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*Office of Inspector General*

*Audit Report*

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**Report on FAA/NASA Research and  
Development Coordination Efforts**

**Federal Aviation Administration**

**Report Number: AV-1998-008**

**Date Issued: October 8, 1998**





# Memorandum

**U.S. Department of  
Transportation**

Office of the Secretary  
Of Transportation

Office of Inspector General

Subject: ACTION: Report on FAA/NASA Research and  
Development Coordination Efforts  
AV-1999-008

Date: October 8, 1998

From: **Kenneth M. Mead** *K.M. Mead*  
Inspector General

Reply to  
Attn of:

To: Federal Aviation Administrator

This report summarizes the results of our audit of the coordination efforts between the Federal Aviation Administration (FAA) and National Aeronautics and Space Administration (NASA) on aviation safety and air traffic management research. We initiated the audit as a joint effort with the NASA Office of Inspector General in response to concerns expressed by members of the National Airspace System Modernization Task Force. A description of the scope and methodology is included as Exhibit A.

We focused our work on aviation safety and air traffic management research because of their importance to the National Airspace System and the projected \$1.3 billion FAA and NASA plan to spend on joint research and development efforts in these areas through Fiscal Year (FY) 2002.

## **BACKGROUND**

**Missions**: Both FAA and NASA seek to improve the National Airspace System and each agency's mission includes research and development for aviation. A significant portion of each agency's research and development efforts goes to aviation safety and air traffic management. The projected Research, Engineering, and Development (RE&D) budgets for FYs 1998 through 2002 are \$1.4 billion for FAA<sup>1</sup> and \$4.4 billion for NASA. Of this total, an estimated \$1.3 billion will be spent on joint aviation safety and air traffic management research and development efforts. There are about 18 joint aviation safety projects and tasks, and 27 joint air traffic management projects.

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<sup>1</sup>Amounts shown are RE&D funds only. Some of FAA's research and development efforts are funded from other sources, including FAA's Facilities and Equipment account.

**Goals:** The FAA and NASA joint research efforts can have a major impact on the future of aviation safety, and on airspace and airport capacity. These joint efforts include research in areas such as aircraft structures, security, human factors, simulation modeling of the air traffic control system, and weather. Both agencies support the national safety goal to reduce the fatal aviation accident rate by 80 percent in 10 years and air traffic management goals to increase the capacity and efficiency of the National Airspace System.

**Roles:** While FAA and NASA share a common mission and some aviation safety and air traffic management goals, each has individual but different research roles. FAA's research is generally short-term to refine existing technology, systems, designs, and procedures that directly support its operational and regulatory responsibilities. NASA conducts primarily basic scientific research that provides focused long-term research and development in aeronautics and related technologies. For example, on the Dynamic Final Approach Spacing Project<sup>2</sup> FAA is responsible for prototype development and deployment while NASA is responsible for concept exploration and development. In other words, FAA carries the project forward from pre-production prototype development to full-scale development and deployment in the National Airspace System after NASA validates the concept and functional capabilities of the technology.

## **RESULTS AND RECOMMENDATIONS**

Over the years, joint FAA and NASA research have produced very valuable aviation technology. For example, windshear technology has significantly enhanced flight safety for airline passengers and crews. Aircraft are now equipped with a windshear radar system which alerts aircraft of a windshear event<sup>3</sup> up to 90 seconds before the aircraft flies into it. This gives flight crews the time they need to prepare for or avoid a potentially hazardous situation.

Recognizing that FAA and NASA have different and evolving roles, and separate approaches to achieving shared goals, it is imperative that the agencies seek the clarity of an agreement on what needs to be done and a common understanding of the expectations of how the research undertaken by each agency will enable them to achieve their goals. We have identified five areas where FAA and NASA can take action to enhance the effectiveness of their coordination efforts and help ensure agency resources are used in the most cost-effective manner.

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<sup>2</sup> The objective of this project is to determine safe aircraft separation standards for arriving aircraft under specified conditions.

<sup>3</sup> Windshear is an abrupt change in wind direction and/or velocity that may occur in any type of weather. It is particularly dangerous to aircraft landing or departing.

We recommend that FAA, in cooperation with NASA:

- **Re-evaluate the advisory committee structure and modify, where appropriate, the number and composition of the committees and subcommittees.**

FAA and NASA each have established an advisory committee to provide advice and recommendations on aviation issues. The committees consist of aviation experts from industry and academia who are selected on the basis of their technical knowledge and the requirements for the research. Advisory committees provide an external view to Government agencies and are a valuable source of expert advice, ideas, and diverse opinions. Currently, there are six subcommittees and an ad-hoc committee that report to the FAA advisory committee and eight subcommittees, a task force, and a steering committee that report to the NASA advisory committee. These 19 FAA and NASA advisory committees and subcommittees include approximately 132 and 154 member positions, respectively.

In our opinion, now is the time to review the advisory committee structure. The advisory committees need to recognize NASA's expanded role and responsibilities in aviation safety and ensure current needs and priorities of both agencies are reflected in their deliberations. Exhibit B diagrams FAA's and NASA's advisory committee structure.

- **Increase the number of common members participating on both advisory committees.**

Only one of the advisory committee members has been selected to serve on both FAA's and NASA's advisory committees. Having committee members with information and insight of both agencies' research activities would make the members' advice more complete and relevant and enhance coordination between the agencies. The agencies should determine whether it is more advantageous to designate the members to participate on both committees from the existing member positions or expand the total advisory committee membership to accommodate new positions.

- **Adopt a joint implementation plan and a formal agreement for aviation safety research that includes a requirement for an integrated plan.**

Congress, in passing the Aviation Safety Research Act of 1988, required FAA to conduct more research in aviation safety. In addition, the White House Commission on Aviation Safety and Security in a February 1997 report urged

NASA to expand its involvement in aviation safety. Both the legislation and the Commission emphasized the need for interagency cooperation and coordination in aviation safety research. However, FAA and NASA have yet to develop a formal agreement to jointly manage aviation safety research. Also, they do not have a detailed integration plan that identifies the research and development requirements, roles, and responsibilities of each agency. Without a formal, executive-level document, there is no assurance that the most cost-effective research is being performed and that the national goals will be met.

- **Ensure adequate cross representation of agency expertise at each agency's Headquarters, key research facilities, and task force activities.**

FAA and NASA have an agreement to establish engineering field offices at NASA's Ames and Langley Research Centers and a research position at each agency Headquarters. However, NASA was not represented at the FAA Technical Center and the NASA position at FAA Headquarters for aviation safety research has been vacant for over a year. Nearly all of the FAA and NASA officials we interviewed stated that cross staffing has proven to be a valuable tool for improving coordination and providing on-site technical assistance. Having on-site representatives collaborate on research and development activities can help ensure that significant technologies are effectively developed and deployed. In addition, NASA was not a participant in the FAA Administrator's National Airspace System Modernization Task Force. In our opinion, given all of NASA's research and development expertise, it could lend valuable advice and technical support to special task forces and related RTCA<sup>4</sup> activities.

- **Update the coordinating committee agreement and require the committee to meet regularly to resolve, in a timely manner, issues regarding FAA and NASA joint research efforts.**

The FAA/NASA coordinating committee was established in 1980 to enable a continuing executive level exchange of information between NASA and FAA regarding each agency's ongoing research programs as well as future requirements. The committee agreement provides a formal mechanism for timely sharing of information and requires the committee meet at least semi-annually. The coordinating committee agreement was last renewed in 1990. Since then each agency has established new research and development goals, responded to new research budget constraints, and initiated new programs.

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<sup>4</sup> RTCA is a not-for-profit corporation that functions as a Federal Advisory Committee and develops consensus-based recommendations on contemporary aviation issues.

In addition, the coordinating committee did not meet for 11 months between September 1997 and August 1998. During this period several important actions occurred that would have benefited from the joint counsel of the coordinating committee. For instance, the Office of Science and Technology Policy of the Executive Office of the President contracted with the Rand Corporation to develop a joint implementation plan for aviation safety research. In addition, NASA reprogrammed \$500 million for aviation safety research through FY 2002 and - with input from FAA, industry and the Department of Defense - identified 23 investment areas for its proposed aviation safety program. It is important that the coordinating committee maintains a continuous exchange of information and closely monitors the agencies' performance on research goals.

### **ACTION REQUIRED**

The recommendations were discussed with FAA and NASA program officials and they generally concurred with each of the recommended actions. A similar report is being provided to NASA's Associate Administrator for Aeronautics and Space Transportation Technology.

Please provide your written comments within 30 days on the specific actions taken or planned, along with target dates for completing planned actions. We appreciate the cooperation and assistance provided during the audit. If you have any questions or need further information, please contact me at 366-1959 or Alexis Stefani, Deputy Assistant Inspector General for Aviation, at 366-0500.

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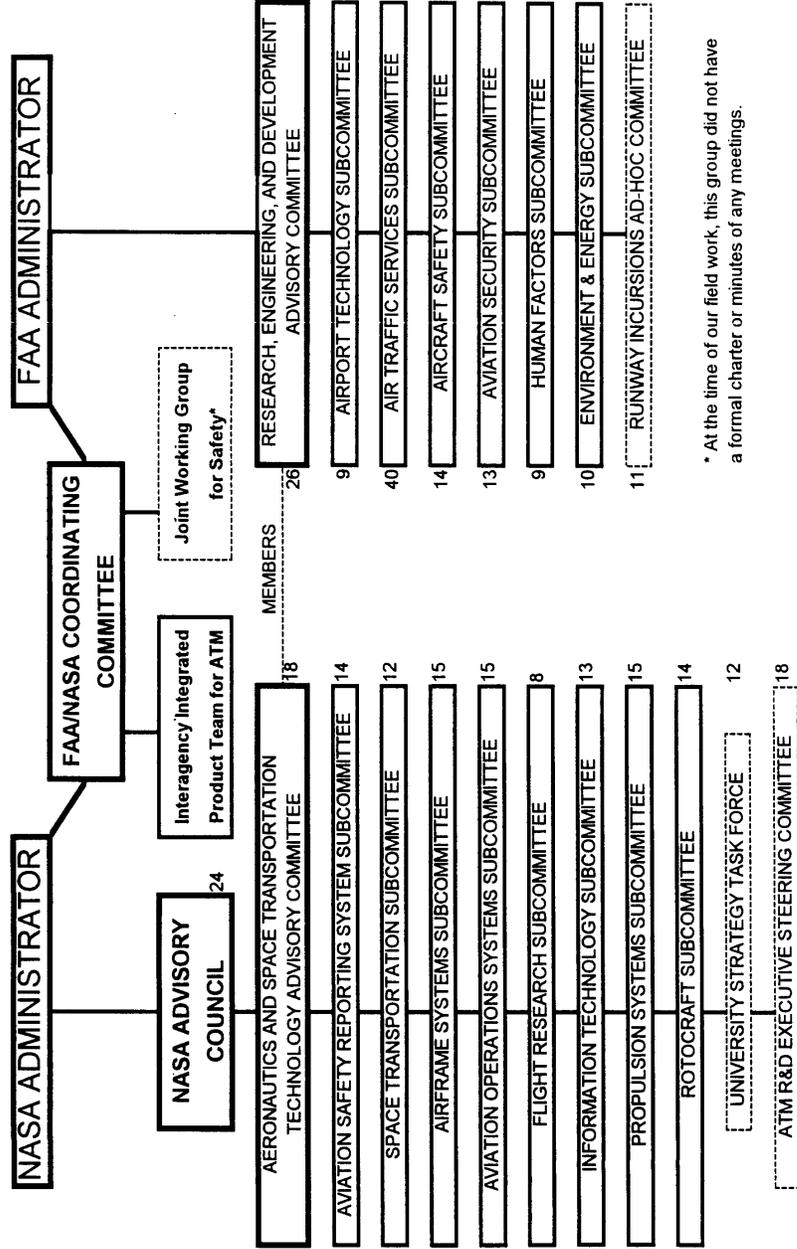
SCOPE and METHODOLOGY

The Office of Inspectors General of the Department of Transportation and NASA conducted a joint review of the research and development coordination efforts between FAA and NASA. We performed the fieldwork between February 1998 and July 1998, and covered the coordination efforts between FAA and NASA on aviation safety and air traffic management research activities from FY 1997 to May 1998. We selected aviation safety and air traffic management because they are the two major joint activities supporting the National Airspace System and receive most of the funding for joint efforts between the two agencies. Work was performed at FAA and NASA Headquarters, NASA Langley and Ames Research Centers, and FAA's Technical Center.

We evaluated the effectiveness of FAA/NASA coordination efforts by reviewing four joint aviation safety projects and four joint air traffic management projects. The aviation safety projects were selected from projects and tasks identified in existing memorandums of agreement and the air traffic management projects from the Integrated Plan for Air Traffic Management Research and Technology Development. We reviewed the goals and objectives, planning and project selection, program reviews, committee processes, staffing, funding and schedules for each of the selected projects.

We interviewed FAA/NASA program officials and gathered and reviewed documentation to determine what extent planning, project selection, program reviews, and committee processes included coordination. We also interviewed officials at the Office of Management and Budget, the Office of Science and Technology Policy, MITRE Corporation, and MIT/Lincoln Laboratory to determine their involvement and obtain their opinions on the coordination efforts between FAA and NASA. We performed the audit in accordance with Government Auditing Standards prescribed by the Comptroller General of the United States and included such tests of procedures and records as were considered necessary.

FAA/NASA COMMITTEE REPORTING STRUCTURE



\* At the time of our field work, this group did not have a formal charter or minutes of any meetings.