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FAA BUDGET

Agency Faces Key
Management Challenges
on Major Issues

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify on the Federal Aviation Administration's (FAA) budget and programs. At just over \$8.8 billion, FAA's fiscal year 1995 budget request represents a 2-percent increase over the fiscal year 1994 appropriation. This includes \$2.3 billion for facilities and equipment (F&E); \$4.6 billion for operations; \$1.7 billion for the Airport Improvement Program (AIP); and \$267 million for research, engineering, and development (RE&D). About \$6.6 billion will be charged to the Airport and Airway Trust Fund; the remaining \$2.2 billion will be charged to the General Fund. At these levels, outlays would exceed trust fund receipts from user fees that are estimated at under \$6 billion for fiscal year 1995. Accordingly, the fiscal year 1995 budget would continue the trend of drawing down the trust fund balance.

Against this financial backdrop, FAA faces significant challenges. How FAA meets these challenges will have profound effects on airports, airlines, and the traveling public. Our testimony today will focus on issues associated with the air traffic control (ATC) modernization program, work force operations in a period of downsizing, the use of Airport Improvement Program (AIP) funds, and research and development efforts for detecting explosives. The information we are presenting is based on the reports and testimonies we issued in the past year, our ongoing work, and information provided by FAA. Our relevant reports and testimonies are listed in appendix III, including the annual status report on modernization that we issued to this Subcommittee last week. Our major points are as follows:

- In its ATC modernization program, FAA faces several challenges as the agency tries to (1) complete long-standing F&E projects and (2) improve its acquisition management. The agency will have to address the cost and schedule problems that the Advanced Automation System (AAS)--FAA's largest acquisition--continues to encounter. Problems and recent developments affecting AAS will have important implications. For example, completing the system as planned could crowd other projects out of the F&E account unless AAS costs are reduced or total F&E funding is increased beyond current levels. Progress this past year with other major modernization projects was mixed. FAA met scheduled implementation dates for two major systems--the Airport Surface Detection Equipment radar and the Mode Select radar--but did not meet schedules for two others--the Air Route Surveillance Radar and the Terminal Doppler Weather Radar. FAA is also facing the challenge of improving its management of acquisitions. For example, we found that agency officials cannot explain how they rank sites for the receipt of the facilities and equipment or

how benefit-cost information was factored into those decisions.

- The most critical challenges FAA faces in the operations area will be reducing its work force by 12 percent (about 6,500 employees) and administering its buyout authority. In doing so, FAA must ensure that the reductions do not have a negative impact on safety and do not drain technical expertise critical to its mission. Of particular note is the need to ensure the appropriate supervisory span of control over controllers, to downsize overstuffed ATC facilities, and not to aggravate staff shortages at understaffed facilities. Work force reductions have already begun, but the agency does not yet have a strategic or tactical plan for addressing staffing imbalances and ensuring the appropriate distribution and mix of staff among its many facilities.
- FAA faces the challenge of making sound investment decisions for the AIP. FAA has billions of dollars more in demands for AIP funds than its funding levels allow. We have reported on shortcomings in the agency's approach to deciding where to invest scarce funds in the most cost-effective manner. The corrective actions we have recommended to FAA include (1) establishing program goals to help guide FAA's investment decisions and also act as benchmarks for measuring progress and (2) ensuring that the AIP letter-of-intent funding mechanism is used only to fund projects that will significantly enhance systemwide capacity, as required by statute. FAA officials told us that they plan to take action in these areas, and it is important that the agency follows through. We will monitor FAA's progress. Also, in our ongoing work on the set-aside funds for reliever airports and the Military Airport Program, we have found that FAA is not analyzing the extent to which projects are achieving--or can achieve--their intended objectives, such as relieving congestion. Such analysis could help FAA determine if the AIP funds need to be redirected.
- At the request of the Subcommittee, we are examining FAA's efforts to develop new equipment to detect explosives. This effort consumes about \$36 million of the about \$267 million in the fiscal year 1995 requested RE&D budget and will continue at comparable funding levels for the immediate future. Our work shows that FAA may need 2 to 5 more years to develop and approve a device that meets standards for detecting explosives in checked baggage. The Congress is now considering legislation that would permit airports to purchase explosive detection equipment with AIP funds. If enacted, this legislation would represent a shift in responsibility from airlines to airports and would

have significant cost implications for the AIP program. Regardless of who pays, the devices will need to work reliably at airports. However, we found that FAA's approach to certifying new equipment will not ensure reliability.

FACILITIES AND EQUIPMENT ACCOUNT

FAA is seeking \$2.269 billion in F&E funds this year to sustain and modernize the nation's ATC system, a 7-percent increase over the fiscal year 1994 appropriation of \$2.12 billion. Although FAA received large increases in the F&E account throughout the 1980s and early 1990s, that trend has not continued in the last 2 years, as shown in appendix I. The administration has proposed an authorization level of \$2.5 billion for fiscal years 1996 and 1997. It is becoming clear that the F&E account will not return to the high rate of growth it had in prior years.

The cost and schedule problems facing FAA with the AAS are well known to this Subcommittee and the aviation community. Other major F&E projects we report on each year have also experienced cost and schedule difficulties, as we have just reported to this Subcommittee.¹ At this time last year, FAA planned to have four major systems deployed in the field: the Air Route Surveillance Radar (ARSR-4), the Airport Surface Detection Equipment (ASDE-3) radar, the Mode Select (Mode S) radar, and the Terminal Doppler Weather Radar (TDWR).² Delays from problems uncovered in systems testing have delayed the fielding of both the ARSR-4 and the TDWR. Although most funds have been appropriated and obligated, FAA and aviation system users must wait to receive benefits from these systems. FAA has implemented the first Mode S in Baltimore and the first ASDE-3 in Seattle. Unfortunately, such problems as ghost images delay use of the ASDE-3 at other sites.

By meeting several challenges, FAA can improve its acquisition management and positively impact long-standing F&E projects.

FAA Can Further Improve Its Acquisition Management

Over the last several years, FAA has undertaken several acquisition reform efforts--initiatives such as requiring mission need statements to start acquisitions and the performance of

¹Air Traffic Control: Status of FAA's Modernization Program (GAO/RCED-94-167FS, Apr. 15, 1994).

²The ARSR-4, ASDE-3, Mode S, and TDWR are radars that will be used by FAA for surveillance or weather detection. For more complete descriptions, see Air Traffic Control: Status of FAA's Modernization Program (GAO/RCED-94-167FS, Apr. 15, 1994).

operational testing before committing to full production.³ We can report that FAA has made some progress. For example, in response to our 1993 report,⁴ FAA has given greater scrutiny to mission need statements. Of 31 mission need statement proposals developed for the fiscal year 1995 budget cycle, 11 (35 percent) were withdrawn by program sponsors because they could not quantify a need or because the proposals were a low priority.

Although FAA has improved its mission need statements, our ongoing work for this Subcommittee indicates that further improvements in its acquisition management are still warranted. One area for improvement is FAA's decision-making for siting facilities and equipment. Each year, FAA is confronted with decisions on where to locate equipment for systems that have already been developed--such as instrument landing systems (ILS) and the ASDE-3--and decisions on which terminal facilities should be replaced. Various FAA offices ask for more terminal facilities and equipment funding than the agency's budgetary resources can fund. For example, in fiscal year 1994, FAA funded only \$361 million, or 32 percent, of \$1.1 billion in internal agency requests for terminal facilities and equipment. Sound business management practices dictate that FAA should acquire facilities and equipment for those locations where it is most cost-effective to do so.

In our ongoing work for this Subcommittee, we are evaluating how well FAA makes these siting decisions. We found that agency officials cannot explain how they rank sites for the receipt of the facilities and equipment or how benefit-cost information was factored into those decisions. Moreover, FAA has limited documentation supporting its decisions. FAA project sponsors--operational groups responsible for determining facilities and equipment needs--told us they have basically divided available dollars for terminal projects in roughly equal measure among FAA's nine regional offices, usually resulting in each region's top priority candidate site being funded. We expect to report shortly on issues relating to FAA's siting criteria.

We found other areas for improvement in FAA's acquisition management, as discussed below:

- After 2 years of effort, FAA has not completed its acquisition tracking and management system. As a result, FAA acquisition oversight officials were not able to provide us with a list of projects by acquisition phase.

³FAA has reported lack of adequate policies and procedures for major system acquisitions as a material weakness under the Federal Managers' Financial Integrity Act.

⁴Air Traffic Control: Justifications for Capital Investments Need Strengthening (GAO/RCED-93-55, Jan. 14, 1993).

Until this system is fully operational, FAA officials responsible for acquisitions cannot readily analyze a project's acquisition history to help evaluate its status.

- FAA has not developed guidance to implement its revised acquisition policy order. For example, guidance for risk management plans is still being developed. Such plans should identify the areas of greatest risk with a project and allow FAA to develop an approach to mitigate those risks. FAA officials estimate that it could take 3 more years to complete the various guidance needed to fully implement its new order.
- FAA has experienced a high turnover rate for its most senior acquisition executive, who is charged with overseeing acquisition policy and program execution. Since 1990, four different people have held the position of Executive Director for Acquisition and Safety Oversight. Although it is difficult to measure the effects of this turnover, we believe that large and complex acquisitions such as the AAS and the Voice Switching and Control System (VSCS) require stable leadership.
- In two cases, FAA has not provided the Congress with the most current and accurate project cost estimates developed in the acquisition process. We found that the total acquisition cost estimates for the Aviation Weather Products Generator and the Integrated Terminal Weather System are twice the estimates provided in FAA's budget justifications. By not including the most recent cost information in its budget, FAA may limit the ability of the Congress to make sound investment decisions.

FAA announced last week that George Donohue from Rand Corporation will soon join FAA to evaluate FAA's internal process for managing acquisitions, systems development, and new technology. We look forward to the results of that evaluation.

FAA Can Make Decisions That Have Positive Impacts on Long-Standing F&E Projects

Long-standing F&E projects still constitute a major share of the F&E budget. The AAS and the VSCS alone account for about one-third of this year's budget request. FAA is still living with the effects of decisions made on these projects in the 1980s. Nevertheless, our work for this Subcommittee shows that FAA can better ensure that it meets the needs of the agency and users of the ATC system in a cost-effective manner--particularly with the AAS, the Microwave Landing System (MLS), and the VSCS.

Advanced Automation System

Over the years, we have reported to the Congress on the serious cost and schedule difficulties that have affected the AAS--FAA's largest acquisition. As we testified before the House Subcommittee on Aviation last week,⁵ despite several FAA management initiatives, the AAS problems continue and, without corrective action, may worsen. Last year, FAA announced a \$1.2-billion cost increase, raising the total cost of the AAS project to \$5.9 billion, compared with the 1988 estimate of \$4.3 billion. As a result of the problems with the AAS, the agency recently commissioned several reviews to support decisions on the project's future. In a candid report, FAA's AAS Task Force estimates that the agency may need an additional \$1 billion to complete system development and implementation.⁶ The report also projects a likely schedule delay of 20 months for the Initial Sector Suite System (ISSS), which would put it over 4 years behind schedule.

The cost and schedule problems with the AAS have resulted from several technical and managerial factors. First, FAA and IBM's development and implementation plan--including cost and schedule estimates--was overly ambitious given the highly demanding requirements and the complex software architecture for this system. Second, FAA did not provide adequate oversight of IBM's performance, especially during the initial development of the key ISSS component. As a result, IBM's lack of progress did not always surface in a timely manner. Third, FAA changed requirements and was indecisive in resolving some issues about basic requirements, such as the format of new electronic flight data strips to be used by controllers. In our opinion, the above factors--not inadequate funding or federal procurement or personnel rules, as contended by some proponents of an ATC corporation--have caused the problems with the AAS.

Problems and recent developments affecting the AAS will have several important implications:

- First, the bulk of the benefits to users have been delayed because of the schedule extension. These benefits are expected mostly from a new automated capability, Automated En Route Air Traffic Control (AERA). FAA planned to implement the AERA in the last component of the AAS, the Area Control Computer Complex; however, the agency now intends to include an early version of the AERA--albeit limited in capabilities--in the ISSS.

⁵Advanced Automation System: Implications of Problems and Recent Changes (GAO/T-RCED-94-188, Apr. 13, 1994).

⁶Review of Cost and Schedule for the Advanced Automation System Program, Federal Aviation Administration, Mar. 3, 1994.

- Second, because the scope of the system has been reduced as a result of FAA's plans for limited consolidation as well as strategic automation, the agency will have to acquire additional automated systems to enhance ATC facilities and airspace that were expected to be supported through the AAS.
- Third, unless development costs are reduced or the Congress increases FAA's funding, completing the system as planned could crowd out other modernization projects. The \$1.2-billion unanticipated increase in AAS funding will need to be absorbed in fiscal years 1996 through 1999 under the project's current course. If the cost or the scope of the AAS is not reduced, the high annual funding levels for the AAS could crowd out other modernization projects at that time. Newer F&E projects will be the most vulnerable since contracts will not be in place.
- Fourth, if the 20-month schedule delay for ISSS projected by the AAS Task Force becomes a reality, the agency may need to initiate interim measures--such as replacing, at a cost of \$60 million, existing display channel equipment in its en-route ATC facilities.
- Fifth, the agency faces the risk of additional costs to fix the system if FAA follows the current plan to accept parts of the ISSS before all critical requirements are met. FAA's current plan anticipates accepting the ISSS hardware and software following testing scheduled for completion by November 1994. Under this schedule, key functions--such as continuous operations--would not have undergone testing by the time the first increment of the ISSS is accepted. As the AAS Task Force stated, once the government has formally accepted the system, it becomes considerably more difficult to require the contractor to bear responsibility for system performance. Necessary corrections to achieve needed performance are likely to entail additional costs to FAA.

The coming months will be critical from the standpoint of restructuring FAA's automation program. We have made recommendations to ensure that future investment decisions on the AAS are based on sound information, meet the needs of ATC system users, and allow the agency to use F&E funds in the most cost-effective manner. Specifically, we have recommended that the Secretary of Transportation direct the FAA Administrator to

- defer governmental acceptance of the ISSS until all critical operational requirements are met and
- submit a report to the Congress, before the administration proposes its fiscal year 1996 budget for FAA, that describes a comprehensive automation plan--including time

frames, funding levels, and all interim and long-term actions necessary to satisfy user needs and FAA's ATC and flow management requirements.

Microwave Landing System

For many years, FAA planned to replace all of its ILSs with almost 1,300 Microwave Landing Systems (MLS), at a cost of \$2.6 billion. In mid-1993, FAA decided to procure only 255 Category II and III MLSs because the Global Positioning System (GPS), enhanced by ground equipment, could support all types of precision approaches to runways. In our report on precision landing systems to this Subcommittee, we recommended that FAA analyze its need for precision landing systems in general to determine which system-- ILS, MLS, or a satellite-based system--or a mix of systems could provide the most benefits at the lowest cost to both FAA and the system's users.⁷ FAA's recent actions are responsive to our recommendation and to the needs of the aviation community. Because of this change, the total estimated cost for the MLS has decreased by approximately \$1.9 billion. This cost reduction will help save F&E funds in the long-term and will help airlines avoid unnecessary investments in MLS avionics.

Voice Switching and Control System

FAA and the Department of Transportation (DOT) also face key decisions on the \$1.4-billion VSCS. In early 1993, FAA and the Department approved the limited production of the first 5 of 25 VSCSs, including a system for the first field site in Seattle--the same first site FAA has chosen for the ISSS. The contractor will deliver the VSCS in two phases. The first will work with existing controller consoles; the first-site implementation is scheduled for April 1995. During the second phase, the contractor will upgrade the system to work with the ISSS.

In December 1993, FAA completed operational testing at its Technical Center of the most recent developmental version of the VSCS. Test reports stated that the system is "potentially operationally suitable" and recommended a full-production decision for VSCS hardware. However, the reports pointed to several serious risks, including immature software, a backlog of software problems, and a substantial amount of software that still needs to be integrated and tested--approximately 150,000 lines of code. Additionally, more VSCS hardware needs to be tested.

The Department's Transportation Systems Acquisition Review Council (TSARC) met in March to assess VSCS readiness for full-

⁷Airspace System: Emerging Technologies May Offer Alternatives to the Instrument Landing System (GAO/RCED-93-33, Nov. 13, 1992).

production of the remaining 20 systems. The TSARC has withheld authority for full production until satisfactory completion of operational testing of the first phase of the VSCS in January 1995. However, the TSARC has allowed FAA to begin ordering one additional VSCS per month. We do not believe it is wise for FAA to order more systems at this time given the amount of work still needed on VSCS. If the contractor continues to produce additional systems, we believe FAA will have less leverage with the contractor. This could result in FAA's having to pay for changes needed to make the system meet requirements. A more prudent approach would be to wait until the key capabilities are proven through operational testing.

FAA FACES SIGNIFICANT CHALLENGES IN STREAMLINING ITS OPERATIONS

FAA's requested appropriations of \$4.58 billion for operations is about the same as its fiscal year 1994 appropriations. The operations account funds the salaries, benefits, and training of such FAA work forces as air traffic controllers, safety inspectors, and security personnel (see app. II). As a result of the President's initiatives for reforming government and the National Performance Review (NPR), between now and fiscal year 1999, FAA must reduce its work force by 12 percent (about 6,500 employees), its senior level employees, and its layers of management. FAA has several initiatives under way to accomplish these reductions. These include streamlining its organizational structure, reducing the span of control by increasing the employee-to-supervisor ratio, imposing a hiring freeze, and offering voluntary early retirements with financial incentives (buyouts). FAA estimates that about 2,500 employees could take advantage of the buyout this fiscal year.

To meet the President's and NPR's goals, FAA had said that it would exclude its safety work force from any reductions. However, FAA is offering certain members of the safety work forces a financial incentive to retire. FAA is offering financial incentives to (1) all first-line controller supervisors and all controllers at low-activity towers (level-1), (2) inspector and aircraft certification supervisors and managers, (3) maintenance technician supervisors and managers, and (4) all security employees. FAA excluded controllers at other than level-1 facilities, inspectors, and maintenance technicians from the buyouts.

FAA Must Carefully Assess the Impact of Streamlining Options on Its Operations

If FAA does not manage release dates of employees accepting early retirement under the buyout proposal, it could lose a disproportionate number of employees in key positions and facilities, and the loss most likely would not be uniform throughout the organization. In addition, although the buyout

could decrease staff at overstuffed field facilities, it could also increase shortages at understaffed field facilities. On the basis of its staffing standards, FAA already has staff shortages--the controller work force is understaffed, for example, by 1,533 at 302 facilities, and the inspector work force is understaffed by 580 at 65 field offices.⁸ Thus, further reductions could exacerbate an already tenuous situation. In addition, FAA plans to contract out the operation of about 100 level-1 towers--25 this fiscal year and the remainder over the next 3 fiscal years. However, FAA has not assessed the impact of allowing the controllers at such towers to retire before FAA contracts out their operations. For example, at one tower, 4 of 11 controllers are eligible to retire this year. If they all retire, the tower would be 30 percent below its prescribed staffing, which could adversely affect its operations. Overall, 18 level-1 towers would face staffing shortages if eligible controllers retire.

Although FAA has not established a specific deadline, the agency expects to develop a strategic and tactical plan within the next few weeks to address the staffing shortages that may result from the buyout. This plan would be most effective if it were to identify (1) specific facilities affected by the reductions, particularly those that are critically affected; (2) milestones for overcoming staffing shortages; and (3) funding required to staff facilities at their prescribed levels.

Likewise, FAA has initiated a review of its inspection and certification staff as part of its streamlining efforts. FAA has directed its nine regional offices to examine, among other things, establishing work priorities and providing full-service offices for inspection and certification responsibilities. According to the Director, Flight Standards Service, the primary emphasis of the review is to ensure the appropriate mix and allocation of inspectors. Additionally, the review will examine opportunities to reduce management layers, improve diversity among the work force, improve the supervisor-to-employee ratio, and reassign inspection and certification responsibilities to other offices. We recently reported that FAA did not have the appropriate mix of certification staff, and as a result, the agency did not understand the new and emerging technologies it was asked to certify.⁹ For example, we found that the ratio of industry software designees to FAA staff responsible for certifying new aircraft software systems was 19 to 1, but the ratio in the propulsion area, which has seen far less technological change, is 7 to 1. FAA officials have acknowledged

⁸FAA is revising its controller staffing standards and expects to significantly reduce the number of controllers needed.

⁹Aircraft Certification: New FAA Approach Needed to Meet Challenges of Advanced Technology (GAO/RCED-93-155, Sept. 16, 1993).

the need to improve the mix of certification staff and expect to develop options to improve the inspection and certification staff by September 1994.

In addition to reducing its total work force, FAA must also reduce senior-level employees. In doing so, FAA plans to have more employees per supervisor (span of control). However, FAA has not assessed the impact of changing the span of control on its operations. For example, one air traffic facility reorganized in early 1993 and reduced the number of supervisors. Subsequently, operational errors at the facility increased from 9 in 1992 before the reorganization to 13 in 1993 after the reorganization--a 44-percent increase. Although FAA could not definitively establish a cause and effect relationship between the increase in operational errors and fewer supervisors, it did cite the reduced level of supervision as a contributing factor for the increase.

Improved Training Could Help Minimize Potential Streamlining Consequences on FAA Operations

As efforts to downsize and streamline operations continue, FAA needs to improve its training programs to ensure that the smaller, less experienced work forces can effectively conduct the agency's activities. Although FAA has undertaken ambitious initiatives to upgrade its training system, it has not resolved long-standing problems with its training program, and training problems continue to trouble the FAA work forces.

Since the mid-1980s, FAA, DOT's Office of the Inspector General, and GAO have examined FAA's training programs and found serious problems. The problems cited in these reports included a fragmented training organization with poorly defined lines of authority, responsibility, and accountability; a lack of long-range planning for training requirements that resulted in the budget process determining training; an ineffective training curricula; and a lack of appropriate training evaluation. On the basis of these findings, in 1988 FAA established a centralized training office and developed a Flight Plan for Training outlining the initiatives and projects needed to improve training for all its work forces.

However, the Flight Plan has received limited funding, and little progress has been made in implementing the plan's projects. FAA has spent about \$81 million on the projects, or 29 percent of the \$282 million in Operations funding FAA initially estimated was needed to complete the initiatives. In fiscal year 1995, FAA proposes spending about \$6.9 million on the Flight Plan initiatives, a decrease of over \$3.5 million, or 34 percent, of the fiscal year 1994 funding for the Flight Plan. Moreover, of the 76 Flight Plan projects, 46 are still ongoing, 22 have been terminated, and only 8 have been completed.

Today, FAA is again embarking on an ambitious initiative to upgrade and modernize its training system. In 1992, FAA created the Technical Training Management System to devolve responsibility for managing training from the centralized training office to each service organization. The basic concept under the new system is that "true-need" training, broadly defined as the training an organization must do to carry out its mission, must be fully funded either from the centralized training budget or from the organization's operations budget. However, our ongoing work for the Senate Subcommittee on Aviation shows that the service organizations have received little guidance on how to implement the system. For example, FAA's currently approved training order dates back to December 1974, and the organizations must rely on word of mouth and meeting minutes to identify changes to training policy and procedures. As a result, the methods for determining training requirements vary considerably among the organizations, widespread confusion exists within organizations as to what constitutes true-need training, and the new system is still not fully implemented. Moreover, FAA has not established mechanisms to monitor and evaluate how the service organizations meet their training needs and how their training programs improve operations. Finally, the centralized funding organization created to maintain accounts for training funds allocated to each service lacks the internal control procedures to ensure that only authorized persons execute transactions. For example, any service organization official can have funds transferred between subaccounts.

Despite FAA's initiatives to improve its training programs, problems continue. For example, FAA recently acknowledged that it did not adequately train its air traffic controllers in the operational capabilities of airborne traffic-alert collision avoidance systems. We recently reported that FAA's aircraft certification staff were not effectively involved in the certification process because FAA's training had neither kept pace with new technological advances nor provided its staff with the assistance and training needed to ensure competence in new technologies.¹⁰ In addition, annual enrollments in courses between 1991 and 1993 have averaged about 19 percent below training quotas, indicating that FAA cancels many courses or staff do not show up for scheduled training. We expect to report later this year on these and other issues affecting FAA's training program.

AIRPORT IMPROVEMENT PROGRAM ACCOUNT

FAA's budget request sets a \$1.69-billion obligation limitation for the AIP--the same level enacted for fiscal year 1994. The AIP account funds capacity, safety, security, and noise

¹⁰Aircraft Certification: New FAA Approach Needed to Meet Challenges of Advanced Technology (GAO/RCED-93-155, Sept. 16, 1993).

mitigation projects. Almost 3,300 airports designated by FAA as critical to the national airport system are eligible for AIP funding. FAA has identified about \$40 billion in development needs at these airports between 1990 and 1999. These needs far exceed available AIP funds and Passenger Facility Charge revenues that also fund airport improvements.¹¹

Our work over the past several years has identified ways in which FAA could better ensure that the AIP funds are used in the most cost-effective manner. In our FAA budget testimony before this Subcommittee in 1992, we recommended that FAA establish program goals to help guide FAA's investment decisions and also act as benchmarks for measuring progress. However, despite its commitments, including assurances to this Subcommittee last year, FAA has not yet set goals for the AIP. Such goals could provide focus and direction for the AIP and form a basis to measure the program's accomplishments. For example, FAA could set a goal of reducing aircraft delays nationally by 50,000 hours and analyze the potential effect of various projects on this goal.

As we recently reported to the Senate Appropriations Subcommittee on Transportation,¹² in two respects, FAA could have more effectively managed the use of letters of intent (LOI).¹³ First, while most LOI commitments were for capacity projects, FAA did not ensure that LOIs were used only for projects that significantly enhance systemwide airport capacity, as required by statute. FAA did not establish criteria defining a "significant" enhancement by which to evaluate and approve LOI proposals or set a goal for improving systemwide capacity on which to base criteria for LOIs. As a result, FAA issued LOIs for some projects that could not significantly enhance systemwide capacity. For example, FAA approved LOIs for projects to construct water treatment facilities and access roads at two major airports and for projects

¹¹The Passenger Facility Charge program was authorized in 1990 to allow commercial airports the option of imposing a per passenger fee for eligible airport development projects. As of April 1994, FAA estimates that about 160 airports will collect about \$750 million in Passenger Facility Charges in fiscal year 1995.

¹²Airport Improvement Program: Better Management Needed for Funds Provided Under Letters of Intent (GAO/RCED-94-100, Feb. 2, 1994).

¹³FAA can provide AIP funds under either grants or letters of intent. LOIs provide attractive options not available with grants, such as the ability to draw multiyear funding from all three of the program's funding categories (entitlement, set-aside, and discretionary funds) and to schedule disbursements beyond the program's current authorization period. LOIs can only be issued for projects at primary and reliever airports.

at eight small primary airports where fewer than one-tenth of 1 percent of all U.S. passengers are enplaned annually. We recommended that FAA set a goal for improving systemwide capacity and a definition of significant capacity enhancement in relation to this goal and analyze projects proposed for LOIs against this goal and definition.

Second, while FAA carried out the statutory planning requirement, the agency made incorrect assumptions about the AIP's future funding levels. Under the planning requirement, FAA set goals to ensure that a reasonable level of discretionary funds would be available for other airport needs after meeting LOI commitments. In 1992, FAA determined that LOI commitments should be limited to half of the AIP discretionary funds available for LOIs at the beginning of each fiscal year. FAA met this goal in fiscal years 1992 and 1993. However, the agency may not meet its goal in fiscal years 1994 and 1995. The discretionary funds available for LOI disbursements at the beginning of the fiscal year decreased from fiscal year 1992 to fiscal year 1993 and may decrease further. At the same time, the commitments under LOIs are at a higher level. Under these circumstances, fewer funds are available for projects not funded with LOIs than FAA had anticipated. We recommended that FAA plan LOI funding commitments for each fiscal year on the basis of more conservative assumptions about future discretionary funding levels in the AIP.

Our ongoing work for the Senate Appropriations Subcommittee indicates that FAA has not assessed whether the set-asides for reliever airports and the Military Airport Program are having their intended effects or can meet their respective objectives. Such analysis could help FAA determine if the AIP funds need to be redirected. FAA has provided about \$1.5 billion in AIP funds to 291 reliever airports since 1982, but it does not know the extent to which this investment has alleviated--or can alleviate--congestion at larger commercial service airports. Also, FAA has not determined how over \$96 million in Military Airport Program funds will enhance capacity in major metropolitan areas by assisting in the conversion of selected airports to civilian use. We plan to report on FAA's management of these set-asides later this year.

In our ongoing work for this Subcommittee, we also found that FAA did not ensure the cost-effective use of AIP funds for airport access control security systems.¹⁴ FAA did not establish guidelines to encourage airports to install the most cost-effective system or a ceiling on the amount of AIP funds that airports could receive. As a result, costs far exceeded the original FAA estimates that these systems at 270 airports would cost about \$170

¹⁴These airport access control systems are required under 14 C.F.R. Section 107.14 that became effective in February 1989.

million. As of April 1994, FAA estimates that these systems have cost about \$480 million, including about \$250 million in AIP funds. Costs have varied widely across comparable airports. For example, Hartsfield-Atlanta Airport installed access control systems costing \$1.6 million, of which over \$0.4 million was AIP-funded. In contrast, Chicago O'Hare Airport installed systems costing about \$45 million, including \$29 million in AIP funds. Although most airports have completed system installation, many will begin to assume costs to upgrade or replace their systems over the next few years. These costs are eligible for AIP funding. We intend to report soon on how to achieve a more cost-effective approach to access control systems.

According to FAA officials, over the next year, FAA plans to take several actions to better manage the AIP. Specifically, FAA plans to (1) establish program goals, (2) perform cost-benefit analysis on capacity projects proposed for \$10 million or more in funding, (3) perform analysis to determine the systemwide effects of projects proposed for LOIs on aircraft delays, (4) monitor investment decisions across regions to ensure consistent application of its priority system for funding projects, and (5) analyze and report on how investments have met program goals. However, it is important that FAA follow through with its plans. We will monitor FAA's progress in implementing its planned program changes.

FAA'S SECURITY RESEARCH EFFORTS HAVE NOT MET CONGRESSIONAL EXPECTATIONS

FAA's RE&D Program plays an important role in ensuring the safety, security, and efficiency of the U.S. transport system. FAA is requesting about \$267 million in fiscal year 1995--an increase of about 5 percent from the level enacted last year. FAA's RE&D budget funds such regulatory issues as aircraft safety and explosives detection as well as aging aircraft, fire safety, human factors research, and efforts to refine and develop ATC technology. FAA allocates about 40 percent of the RE&D budget to regulatory and 60 percent to ATC research.

At the request of this Subcommittee, we are assessing FAA's security research program, particularly the development of new explosive detection equipment. The Aviation Security Improvement Act of 1990 directed FAA to support the acceleration of efforts to develop new explosive detection technology and have new equipment in place by November 1993. We recently provided this Subcommittee with a report on FAA's progress in responding to other key provisions of the act.¹⁵ FAA is requesting \$36 million for

¹⁵Aviation Security: Additional Actions Needed to Meet Domestic and International Challenges (GAO/RCED-94-38, Jan. 27, 1994).

security research in fiscal year 1995--about the same as last year's enacted level.

Since the Pan Am tragedy more than 5 years ago, FAA has made little progress in developing new security technology. However, to meet the act's goals, FAA will need to conduct research at comparable funding levels into the foreseeable future. FAA has efforts under way to improve the screening of carry-on and checked baggage, passengers, and electrical devices and to enhance aircraft survivability. According to FAA's Aviation Security Research and Development Scientific Advisory Panel, it may be another 2 to 5 years before FAA develops and approves an explosive detection device that can meet FAA's requirements for checked baggage. Advanced X-ray, the most promising technology, borrows heavily from advances made in the medical field, but such other technologies as trace and nuclear do not appear promising for screening checked baggage. However, FAA officials point out that nuclear devices--like the thermal neutron analysis device--remain as good as any other technology for detecting a wide range of explosives and may offer longer-term potential for screening cargo.

The most promising research effort to date is the development of blast-resistant luggage containers to improve aircraft survivability. FAA expects to approve design specifications for the containers by the end of fiscal year 1994. We testified last year that the airline industry has concerns about the cost, weight, and durability of the new containers.¹⁶ These concerns still exist, but FAA is optimistic that the new containers can be made competitive in terms of cost, weight, and durability with aluminum ones currently in use.

Last year legislation was introduced in the Congress that would clarify the use of AIP grant funds for airports to purchase explosive detection devices. Several issues need to be resolved before federal funds are used for this purpose. For example, if enacted, this legislation would shift responsibility for screening passengers and their baggage from airlines to airports. FAA officials told us that airlines would have to enter into agreements to use the equipment while maintaining the responsibility for screening passengers and bags. In addition, because FAA has not analyzed the cost of new explosive detection equipment, the impact on the AIP is unknown.

In the longer term, as FAA and the industry move to implement new explosive detection technology, the cost and funding of the devices will take on increasing importance. Currently, neither FAA nor the industry has information on the acquisition and life-cycle costs associated with implementing the new technology. Industry

¹⁶FAA Budget: Important Challenges Affecting Aviation Safety, Capacity, and Efficiency (GAO/T-RCED-93-33, Apr. 26, 1993).

estimates that new devices could cost between \$250,000 and \$1 million each; FAA's most promising device is estimated to cost about \$800,000. Because devices will have to be used in combination to meet FAA's requirements for screening checked baggage, airlines' costs to purchase new detection equipment could skyrocket. FAA, DOT, and airline officials with whom we spoke believe that federal funds will be needed to speed the introduction of this technology. Regardless of who will pay, the devices must work reliably at airports.

However, we found serious shortcomings in FAA's process for approving new explosive detection equipment for industry use. For example, FAA does not plan to test new equipment at airports as part of the certification process but instead intends to rely on contractor and laboratory tests to determine the performance of new equipment. In addition, FAA has not developed reliability standards for the new equipment, even though the reliability of the devices can have significant impacts on airlines' operations. FAA could approve a system without knowing how frequently it will break down. FAA officials believe that such operational issues as maintainability, reliability, and compatibility are economic trade-offs that only the airlines can make. Later this year, we expect to provide this Subcommittee with a report detailing these and other issues related to FAA's efforts to develop new explosive detection technology.

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FAA is at a pivotal point because of the convergence of several key challenges. First, FAA faces the prospect of almost no-growth budgets for the foreseeable future. In addition, current trust fund revenues are less than outlays for FAA's budget and it is important that FAA operate in the most cost-effective manner within available funds.

Second, FAA needs to make key decisions on restructuring the AAS and cannot afford to permit acquisition reform efforts to slip. A major problem with the AAS as well as with other components of the modernization effort has been inadequate management oversight at various project phases. And it would be a misconception to point to funding levels and procurement or personnel rules as a cause of the modernization program's problems.

Third, FAA must downsize its work force consistent with a strategy for ensuring the appropriate distribution and mix of staff among its facilities. This is a good opportunity to downsize overstaffed facilities, address imbalances at the understaffed facilities, and make any appropriate adjustments in the mix of FAA's various work forces.

Fourth, we have identified significant targets of opportunity for FAA to make more cost-effective decisions when investing AIP

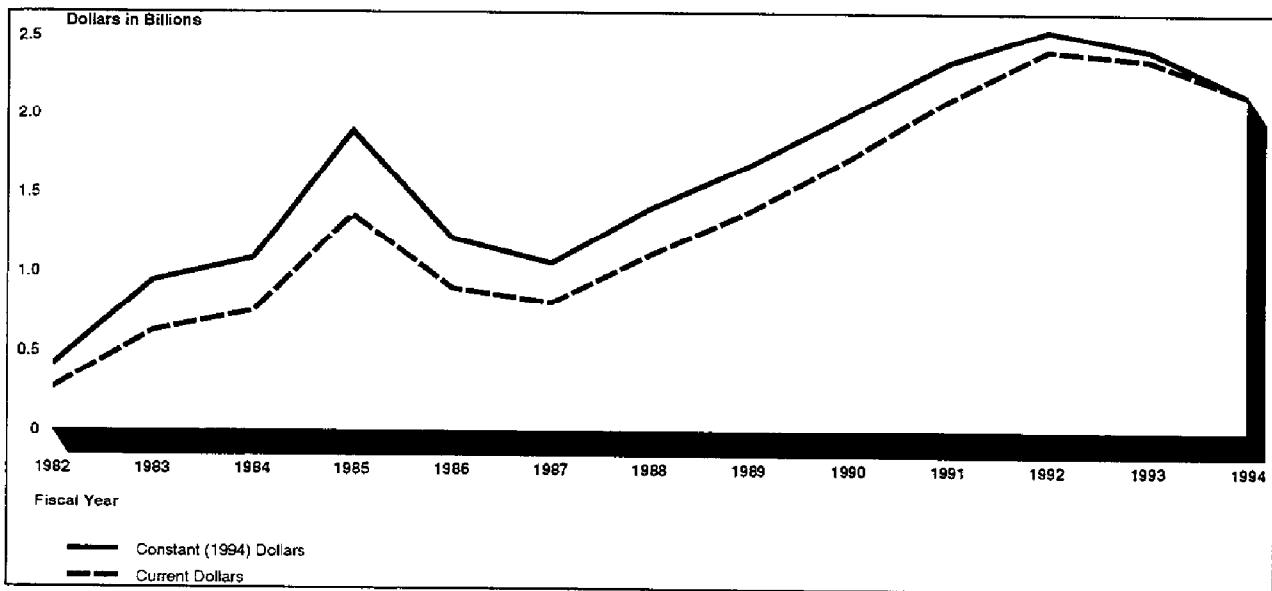
funds. FAA plans to take several actions that address our recommendations and now must follow through to implement them. And finally, in the security research and development program, FAA needs to give management attention to how new security devices will be tested to ensure they work reliably and in assessing the cost implications of fielding these new technologies.

Mr. Chairman, this concludes our testimony. We will be pleased to respond to any questions you or other Members of the Subcommittee may have.

F&E APPROPRIATIONS HAVE INCREASED SIGNIFICANTLY
BUT ARE NOW LEVELING OFF

As indicated in figure 1, FAA's F&E appropriations have increased significantly since fiscal year 1987; however, the F&E appropriation decreased in fiscal years 1993 and 1994. In constant 1994 dollars (calculated to remove the effect of inflation), the Congress has increased the F&E appropriation at an average annual rate of 21 percent since the early days of the modernization program in 1982. The F&E appropriation increased sharply between fiscal years 1982 and 1985. After a decline in fiscal years 1986 and 1987, the F&E appropriation again rose sharply--increasing at an inflation-adjusted average annual rate of 11 percent between fiscal years 1987 and 1994, despite an average annual decline of 8 percent during the last 2 years.

Figure 1: F&E Appropriations in Constant and Current Dollars, 1982-94



Source: GAO's analysis of data from FAA's Budget Office.

FULL-TIME EMPLOYMENT OF FAA'S WORK FORCES
AT THE END OF FISCAL YEARS 1986-95

End of fiscal year	Air traffic controllers	Field maintenance technicians	Aviation safety inspectors	Aircraft certification work force	Aviation security work force	Total
1986	14,803	8,306	1,813	684	379	25,985
1987	15,433	8,667	1,939	720	404	27,163
1988	16,436	8,646	2,093	733	478	28,386
1989	16,832	8,687	2,311	751	511	29,092
1990	17,226	8,904	2,577	806	627	30,140
1991	17,721	8,994	2,487	854	810	30,866
1992	17,982	8,995	2,582	837	852	31,248
1993	17,688	8,756	2,423	845	831	30,543
1994 ^a	17,523	8,348	2,370	826	812	29,879
1995 ^a	17,300	8,200	2,568	900	812	29,780

^aEstimated.

Source: Compiled by GAO from FAA's data.

RELATED GAO PRODUCTS

Air Traffic Control: Status of FAA's Modernization Program
(GAO/RCED-94-167FS, Apr. 15, 1994).

Advanced Automation System: Implications of Problems and Recent Changes (GAO/T-RCED-94-188, Apr. 13, 1994).

Aviation Safety: FAA and the State Department Can Better Manage Foreign Enforcement Cases (GAO/RCED-94-87, Mar. 17, 1994).

Transportation Safety: Opportunities for Enhancing Safety Across Modes (GAO/T-RCED-94-120, Feb. 10, 1994).

Airport Improvement Program: Better Management Needed for Funds Provided Under Letters of Intent (GAO/RCED-94-100, Feb. 2, 1994).

Aviation Security: Additional Actions Needed to Meet Domestic and International Challenges (GAO/RCED-94-38, Jan. 27, 1994).

Aviation Safety: FAA Can Better Prepare General Aviation Pilots for Mountain Flying Risks (GAO/RCED-94-15, Dec. 9, 1993).

Aircraft Certification: FAA Can Better Meet Challenges Posed by Advances in Aircraft Technologies (GAO/T-RCED-94-53, Oct. 20, 1993).

Airport Improvement Program: Allocation of Funds from 1982 to 1992
(GAO/RCED-94-14FS, Oct. 19, 1993).

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FAA Reauthorization: Opportunity Exists to Address Safety, Capacity, and Efficiency Issues (GAO/T-RCED-93-75, Sept. 28, 1993).

Aircraft Certification: New FAA Approach Needed to Meet Challenges of Advanced Technology (GAO/RCED-93-155, Sept. 16, 1993).

Aviation Research: Issues Related to FAA's Research Activities
(GAO/T-RCED-93-68, July 29, 1993).

FAA Work Forces: Important Decisions Affecting Staff Use and Management (GAO/T-RCED-93-59, June 30, 1993).

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Air Traffic Control: Improvements Needed in FAA's Management of Acquisitions (GAO/T-RCED-93-36, May 5, 1993).

FAA Budget: Important Challenges Affecting Aviation Safety, Capacity, and Efficiency (GAO/T-RCED-93-33, Apr. 26, 1993).

Air Traffic Control: Uncertainties and Challenges Face FAA's Advanced Automation System (GAO/T-RCED-93-20, Apr. 19, 1993).

Air Traffic Control: Status of FAA's Modernization Program (GAO/RCED-93-121FS, Apr. 16, 1993).

Air Traffic Control: Advanced Automation System Problems Need to Be Addressed (GAO/T-RCED-93-15, Mar. 10, 1993).

Air Traffic Control: Justifications for Capital Investments Need Strengthening (GAO/RCED-93-55, Jan. 14, 1993).

Aviation Safety: Increased Oversight of Foreign Carriers Needed (GAO/RCED-93-42, Nov. 20, 1992).

Airspace System: Emerging Technologies May Offer Alternatives to the Instrument Landing System (GAO/RCED-93-33, Nov. 13, 1992).

Air Traffic Control: Advanced Automation System Still Vulnerable to Cost and Schedule Problems (GAO/RCED-92-264, Sept. 18, 1992).

FAA Budget: Key Issues Need to Be Addressed (GAO/T-RCED-92-51, Apr. 6, 1992).

Aviation Safety: Commuter Airline Safety Would Be Enhanced With Better FAA Oversight (GAO/T-RCED-92-40, Mar. 17, 1992).

Aviation Research: Progress Has Been Made but Several Factors Will Affect Program Success (GAO/T-RCED-92-39, Mar. 10, 1992).

Air Traffic Control: Challenges Facing FAA's Modernization Program (GAO/T-RCED-92-34, Mar. 3, 1992).

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Airport Development: Improvement Needed in Federal Planning (GAO/T-RCED-92-30, Feb. 19, 1992).

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(GAO/RCED-92-14, Nov. 20, 1991).

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Air Traffic Control: FAA Can Better Forecast and Prevent Equipment Failures (GAO/RCED-91-179, Aug. 2, 1991).

Aviation Acquisition: Further Changes Needed in FAA's Management and Budgeting Practices (GAO/RCED-91-159, July 29, 1991).

Air Traffic Control: The Interim Support Plan Does Not Meet FAA's Needs (GAO/RCED-90-213, Sept. 11, 1990).

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

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