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FAA BUDGET

Important Challenges Affecting Aviation Safety, Capacity, and Efficiency

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify on the status of the Federal Aviation Administration's (FAA) programs and activities that provide the framework for its fiscal year 1994 budget request. At $9.2 billion, FAA's budget request represents a 3.5 percent increase over the fiscal year 1993 appropriation. This includes $2.5 billion for facilities and equipment (F&E); $4.6 billion for operations; $1.8 billion for grants-in-aid to airports; and $250 million for research, engineering, and development (RE&D). In all of these areas, FAA faces important challenges that affect the safety, capacity, and efficiency of the aviation system. One such challenge, as discussed during our March 10, 1993, testimony before this Subcommittee, is how FAA can help improve the U.S. airline industry's financial condition.[1]

Our testimony today identifies additional challenges and focuses on the status of FAA's air traffic control modernization program, work forces, airport development, and aviation security initiatives. The information we present here is based on reports that we have issued in the past year and other information that FAA provided to update the status of certain programs. A list of our relevant reports and testimonies appears in appendix I. In summary, we found that:

-- The aviation community's confidence in FAA's ability to manage the air traffic control modernization program has been weakened by a history of cost increases and schedule delays. FAA has the opportunity in the next year to help put the program on track. First, FAA must follow through and field some systems, such as Mode Select and the Airport Surface Detection Equipment radar. Second, FAA must resolve the budgetary impact of its recently announced facility consolidation plan. The new plan--which calls for an estimated $2.5 billion in additional F&E costs through the year 2004--will require FAA to request more funds or to decrease funding for projects that are unrelated to the consolidation plan. Finally, FAA needs to strengthen its acquisition management. For example, in reviewing the earliest phase of 25 new acquisitions costing an estimated $5 billion, we found that many mission need statements did not justify the need for capital investments. Acquisition reforms may also have an important impact on older projects--such as those involving precision landing systems. The actions FAA takes will do a great deal to enhance or diminish its credibility in managing the modernization program.

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[1]State of the Airline Industry: Strategies for Addressing Financial and Competition Problems (GAO/T-RCED-93-21, Mar. 10, 1993).

-- FAA spent much of the 1980s ensuring that it had a sufficient number of air traffic controllers and safety inspectors to fulfill all its responsibilities. Today, the primary challenge is not one of overcoming staffing shortages but rather one of effectively distributing its controller work force among key facilities and targeting its inspector resources to those areas needing the most attention. FAA is moving forward to develop a system for better targeting inspection resources to areas needing the most attention.

-- We have concerns about the validity of FAA's field maintenance technician staffing standards because the agency has consistently maintained a high level of system availability with a work force well below the standards. FAA has used contractors and overtime to help bridge the gap between estimated maintenance staffing needs (12,700) and availability (8,900). With an increase in the number of new systems planned over the next few years, FAA is evaluating various options to better utilize the existing maintenance work force.

-- FAA could leverage the about $2 billion Airport Improvement Program budget by developing national goals to guide project funding decisions and measuring how projects meet these goals. This process would enhance FAA's ability to evaluate projects like the proposed new Chicago-area airport and help allocate limited airport improvement funds effectively among projects. FAA is now working on setting goals and developing a system to measure performance against goals, but it has not established a time frame for completion.

-- The Congress directed FAA to accelerate its research efforts to help prevent a recurrence of the Pan Am Flight 103 tragedy. Last year this Subcommittee directed FAA to analyze the trade-offs between aircraft survivability and explosive detection. FAA expects to complete its analysis in 1995. In addition, our ongoing work has identified several issues--such as technical problems with new devices and industry concerns about the cost of new devices--that need to be resolved before FAA can meet the high expectations of the Congress and the traveling public.

FACILITIES AND EQUIPMENT ACCOUNT

The F&E appropriation account funds the Capital Investment Plan (CIP), FAA's program to modernize the nation's air traffic control system. For fiscal year (FY) 1994, FAA has requested an F&E appropriation of $2.5 billion, a 7-percent increase over the FY 1993 F&E appropriation.

CIP Projects Have Experienced Schedule Delays, But FAA Promises to Field Some New Systems Within the Next Year

FAA completed 10 CIP projects this past year. For example, FAA completed a communications project called NADIN II and a project to modernize automated systems in terminal air traffic control facilities.

Schedules for several major CIP projects were delayed. Our recent report on the CIP status found that 4 of the 12 major projects we follow each year had delays in the yearly implementation milestones published in the CIP.[2] For example, the first implementation milestone for the Airport Surface Detection Equipment (ASDE-3) radar--a system which could prevent runway incursions--was delayed 1 year because of continuing software problems. The 1991 CIP had projected that ASDE-3 would be operational in 1992, but as of early April 1993, none was yet operational. ASDE-3 is now 6 years behind its original schedule. Another example is that the first implementation date for FAA's new long range radar--the Air Route Surveillance Radar (ARSR-4)--was delayed from October 1993 to January 1994 because testing has taken longer than originally anticipated.

Other projects among the 12 we tracked also experienced delays in their initial segments. For example, as we testified to your Subcommittee last week, a key initial segment of the Advanced Automation System (AAS) has recently been delayed 14 months.[3] As a result, this segment is about 3 years behind 1988 contract milestones. In another example, the initial version of the Mode Select (Mode S) radar has also experienced delays. At this time last year, FAA expected the first Mode S system to be operational in July 1992; now the milestone has slipped 10 months, to May 1993.

Because modernization projects have encountered serious schedule delays over the years, FAA's ability to manage the modernization program has been called into question. This coming year is vitally important to FAA's credibility, because FAA has promised that several key systems--including Terminal Doppler Weather Radar, ASDE-3, ARSR-4, and Mode S--will be operational in the field.

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

[3]Air Traffic Control: Uncertainties and Challenges Face FAA's Advanced Automation System (GAO/T-RCED-93-30), Apr. 19, 1993.

CIP Costs Have Grown, and a Decision on Facility Consolidation Will Have Major Budgetary Implications

Overall CIP costs grew this past year. FAA's latest estimate of modernization costs through the year 2000 is $32.8 billion, or an increase of $869 million over the $31.9 billion we reported in April 1992. A significant portion of this increase is due to the inclusion of 12 new projects in the CIP. Cost increases on key existing CIP projects also occurred. We found that 9 of 12 projects we follow had cost increases, ranging from $1.7 million to $77.1 million. In addition, 7 of the 12 have cost increases pending approval within the agency. For example, the ASDE-3 radar has $30 million in pending changes to fix a persistent target-splitting problem, make needed site configuration changes, and pay the contractor for hardware and software changes it has already made.

FAA recently announced a major change to its air traffic control facility consolidation plan, which will increase CIP costs. FAA's original plan, developed in 1983, was designed to consolidate over 230 terminal radar approach control facilities and air route traffic control centers into just 23 facilities. Current CIP project costs are based on that level of consolidation. Because this consolidation plan has important limitations, including operational feasibility problems, FAA has considered alternative plans since 1987. Last week, FAA announced its decision to proceed with a "limited consolidation plan" that would include 22 centers, 9 consolidated terminals, and about 170 unconsolidated terminals--in total about 200 facilities. Also last week, the Acting FAA Administrator promised to deliver the consolidation plan to the Congress within 30 days. At your request, we are reviewing FAA's consolidation effort.

Retaining a large number of facilities under the limited consolidation plan will increase F&E costs, because the plan will require additional building refurbishment and equipment purchases. For example, total costs for the Voice Switching and Control System (VSCS) will increase over $100 million if FAA exercises contract options for additional systems for terminals. In total, FAA estimates that, through the year 2004, the plan will increase total F&E costs by almost $2.5 billion. Because FAA has not yet released its consolidation plan and the analyses supporting it, we cannot assess its complete impact on costs. However, it is clear that the limited consolidation plan will have far-reaching budgetary implications. To accommodate the costs added by the limited consolidation plan, FAA will need to either increase its annual F&E appropriations requests or to reduce the money requested for non-consolidation-related CIP projects.

Acquisition Management Needs to Be Strengthened

Continued cost growth and schedule delays are, to a large extent, a reflection of decisions made many years ago. Most of the projects whose progress we report on were begun in the early 1980s. Improvements in FAA's acquisition management can help to minimize problems with existing projects and also help prevent cost and schedule problems with newer projects. These newer projects will consume an increasing portion of the F&E budget.

FAA can further strengthen its acquisition management by developing well-supported mission need statements, assessing alternatives for key projects such as those involving precision landing systems, and developing performance measures to quantify progress toward CIP goals.

Developing Well-Supported Mission Need Statements

Over the past few years, FAA and OST have taken steps to bring their acquisition management into compliance with federal acquisition policy. These steps included a commitment to follow a more disciplined approach to acquisition. For example, FAA requires mission need statements for all new projects in the CIP and F&E budget.

At the request of this Subcommittee, we recently reported on this vital first step in FAA's acquisition process.[4] We found that many of FAA's mission need statements for new Capital Investment Plan projects do not justify that a need exists for the projects. The 25 approved mission need statements we examined listed 110 deficiencies in the air traffic control system, deficiencies that could cost $5 billion in new investments to fix. However, many of these statements were not supported with either qualitative or quantitative evidence. The statements merely indicated that deficiencies had adverse effects on FAA's operations. Also, the statements did not contain evidence describing what performance problem was to be fixed, such as the extent to which a new investment could be expected to reduce delays or maintenance costs. Moreover, the statements were seldom based on analyses of performance, which would have measured how well current systems are performing, identified areas most in need of improvement, and helped to set priorities for capital investments.

Such system performance analyses should be the beginning point of the acquisition process. Yet, FAA's acquisition order and other

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

guidance for mission need statements do not require an analysis of current performance as the starting point. FAA has made progress in improving its mission need statement process by setting up a team that performs mission analysis. However, FAA's new guidance depicts the team's conducting mission analysis after the submission of the mission need statement. The mission analysis process should begin earlier.

To avoid a repetition of past problems and to make significant improvements in its process for developing mission need statements for new projects, FAA must change its acquisition paradigm. Rather than continuing to focus on which system to purchase, FAA officials will have to reorient their thinking toward first analyzing current performance to identify and demonstrate deficiencies and a need for improved capabilities. Only then should FAA begin developing mission need statements. Until FAA takes this step, we are concerned that it may be asking the Congress to invest in new systems to solve problems that it has not thoroughly defined and analyzed.

Reassessing Needs and Identifying Alternatives For Existing Projects

New acquisition policies recently issued by OST and FAA highlight the need to consider affordability of acquisition projects and to look for opportunities to acquire "off-the-shelf" technologies to help control costs and accelerate the delivery of new systems to the field.

The intent of the new policies is to help FAA identify and assess cost-effective alternatives. The identification and assessment of alternatives was the subject of one of our recent reports. Specifically, we see an opportunity for FAA to revalidate its needs and assess alternatives for the Microwave Landing System (MLS), which at $2.6 billion is the second most costly CIP project. Last year, at your request, we reviewed FAA's plans to develop alternative precision landing systems, including the existing Instrument Landing System (ILS) enhanced with an aircraft-based computer system, and two emerging and potentially more capable technologies--the MLS and a satellite-based landing system. As we reported in November 1992, we found that FAA had not determined, on a runway by runway basis, which category of system would be needed and whether the replacement of each ILS with a higher capability system was actually justified.[5] We recommended that FAA provide full budgetary support for the development of all alternatives and

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[5]Precision landing systems are categorized by different minimum standards of height and visibility. Category I equipment allows aircraft to descend to a height of 200 feet above the ground when the runway visual range is at least 1,800 feet. Category II and III equipment allow aircraft to descend closer to the runways.

prepare a new mission need statement for precision landing systems in general.[6] We emphasized that this statement should be ready before FAA decides on replacing existing ILSs.

FAA's Satellite Program Office conducted several flight tests using the Department of Defense's Global Positioning System (GPS) during 1992. In 1995, FAA will begin augmenting GPS to support special Category I precision approaches and will complete its evaluation of the feasibility of using an augmented GPS for Category II and III precision approaches. At the same time that FAA will complete its feasibility study, the agency will also be receiving 12 prototype Category II and III MLSs. We recommended full budgetary support for the development of MLS and a satellite-based system to put FAA in the best position to compare the capabilities, costs, and benefits of those systems before the MLS full-production decision scheduled for 1996.

If proven feasible, the use of a GPS-based system could have a major impact on the costs to the airline industry. Some airlines are already installing GPS avionics to support aircraft operations during other phases of flight. Cost estimates are not yet available for GPS avionics upgraded for precision landing capability. However, using GPS for precision landings may allow airlines to forgo some of the substantial costs of equipping their aircraft with MLS avionics--which are estimated to range from $252 million to $336 million for the commercial aviation fleet. The potential costs to both FAA and aviation users make it essential that FAA thoroughly assess its needs and alternatives for precision landing systems, as we have recommended.

Establishing Goals From Which Progress Can Be Measured

Last year, we recommended that FAA incorporate measurable goals in the CIP to help guide funding decisions. FAA has not yet published the 1992 CIP. However, our review of a draft indicates that FAA will incorporate measurable goals. For example, one goal is to increase airport and airspace capacity by 20 percent by 1999. Another is to reduce runway incursions by 80 percent by 2000.

Now that FAA is taking this important step, it would be helpful for decision makers in both the executive branch and the Congress if FAA reported its progress against these goals. Up until now, FAA has reported its progress in terms of the number of CIP projects under contract and completed. Those are not true indicators of progress because they do not show how FAA is improving the safety and efficiency of the air traffic control system, which is the overall goal laid out for the CIP and the F&E budget.

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

FAA has recently indicated that it is developing performance measures to track progress against these new CIP goals. Measuring progress against goals would help the Congress in making decisions on where to focus F&E resources. Additionally, FAA would be in a better position to analyze its performance and detect deficiencies in existing systems. This would result in improved mission need statements and better support for its F&E projects.

OPERATIONS ACCOUNT

FAA's requested appropriations of $4.6 billion for operations represents less than a 1-percent increase ($38 million) over its fiscal year 1993 appropriation. The operations account funds the salaries, benefits, and training of FAA's major work forces--air traffic controllers, safety inspectors, and maintenance technicians. FAA spent much of the 1980s ensuring that it had sufficient numbers of controllers, inspectors, and maintenance technicians. Today, the primary challenge is not one of overcoming staffing shortages but rather one of effectively distributing controllers and technicians among key facilities and targeting its inspector resources to those areas needing the most attention.

Strategy Needed to Overcome ATC Facility Staffing Imbalances

Currently, the overall size of the controller work force is less than 1 percent short of the 17,900 prescribed by FAA's staffing standards. However, in total, air traffic control centers are staffed at 6.6 percent greater than the standards while terminals are 5.2 percent less than the standards. Since 1991 the Congress and FAA have been aware of staffing imbalances. These imbalances occur (1) between terminal and center facilities, (2) among terminals, and (3) among centers. For example, FAA's recent staffing study, using current standards to measure imbalances, indicated that 210 terminals were understaffed by about 1,000 controllers and 167 terminals were overstaffed by about 800 controllers.

To ensure that individual air traffic facilities are properly staffed, the Congress required FAA to perform a facility-by-facility analysis and to report by December 31, 1991, on its staffing needs and the actions needed to correct the disparities. When FAA performed its analysis using May 1992 data, it identified problems with its staffing standards. According to Air Traffic Control officials, the standards do not adequately consider complexities unique to each facility, such as training and attrition rates. Therefore, FAA does not want to submit a report to the Congress until it develops solutions to the imbalances.

FAA recognizes that it must consistently and accurately measure staff needs before implementing a solution for the

imbalances. Once staffing needs are accurately determined, FAA has several options for correcting the imbalances. These options include (1) assigning controller candidates to understaffed facilities, (2) reassigning controllers at overstaffed facilities to understaffed facilities, (3) allowing overstaffed facilities to continue operating with current staffing levels and not hire replacements for those that leave through normal attrition, and (4) contracting out towers and reassigning the freed-up controllers to understaffed facilities. FAA estimates that if it contracted out its level 1 facilities' operations at a rate of 10 per year it could save a total of $93 million to $101 million through the year 2012 without negatively affecting safety.

FAA officials are aware of these options and recognize the short and long-term limitations of implementing them. For example, in the short term, FAA cannot relocate controllers from overstaffed facilities to understaffed facilities because FAA does not believe that it has sufficient permanent change-of-station funds to pay for the moves. In the long term, FAA's facility consolidation plan could have the effect of creating new staffing standards and requiring the movement of controllers to these facilities depending on how the consolidated facility is structured.

Opportunities for FAA to Better Use Its Inspector Work Force

FAA's fiscal year 1994 budget request retains the current number of safety inspectors at about 2,500. These inspectors perform a multitude of activities that include inspections of commercial aircraft, general aviation aircraft, repair stations, pilot training schools, and maintenance schools. Therefore, FAA must identify opportunities to target resources to those areas needing the most attention.

Our recent reports on FAA's inspections of domestic and foreign carriers and aging aircraft illustrate the difficulty that FAA faces in providing sufficient inspection coverage.[7] We recommended that FAA develop clear guidance for inspectors, defining which of their many high-priority areas should take precedence. During our review of aging aircraft, for example, inspectors told us that they also had other high-priority activities and lacked guidance to determine how many aging aircraft to inspect. FAA concurred with the need to develop clear inspection guidance.

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[7]Aviation Safety: Problems Persist in FAA's Inspection Program (GAO/RCED-92-14, Nov. 20, 1991); Aviation Safety: Increased Oversight of Foreign Carriers Needed (GAO/RCED-93-42, Nov. 20, 1992); and Aircraft Maintenance: FAA Needs to Follow Through on Plans to Ensure the Safety of Aging Aircraft (GAO/RCED-93-91, Feb. 26, 1993).

We also recommended that FAA develop criteria for targeting inspections to high-risk conditions. Targeting will help FAA determine how it could best use its limited inspector resources. FAA agreed and has been developing the Safety Performance Analysis Subsystem (SPAS). SPAS is a computer-based system that analyzes information in various FAA data bases that, among other things, identifies potential problem areas for inspection emphasis. FAA plans to spend about $10 million to develop the system through fiscal year 1995.[8] The SPAS initiative is a step in the right direction. However, for SPAS to succeed FAA needs to resolve such issues as (1) defining the telecommunications network needed for the inspectors to enter and retrieve data from the system, (2) ensuring that the system is not too complex and that inspectors are trained on the system, and (3) ensuring that input data contain complete and accurate information. For example, the Program Tracking and Reporting Subsystem (PTRS) is a key data base that FAA plans to use in SPAS. We have previously reported that PTRS contains inaccurate data.[9] We believe that SPAS could be an important management tool for targeting limited resources and both FAA and the Congress should pay attention to its technical problems now to reduce the potential for future problems with schedule delays and cost increases.

FAA Does Not Have Reliable Estimates on Maintenance Technician Staffing Needs

At last year's hearing before this Subcommittee, the then-FAA Acting Administrator stated that the staffing standards for maintenance technicians were suspect and had not been closely evaluated. According to the staffing standards, FAA needs about 12,700 maintenance technicians in fiscal year 1994. In its budget, however, FAA is requesting an end-of-year staffing level of 8,923 for 1994, or 72 less than the level requested for fiscal year 1993 and 30 percent less than the staffing standards would require to maintain the air traffic control system.

We share FAA's concern about the reliability of the staffing standards because FAA has consistently maintained a high level of system availability with a less experienced work force that is well below the levels prescribed by the standards. As of February 1993 FAA had about 8,950 technicians to service equipment at almost 29,000 facilities. Furthermore, the average experience level of technicians has declined from almost 21 years to about 18 years

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[8]FAA will require additional funds to purchase telecommunications hardware and software and provide training. FAA has not yet determined the amount of additional funds needed.

[9]Aviation Safety: Problems Persist in FAA's Inspection Program (GAO/RCED-92-14, Nov. 20, 1991).

since 1988. To help bridge the gap between estimated staffing needs and availability, FAA has relied more on contractors to maintain new equipment and on increased overtime usage. FAA now contracts for the maintenance of 17 systems compared to 6 in 1987. In fiscal year 1994 FAA is proposing to increase contract maintenance to 27 systems at a cost of about $52 million. Also, FAA increased its use of overtime to almost 239,000 hours in fiscal year 1992, a 30-percent increase from fiscal year 1986.

FAA's efforts to compensate for staff and experience shortages, coupled with equipment redundancy, have kept overall system availability at about 99.8 percent. However, indications are that FAA's ability to maintain availability at 99.8 percent could deteriorate. For example, the mean time to restore equipment increased to over 14 hours in 1992, a 45-percent increase since 1988. Also, the experience and system performance levels could decline if the 2,100 technicians eligible to retire by 1995 leave the work force.

We do not know whether FAA will be requesting additional staff in the future, but it is clear that more accurate and reliable staffing estimates would enable FAA and the Congress to make more informed decisions on allocating scarce resources. However, delays in commissioning CIP projects and facility consolidations will affect the number of maintenance technicians needed and where they will be assigned. To better utilize maintenance technicians, FAA is currently taking actions to (1) prescreen applicants and streamline the training process, thus shortening the time needed to progress to the journeyman level; (2) reduce work load by identifying more efficient means to accomplish the required activities; and (3) reduce maintenance activities not related to safety.

AIRPORT IMPROVEMENT PROGRAM ACCOUNT

FAA has the opportunity to leverage the about $2 billion Airport Improvement Program (AIP) budget by funding projects that best achieve national goals, such as how much flight delays should be reduced or airport capacity increased. Last year we testified before the Congress on the need for such specific planning goals.[10] Such goals would give FAA officials direction for making AIP funding decisions on the basis of how projects could improve the national aviation system. We also discussed the need for effective means to measure the contribution of projects to achieving goals that would help both the Congress and FAA revise, as necessary, AIP funding priorities. At this time, FAA has neither set goals nor established methods to measure project performance against goals.

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

Our recent review of a potential new Chicago-area airport, highlights shortcomings in FAA's strategic planning and analysis capability for AIP. We found that FAA headquarters and Great Lakes regional officials did not have specific goals for reducing flight delays nationally. Also, they did not evaluate how a new airport could decrease flight delays system-wide and relied on the airport sponsors' analyses that focused on delays in the Chicago area. By analyzing the effect of projects on achieving system-wide goals, FAA can better determine how limited AIP funds should be allocated. Such analysis is critical given the impact that funding one project can have on the availability of AIP funds for other projects. For example, according to the new Chicago-area airport sponsors' analysis, annual discretionary AIP grants over a 5-year period would average from $110 million to $318 million, depending on the site selected. At this funding level the least costly sites could use the full allocation of discretionary funds typically available to the entire Great Lakes region. The more costly sites could use the full allocation of discretionary funds in several regions.

Until FAA adopts a more strategic approach to airport development that includes setting goals, selecting the most cost-effective projects to meet those goals, and measuring performance, the agency can do little to counteract airlines' arguments that many AIP-funded projects are not needed. Furthermore, FAA cannot be sure that limited AIP funds have been used for the most important projects. FAA officials agree that national goals need to be established and that such goals would provide operational benefits. FAA is now working on setting goals and determining methods to measure airport performance, but it has not established a time frame for completion.

RESEARCH, ENGINEERING & DEVELOPMENT ACCOUNT

FAA's RE&D program plays an important role in ensuring the safety, security, and efficiency of the U.S. air transport system. FAA is requesting $250 million for RE&D for fiscal year 1994. Over the past several years, FAA has increased research in safety, security, and human factors.

In response to the Pan Am Flight 103 tragedy, the Congress directed FAA to, among other things, accelerate its research efforts for bomb detection, and explore ways to enhance aircraft survivability. The Congress' goal was to have new detection systems in place by November 1993. Accordingly, FAA's RE&D funding for security has grown from $16.9 million in fiscal year 1990 to about $36 million in fiscal year 1993--a 113-percent increase. FAA has requested $36 million for security in the RE&D account for fiscal year 1994. FAA expects to obligate all its fiscal year 1993 funds and has over 40 projects to research detection devices.

At the request of this Subcommittee, we are assessing FAA's security research program, particularly the development of new

explosive detection devices and methods to improve aircraft blast resistance (aircraft hardening). The following four issues illustrate the challenges that FAA should address to meet the high expectations of the Congress and the traveling public. These issues illustrate the challenges FAA faces in developing new technology for the aviation industry.

First, technical problems will prevent FAA from having new detection equipment--the centerpiece of its security research--at airports in the near future. For example, some advanced x-ray devices show promise in detecting explosives but are either too slow or have high false alarm rates. Also, FAA plans to spend about 23 percent of its security RE&D budget on vapor technology but has not determined how to ensure that the technology can reliably detect small amounts of explosives. Such devices "sniff" baggage and people for explosives and must discriminate between very small traces of explosives and much larger quantities of other materials. FAA expects to test several devices at selected airports later this year.

Second, FAA has not determined how much the new devices will cost the airlines. Industry estimates that the cost of a single device could range from $250,000 to well over a $1 million. Because no single device can meet the existing threat, airlines will have to use devices in combination to detect a small amount of explosives, which could have a significant financial impact on the industry. According to FAA officials, they will conduct an economic analysis after they approve devices for airlines' use.

Third, industry has raised issues related to the cost, weight, and durability of blast resistant luggage containers. According to an FAA official, the containers that FAA is testing would add an average of about 3,200 pounds to an aircraft's weight, thereby increasing fuel use and operating costs. Also, because of their size, the new containers can be used on only about 25 percent of all flights--on wide-body aircraft that typically fly international routes. According to officials, FAA is working with industry to resolve these issues.

Finally, FAA needs to determine the relationship between detection and aircraft survivability. Last year this Subcommittee directed FAA to conduct a detailed analysis of the trade-offs between survivability and detection. Defining this relationship is important because if FAA finds that an aircraft could be made to withstand an explosion, then devices would not have to be as sensitive as FAA currently requires. Conversely, if an aircraft cannot be made to withstand an explosion, then the devices will have to be as or more sensitive. FAA expects to complete its analysis in 1995.

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In summary, our work has identified some significant challenges for FAA. In the F&E area, FAA must address three major challenges--fielding systems as promised, coming to grips with the budgetary impacts of facility consolidation, and strengthening the acquisition process--to enhance the aviation community's confidence in the agency's ability to manage the modernization program.

In the operations area, FAA continues to face problems affecting its critical work forces--controllers, inspectors, and maintenance technicians. These problems include inadequate staffing standards, staffing imbalances at facilities, and the lack of systems to target resources to areas that pose the greatest safety risk. FAA has several options to correct staffing disparities at air traffic control facilities, but to successfully follow through on any plan will require FAA to first correct its staffing standards. FAA has taken positive steps toward developing a system for targeting inspector resources to high-risk areas, but FAA will have to resolve several significant problems before implementing the system. The maintenance technician work force has been able to preserve the high level of air traffic control equipment availability with staffing shortages and a decline in experience levels, calling into question the adequacy of its staffing standards.

With regard to AIP, FAA cannot be assured that program funds are used in the most effective manner without specific goals to guide funding decisions and means to measure performance against such goals. In the RE&D area, technical problems affecting the performance of bomb detection devices will preclude their being implemented at airports in the immediate future.

Mr. Chairman, this concludes my statement. We will be happy to respond to any questions you might have at this time.

RELATED GAO PRODUCTS

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).

State of the Airline Industry: Strategies for Addressing Financial and Competition Problems (GAO/T-RCED-93-21, Mar. 10, 1993).

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

Aircraft Maintenance: FAA Needs to Follow Through on Plans to Ensure the Safety of Aging Aircraft (GAO/RCED-93-91, Feb. 26, 1993).

New Chicago Airport: Site Comparison, Selection Process, and Federal Funding (GAO/RCED-93-105, Feb. 22, 1993).

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

Transportation Issues (GAO Transition Series) (GAO/OCG-93-14TR, Dec. 1992).

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).

New Denver Airport Followup (GAO/RCED-92-285R, Sep. 14, 1992).

Detroit City Airport (GAO/RCED-92-169R, Apr. 30, 1992).

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

Air Traffic Control: Status of FAA's Modernization Program (GAO/RCED-92-136BR, Apr. 3, 1992).

Aviation Safety: Progress Limited With Self-Audit and Safety Violation Reporting Programs (GAO/RCED-92-85, Mar. 31, 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).

Aviation Safety: Better Oversight Would Reduce the Risk of Air Taxi Accidents (GAO/T-RCED-92-27, Feb. 25, 1992).

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

Aviation Safety: FAA Needs to More Aggressively Manage Its Inspection Program (GAO/T-RCED-92-25, Feb. 6, 1992).

Aviation Safety: Air Taxis--The Most Accident-Prone Airlines--Need Better Oversight (GAO/RCED-92-60, Jan. 21, 1992).

Aviation Safety: Problems Persist in FAA's Inspection Program (GAO/RCED-92-14, Nov. 20, 1991).

Aviation Safety: Emergency Revocation Orders of Air Carrier Certificates (GAO/RCED-92-10, Oct. 17, 1991).

FAA Staffing: Better Strategy Needed to Ensure Facilities Are Properly Staffed (GAO/T-RCED-92-8, Oct. 16, 1991).

New Denver Airport: Safety, Construction, Capacity, and Financing Considerations (GAO/RCED-91-240, Sep. 17, 1991).

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).

FAA Budget: Key Issues in Facilities & Equipment and Operations Accounts Need Resolution (GAO/T-RCED-91-58, June 5, 1991).

Major Acquisitions: Top Management Attention Needed to Improve DOT's Acquisition Process (GAO/T-RCED91-45, Apr. 24, 1991).

Air Traffic Control: Status of FAA's Modernization Effort (GAO/RCED-91-132FS, Apr. 15, 1991).

Aviation Safety: Limited Success Rebuilding Staff and Finalizing Aging Aircraft Plan (GAO/RCED-91-119, Apr. 15, 1991).

FAA Staffing: New Pay Act Offers Options to Bolster Maintenance Work Force (GAO/RCED-91-92, Apr. 2, 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).

Serious Shortcomings in FAA's Training Program Must Be Remedied (GAO/T-RCED-90-86, June 6, 1990).

Air Traffic Control: Ineffective Management Plagues $1.7 Billion Radar Program (GAO/IMTEC-90-37, May 31, 1990).

FAA Encountering Problems in Acquiring Major Automated Systems (GAO/T-IMTEC-90-6, Apr. 26, 1990).

Issues Related to FAA's Fiscal Year 1991 Budget Request (GAO/T-RCED-90-66, Apr. 18, 1990).

Air Traffic Control: Status of FAA's Efforts to Modernize the System (GAO/RCED-90-146FS, Apr. 17, 1990).

Issues Related to FAA's Modernization of the Air Traffic Control System (GAO/T-RCED-90-32, Feb. 27, 1990).

Aviation Safety: Management Improvement Needed in FAA's Airworthiness Directive Program (GAO/RCED-90-94, Feb. 16, 1990).

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