the resource requirements needed to transition projects from F&E funding to Operations funding, the LFRD system to track costs was still in development. Therefore, we were unable to verify the accuracy of these requirements.

#### Recent Actions

During the review, changes occurred which directly affected resource requirement planning within Airway Facilities. These changes included increases in funding and staffing and FAA's response to public concerns about ARTCC safety.

In the FY 1996 budget request, Congress agreed with FAA that the operation and maintenance of the NAS was a high priority. The Conference Committee report language gave FAA funding above the Administration's request and even allowed the Secretary of Transportation to transfer an additional \$60 million of U.S. Coast Guard operating funds to augment the operation and maintenance of the NAS. Operations funding for the maintenance of the NAS for FY 1996 was \$862,595,000, an increase of 2.7 percent over the FY 1995 level. Further, Congress continued its support in the FY 1997 Operations budget and included an 11.9 percent increase over the FY 1996 level. The FY 1997 budget includes \$965,000,000 for the maintenance of the NAS. In addition, after a steady decline in staffing from FY 1992 to FY 1995, FAA has been given authority to hire an additional 264 field maintenance technicians in FY 1996 and 134 in FY 1997. This will bring an end-of-year staffing level of 8,364 field maintenance technicians for FY 1997.

In addition to funding and staffing increases, FAA completed two internal studies which affected resource requirement planning. The first study, "Summary

Report: Air Traffic Services Survey of Air Route Traffic Control Centers,” dated October 17, 1995, was conducted after several high visibility NAS interruptions gave rise to public concern about the ATC system. The study’s findings are presented in six major areas, four of which directly affect Airway Facilities. These areas include information exchange, aging infrastructure, resources, and training. FAA has created action plans to address the issues raised in the study. For example, the study concluded that FAA’s national policy relating to watch coverage and the restoration of operational facilities is not universally interpreted by the ARTCCs. Delayed restoration of some equipment is occurring at some locations due to factors such as available staffing and vacant shifts. FAA created an action plan to review national policy on watch coverage and restoration of facilities. The study also concluded that the longer equipment exceeds its economic service life, the more outages tend to be random and unpredictable. This is being experienced with older ARTCC electronic equipment and with the ARTCC physical plants which are almost 35 years old. An action plan has been developed to perform supportability analyses for older equipment. Further, similar to our results, the study concluded that most Airway Facilities on-board ARTCC staffing is at 60 to 70 percent of generated workload. This shortage of an available and trained workforce is having a negative impact on all areas of operation at the ARTCCs. In addition, a significant number of Airway Facilities employees are eligible to retire and new system installations are affecting staffing resources. FAA’s action items included reviewing ARTCC staffing levels, shift coverage, and work assignments to achieve optimum benefit from available resources and preparing budgetary documentation to support an increase in Airway Facilities staffing.

The second study, “BLUE RIBBON TEAM: ARTCC Power Outage Report,” dated November 1995, was commissioned after 10 significant ARTCC critical-power outages with the new power system. This independent team was to determine the direct and root causes of these incidents and to recommend corrective actions. Many of the findings dealt with the inadequacy of technician training and technical expertise to support new and existing power systems. The Blue Ribbon Team has incorporated recommendations to address the findings identified.

The action items and recommendations from both studies are monitored closely by FAA. Each month, FAA publishes “Summary of ARTCC Action Item Status.” This report tracks each action item and recommendation and includes the Office of Primary Interest, due dates, and current status. The report also includes a detailed description of each action item and recommendation and actions taken to date.

In addition to these internal studies, FAA recently issued its proposed NAS Architecture. The Architecture addresses the issues of an aging NAS infrastructure and shrinking Federal budgets. As evidenced by the Architecture, the total costs of the proposed architecture are higher than the expected available funding. Congress has also expressed concern regarding the costs of modernizing the NAS. Specifically, the Air Traffic Management System Performance Improvement Act of 1996, Public Law 104-264, requires FAA to contract with an independent entity to conduct a complete assessment of the financial requirements of the FAA through the year 2002. The purpose of this assessment is to determine independently what the financial needs of the FAA will be in the short- and long-term. The assessment shall also include a cost allocation analysis detailing which segments of the aviation community are driving the various costs imposed on the FAA. The results of the assessment shall be submitted to the National Civil Aviation Review Commission and will include specific recommendations to Congress on how the FAA can reduce costs, raise additional revenue for the support of agency operations, and accelerate modernization efforts.

### Conclusion

The operation and maintenance of FAA's present and future air traffic control system remains among the highest priorities within the Department. FAA's development of the LFRD, recent internal studies and initiatives, and the requirement to contract for the assessment of its financial needs should assist FAA in its resource requirement planning. Therefore, we are not making any recommendations. However, we encourage FAA to continue with their action items and efforts to determine and track the actual cost to operate and maintain NAS equipment and facilities.

**Team Members**

The following is a list of team members who contributed to this report.

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