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AVIATION SAFETY

FAA Can Be More Proactive in Promoting Aviation Safety

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Mr. Chairman and members of the Committee:

We appreciate the opportunity to testify on the Federal Aviation Administration's (FAA) efforts to ensure the safety of the flying public. Over the last few years, we have issued several reports on FAA's oversight of numerous segments of the airline industry, including commuter carriers and air taxis; safety concerns about aging aircraft; FAA's deicing requirements; the agency's development of new safety technologies; and most recently, its certification of new aircraft. Our testimony today is drawn largely from this body of work and focuses on three basic points, which I would like to summarize.

-- First, the U.S. air transport system, which is comprised of aircraft manufacturers, airlines, pilots, FAA, and others, has achieved a high level of safety. Aviation accident rates in this country are among the lowest in the world. Although the overall aviation safety record has improved in the United States since the early 1980s, the number of fatal accidents in 1994 has raised considerable concern about the safety of air travel. For example, about the same number of passengers died in crashes involving large airlines and commuter carriers in 1994 as in the previous 4 years combined. This raises the question of what steps can be taken to further improve aviation safety.

-- Second, as the regulator of the U.S. aviation system, FAA has a key role to play in promoting safety. The recent Aviation Safety Conference entitled "Zero Accidents--The Challenge," which was convened by the Secretary of Transportation and the FAA Administrator in response to the accidents in 1994, is one example of the positive role FAA can play. Although no system can be completely free of risk, a recurring finding of our work over the years has been that there are significant targets of opportunity where FAA could enhance the margin of safety by being more proactive. For example, we have made recommendations on FAA's capabilities in certifying the safety of new aircraft, its inspections of airlines generally as well as oversight of specific segments of the aviation industry such as commuter pilot training, air taxis, and foreign air carriers, and specific issues such as the safety of aging aircraft and the need for improved aircraft deicing regulations. FAA has generally acknowledged the need to address many of these issues and has made progress to address concerns in these areas. However, its progress to correct such problems has often been slow, and in some cases the problems persist.

-- Finally, our work has identified several longstanding problems that not only handicap FAA's ability to administer its oversight responsibilities as effectively as possible but also inhibit its ability to more proactively promote safety. For

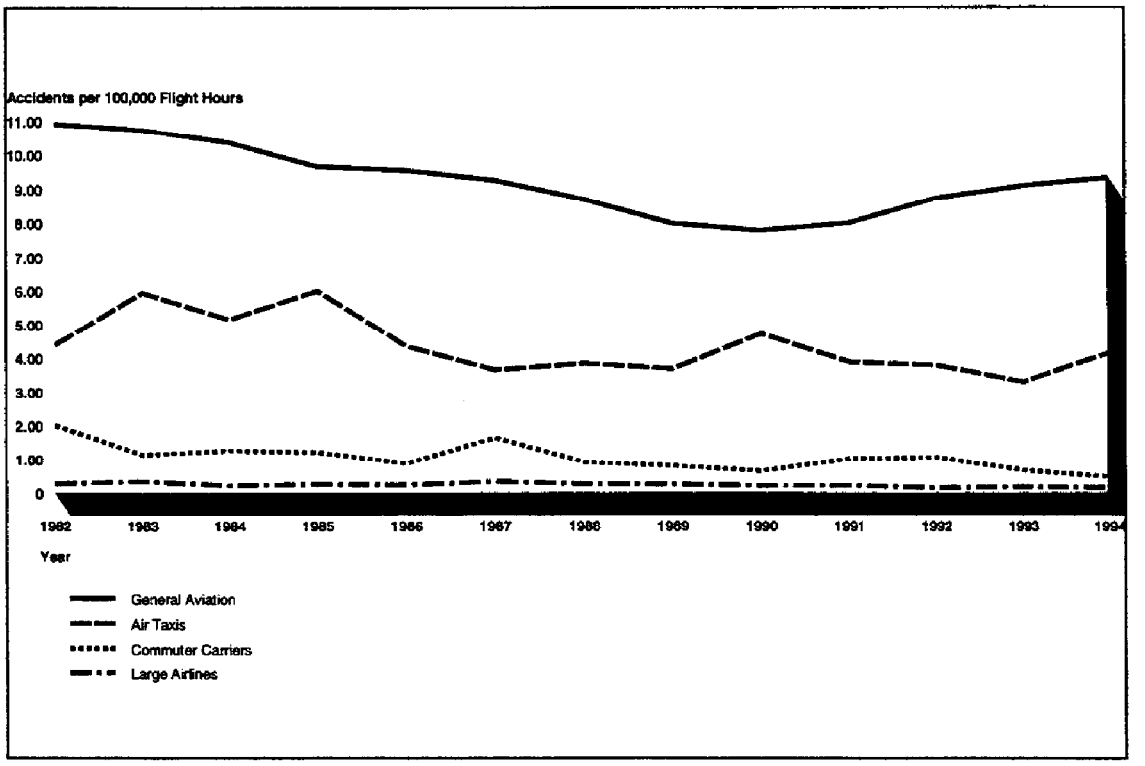
example, FAA has had difficulty recruiting, training, and retaining staff, particularly in the area of advanced technologies that are now being deployed on modern aircraft. Furthermore, on several occasions we found that FAA had not effectively collected and analyzed data that are needed to target its inspection resources to the areas of greatest risk. Although FAA has made progress over the years in this area and is now developing an information system to better target its inspection resources, problems with obtaining and verifying key data still need to be resolved. Last, FAA does not have a good system for obtaining complete and reliable data on problems experienced by aircraft. Without timely, reliable, and comprehensive data on deficiencies identified by its inspectors and safety problems experienced by aircraft, FAA will continue to be constrained in its capacity to target limited inspection resources to areas of greatest risk and to proactively identify and address emerging safety problems.

STATISTICS ON AVIATION SAFETY IN THE UNITED STATES

Although recent aviation accidents have received much publicity and raised considerable public concern, air travel remains generally safe. For example, our system is one of the safest in the world, and since the early 1980s the safety of air travel in the United States has improved. Nevertheless, the series of recent commercial aviation accidents and the increase in the general aviation accident rate since 1990 underscore the need for continued vigilance by all members of the aviation system, including FAA, to ensure that our system remains among the safest in the world.

Several measures are commonly used to report aviation safety data, including accidents per aircraft miles, per departures, and per aircraft flight hours. Regardless of the measure used, U.S. aviation safety has improved overall since 1982. In addition, aviation safety in the United States compares favorably with the aviation safety records of other countries. For example, over the last 10 years large air transport accident rates per departure are over 3 times higher in Europe and over 15 times higher in Asia and the Pacific Rim countries. However, other trends emerge from the analysis of the U.S. aviation safety data that warrant some discussion. A wide disparity in safety levels exists, for example, among the different U.S. aviation sectors. In 1993, large U.S. airlines were over 3 times safer than commuters, 19 times safer than air taxis, and over 50 times safer than privately operated general aviation aircraft. (See figure 1.)

Figure 1: Accident Rates Per 100,000 Hours Flown for U.S. Airlines, Commuters, Air Taxis, and General Aviation, 1982-94



Note: Data for 1994 are preliminary.
Source: National Transportation Safety Board (NTSB).

Although accident rates are a generally accepted measure of overall safety, the number of fatalities is also a major concern, particularly to the traveling public. The issue of aviation safety, for example, has now come to the forefront largely because over half of all passenger and crew fatalities on large and commuter aircraft over the last 5 years occurred in 1994. Table 1 shows the number of onboard fatalities for the various segments of the aviation community for 1990 through 1994.

Table 1: Total Number of Passenger and Crew Fatalities by Industry Segment, 1990-94

Year	Large airlines	Commuter carriers	Air taxis	General aviation	Total
1990	12	4	48	761	825
1991	49	77	66	771	963
1992	31	21	67	858	977
1993	0	23	42	732	797
1994	239	25	63	683	1,010
Total	331	150	286	3,805	4,572

Note: Data for 1994 are preliminary.

Source: NTSB.

FAA HAS OPPORTUNITIES TO BE MORE PROACTIVE IN CARRYING OUT ITS SAFETY MISSION

A recurring finding of our work over the last several years is that although FAA has generally been responsive to addressing identified safety problems, targets of opportunity exist where FAA could have been more proactive in enhancing the margin of safety, and FAA often takes years to bring needed improvements on line. This trend can be seen in several areas of our work including FAA's certification of new aircraft; FAA's oversight of various segments of the aviation community, including commuters, air taxis, foreign air carriers, and privately operated general aviation aircraft in mountainous areas. FAA has also experienced delays in fielding key safety technologies, such as radar systems that can (1) help prevent accidents between aircraft on runways and (2) alert pilots and air traffic controllers to severe weather problems such as wind shear.

FAA Is Having Difficulty Keeping Pace With Advances in New Aircraft Technologies

Aviation safety begins with the design and certification of new aircraft. Before introducing new aircraft into commercial service in the United States, aircraft manufacturers must obtain FAA's certification that the aircraft and its systems meet the agency's safety standards. In 1980, the National Academy of

Sciences warned that FAA's technical competence was falling far behind that of its industry counterparts to the point that FAA's oversight of the new aircraft certification process was becoming superficial.

In September 1993, we reported that the situation had not improved.[1] Specifically, we found that the technical competence of FAA staff has been limited because FAA had not (1) established meaningful guidance to ensure that its staff are effectively involved in a process that delegates up to 95 percent of all activities to designated employees of the manufacturers, (2) fully staffed a program established in 1979 for in-house experts to assist staff, (3) ensured that these experts are involved early and at key junctures during the certification process, (4) provided staff adequate technical training, and (5) addressed the high level of turnover among staff. In one case, for example, during the certification of the Boeing 747-400 aircraft in the late 1980s, FAA engineers did not understand the complex flight management system, which operates the navigational system and monitors the performance of other systems; hence, they delegated to Boeing designees the approval of the entire system. FAA's staff delegated the approval of the system because they were not sufficiently familiar with the system to provide meaningful inputs to the testing requirements or to verify compliance with safety standards. Similarly, because FAA engineers had minimal knowledge of 10 other systems on Boeing's 747-400 aircraft, the agency delegated key analyses of these systems to Boeing designees as well--analyses that on previous certification projects FAA had reserved for its own staff.

FAA has long recognized the need to improve its staff's competence. In 1979, the agency established the National Resource Specialist Program through which experts in such subjects as crash dynamics, composite materials, and advanced avionics could assist FAA's certification staff. Although FAA identified a need for 23 such positions, only 11 were authorized at the time of our report, and only 8 of 11 positions were filled. The three vacancies still exist. The position for an icing expert, for example, has been vacant since 1987, even though FAA staff told us that the effects of ice on different aircraft designs varies greatly, making it imperative that FAA have an expert in this area.

To address the deficiencies in FAA's certification program, we made several recommendations aimed at improving the guidance, training, and expert assistance available to FAA's certification workforce. In response, FAA has (1) created a task force to examine needed changes in program guidance and tracking of designee oversight, with a report expected in the next several months; (2)

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

identified the need for six additional expert positions; and (3) prepared a plan to improve training and is in the process of developing the specific training courses. However, FAA has yet to issue needed guidance, fill any additional expert positions, or establish minimum annual training requirements for staff as we recommended.

FAA Has Taken Years To Develop a System to Target Its Inspection Resources

As early as 1987, we reported that FAA could develop criteria for targeting safety inspections to high-risk conditions and noted that targeting was important because FAA may never have enough resources to inspect all airlines all the time. FAA faces a formidable task with just 2,300 inspectors to oversee the ongoing operations of about 18,000 commercial and 184,000 active general aviation aircraft; 4,800 repair stations; 640 pilot training schools; 190 maintenance schools; and 665,000 active pilots. Given the magnitude of its workload, we have emphasized that FAA needs to target its inspection resources because certain categories of airlines and aircraft require more intensive oversight.

We have reported several times that FAA lacked complete information on its inspection program, and, as a result, the agency could not determine whether inspection priorities were achieved, inspection follow-up activities were adequate and timely, and inspection resources were being used effectively.[2] In these reports, we made several recommendations generally aimed at the need to better gather, analyze, and use data to target its limited inspection resources to areas of highest risk. FAA has recognized this need and taken positive steps, such as increasing the number of inspectors and developing guidance that defines requirements to ensure consistency of inspections by its district offices. Clearly, these are positive and significant actions. FAA is also developing an inspection resource targeting system, but the system will not be fully deployed until 1997, and continuing concerns exist about the accuracy and reliability of the data the system will use.

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[2]Aviation Safety: Problems Persist in FAA's Inspection Program (GAO/RCED-92-14, Nov. 20, 1991); Aviation Safety: FAA's Safety Inspection Management System Lacks Adequate Oversight (GAO/RCED-90-36, Nov. 13, 1989); and Aviation Safety: Needed Improvements in FAA's Airline Inspection Program Are Underway (GAO/RCED-87-62, May 19, 1987).

FAA Has Recently Taken Action to Strengthen Commuter Pilot Training Requirements

As early as 1988, we reported that FAA could take steps to improve the safety of commuter airlines.[3] Because commuter airlines were flying more passengers and using aircraft that include complex operating systems, we recommended that FAA enhance commuter pilot training by strengthening its regulations on pilot training, flight training maneuvers and procedures, and cockpit management training. In 1992, we again emphasized the need for these actions.[4] NTSB has also long been concerned about commuter safety and made similar recommendations in its November 1994 report on the commuter industry. Responding to these concerns and several recent commuter accidents, FAA has proposed new regulations that will make training requirements for commuter pilots similar to those now in effect for major airline pilots. FAA anticipates finalizing these rules later this year.

FAA Is in the Process of Addressing Identified Concerns About Air Taxi Safety

During the last decade, air taxis have had higher accident rates than large airlines or commuter carriers. In January 1992 we reported that FAA was not performing all required inspections of air taxis because it gave large airlines, commuters, and other aviation-related activities a higher inspection priority.[5] Also, we found that, while air taxis were exempt from economic fitness reviews, financial distress had contributed to safety problems. In addition, we noted that some air taxi owners and managers who had committed serious safety violations had moved to similar positions with other air taxi companies. We also reported that FAA had not performed industry-wide special inspections since 1985, on the basis of which it concluded that its own oversight was inadequate. Since our report, FAA has taken actions to improve its ability to oversee air taxis, including issuing guidance to its inspectors for identifying financially distressed airlines. FAA is also in the process of establishing a system for tracking individuals who have committed serious safety violations. However, it has not conducted periodic, industry-wide special inspections as we recommended.

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[3]Aviation Safety: Enhanced Requirements Can Improve Commuter Pilot Training (GAO/RCED-88-218, Sept. 28, 1988).

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

[5]Air Taxis--The Most Accident-Prone Airlines--Need Better Oversight (GAO/RCED-92-60, Jan. 21, 1992).

FAA Has Taken Some Actions in Response to Increased Concerns About the Safety of Foreign Air Carriers

More than 500 foreign air carriers are licensed to fly into the United States. In July 1989, a foreign-operated aircraft crashed near New York after running out of fuel, killing 73 people and spurring increased concern about the safety of foreign air carriers. Over the last 2 years, we have issued three reports that have identified the need for increased oversight of foreign air carriers.[6] FAA has taken several positive steps on this issue, including assessing the oversight capabilities of foreign civil aviation authorities, working with foreign authorities to improve their programs, and increasing the number of inspections of foreign carriers with identified safety deficiencies. Again, these are positive steps, but FAA has not yet implemented two of our prior recommendations that we continue to believe could better ensure aviation safety: (1) performing more detailed inspections of foreign carriers that have been identified as having safety problems and (2) inspecting U.S.-registered, foreign-operated aircraft before they return to service in this country, particularly if they are from countries that do not meet international safety standards.

FAA Can Better Prepare Private Pilots for Flying in Mountainous Areas

In December 1993, we reported that the general aviation accident rate was nearly 40 percent higher for western states designated by FAA as mountainous than for all other continental states, and 155 percent higher for a group of selected mountain airports than for a group of nonmountain airports with similar levels of flight operations.[7] To better prepare pilots for the increased risks of flying in mountainous areas, we recommended that FAA (1) provide incentives for pilots to obtain mountain flying training, (2) identify mountain airports that are especially challenging for takeoffs and landings and produce maps that identify routes that private pilots should use flying to and from these airports, (3) hold safety seminars for pilots in nonmountain states located near mountainous areas, and (4) include specific questions on mountain flying in pilot certification tests. FAA has implemented the first recommendation and plans to implement the

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[6]Aviation Safety: FAA and the State Department Can Better Manage Foreign Enforcement Cases (GAO/RCED-94-87, Mar. 17, 1994); Aviation Safety: Unresolved Issues Involving U.S.-Registered Aircraft (GAO/RCED-93-135, June 18, 1993); and Aviation Safety: Increased Oversight of Foreign Carriers Needed (GAO/RCED-93-42, Nov. 20, 1992).

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

second recommendation in 1995. However, the agency does not plan to implement the third or fourth recommendations, which we continue to believe would improve general aviation safety.

FAA Has Acted to Better Ensure That Aging Aircraft Meet Requirements

The April 1988 structural failure of an Aloha Airlines aircraft that was almost 20 years old in April 1988 surfaced the need for closer scrutiny of older aircraft. This accident triggered a change in the prevailing industry and FAA philosophy on airframe maintenance to one in which airlines should replace rather than simply inspect major components of older aircraft. After the accident, FAA mandated major repairs and a corrosion control program for the aging fleet. However, in February 1993, we reported that FAA had made slow progress in ensuring that the mandatory repairs have been completed.[8] We recommended that FAA collect detailed information on airline compliance with airworthiness directives for aging aircraft. FAA has collected such data for some of the fleet, and has recently initiated another such effort to collect it for the remaining aircraft.

Aircraft Deicing Regulations Revised to Address Identified Problems

In March 1992, a USAir flight crashed on takeoff in a snow storm at La Guardia Airport killing 27 people, prompting FAA to issue regulations to more strictly govern airlines' ground operations in icing conditions. In November 1992, however, we reported that FAA did not apply the new rules to commuter airlines.[9] Although FAA has since addressed this shortcoming, it disagreed with and has not implemented a recommendation that we continue to believe is valid. Specifically, we recommended that if the holdover period since the last deicing has expired, critical aircraft surfaces should either be deiced again, or closely inspected from the outside of the aircraft.[10] FAA maintains that

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

[9]Aviation Safety: New Regulations for Deicing Aircraft Could Be Strengthened (GAO/RCED-93-52, Nov. 18, 1992).

[10]FAA's new rules require outside inspections after the holdover period expires only for hard-wing turbojets with rear fuselage-mounted engines--aircraft that represent about 3 percent of the largest 25 U.S. airlines' fleet.

visual inspection of these surfaces from inside the aircraft is adequate. In our view, the potential for misjudgment exists because obstructed views, distance, and poor lighting can make it difficult to detect ice on wings from inside an aircraft.

Deployment of Advanced Safety Technologies Has Been Delayed

We have reviewed two FAA radar systems that will be key in enhancing safety on runways and the airspace near airports: Airport Surface Detection Equipment[11] (ASDE-3) and the Terminal Doppler Weather Radar (TDWR). However, both programs are facing delays. For example, ASDE-3 is intended to prevent accidents on crowded runways, particularly in times of darkness, rain, or fog, similar to the accident that occurred in Detroit in 1990 when a pilot became lost in fog and collided with another aircraft. A 1983 FAA plan called for deploying surface detection radar at 21 locations by 1990. FAA now plans to deploy such equipment at about 40 airports by 1996, but the radar is currently fully operational at only 2 airports because of software development difficulties and technical malfunctions, such as ghost images and split target problems. Similarly, FAA's TDWR has experienced delays. The system detects hazardous weather conditions, such as wind shear. FAA had planned to have 47 of these systems fully operational by 1994, but only 2 of these systems are currently fully operational, and a date for system-wide implementation is now uncertain primarily because of siting difficulties. FAA estimates that it will have to find new sites for more than one-third of these systems because of land acquisition problems.

FAA FACES CHALLENGES TO BEING MORE PROACTIVE IN PROMOTING AVIATION SAFETY

Over the last several months, FAA has taken several steps to enhance safety. Convening the Aviation Safety Conference this month, for example, brought government and industry leaders together to examine additional steps needed to improve safety. Likewise, FAA has announced that it will conduct special inspections of all commercial airlines and accelerate efforts to apply the same standards to commuter carriers that it applies to large airlines in such areas as pilot training. Such actions are laudable, but FAA must overcome a number of long-standing problems if this proactive posture is to be effective in the long term. Specifically, FAA's staff capabilities must keep pace with the rapidly developing aviation industry, the agency must have accurate data to help target its airline inspections, and it must have complete and timely data on problems aircraft are experiencing.

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

FAA Staff Capabilities Remain a Concern

Our work has shown that in two critical areas FAA has had, and continues to have, difficulty in ensuring that its staff are appropriately trained in new technologies. As mentioned earlier, FAA certification staff often lack the necessary expertise to oversee the certification of some of the advanced technologies found in today's modern aircraft, and FAA has yet to take effective actions to address this problem. We have also reported in the past that FAA's inspectors were not receiving needed training. Our most recent work shows that this remains a concern, particularly in the area of new types of commuter aircraft, where FAA inspectors have limited training and experience.

Data Problems May Jeopardize FAA's New Inspection Targeting System

As we mentioned earlier, FAA is developing a safety performance analysis system (SPAS), which is designed to help FAA better target its limited inspection resources by, among other things, generating indicators on the financial condition of airlines and pilot flight check failures. SPAS will rely on input from over 25 data bases. Our ongoing work, on which we will be reporting shortly, shows that these data bases contain incomplete, inconsistent, and inaccurate data. If the quality of the data that SPAS relies on remains poor, its inputs to safety-related decisions will not be reliable, and it will not effectively support FAA's inspection program.

Improvements Needed in Aircraft Malfunction Data

FAA needs timely information on problems that airlines experience in day-to-day operation. FAA maintains a service difficulty report (SDR) data base that airlines, FAA inspectors, and FAA engineers are supposed to use to alert them to incipient safety problems. In 1991, we reported that information that one airline considers reportable may go unreported by another airline, and consequently, tabulated results for individual airlines could be misleading.[12] We also stated that FAA did not analyze the data, as required by FAA policy, to detect malfunction trends in specific aircraft models or focus the efforts of FAA's inspection workforce because of insufficient staff and unreliable data.

A 1994 report by the Department of Transportation's Inspector General found continuing problems. The Inspector General noted that SDR reports are incomplete, with omissions of information on particular part numbers, models, and manufacturers ranging from 46 to 98 percent. The Inspector General concluded that FAA lacks the

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[12]Aviation Safety: Changes Needed in FAA's Service Difficulty Reporting Program (GAO/RCED-91-24, Mar. 21, 1991).

tools to properly evaluate suspected aircraft maintenance and design problems because it does not have an adequate tracking and reporting mechanism that would allow it to retrieve information from earlier incidents for use in evaluating new problems, and that FAA is hampered by insufficient analysis capability.

CONCLUSIONS

Overall, air travel in this country is generally safe, particularly for scheduled commercial airlines. The combined efforts of aircraft manufacturers, airlines, pilots, and the FAA have all contributed to make ours one of the safest systems in the world. Nevertheless, the events of 1994 have brought the issue of aviation safety to the forefront, raising the question of what more can be done to make an already safe system even safer. Our work over the years suggests FAA can take further steps to better promote safety. While we have elaborated on several of these in our statement today, we believe the most critical of them is that FAA needs to be increasingly proactive, rather than reactive. To do so, however, FAA must overcome a number of challenges, including ensuring that its staff keeps pace with the advances in aviation technology and that it has accurate, reliable, and timely information to better identify emerging safety problems and make the difficult choices on which safety improvements are most critical and time urgent.

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Mr. Chairman, this concludes our prepared statement. We would be glad to respond to any questions that you or any member of the Committee may have.

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