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# AVIATION SAFETY

## New Airlines Illustrate Long-Standing Problems in FAA's Inspection Program



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**Resources, Community, and  
Economic Development Division**

B-265984

October 17, 1996

The Honorable James L. Oberstar  
Ranking Democratic Member  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable John J. Duncan, Jr.  
Chairman  
The Honorable William O. Lipinski  
Ranking Democratic Member  
Subcommittee on Aviation  
Committee on Transportation and Infrastructure  
House of Representatives

The deregulation of the commercial airline industry in 1978 has stimulated the formation of a significant number of new airlines. For example, a total of 79 airlines with fewer than 5 years of operating experience provided scheduled service to the public from January 1990 through December 1994. In his former capacity as Chairman of the House Subcommittee on Aviation, Committee on Transportation and Infrastructure, the current Ranking Democratic Member of the Committee asked us to review the process of certifying new airlines and the safety performance of new airlines. As agreed with the Subcommittee, this report is also addressed to the current Chairman and Ranking Democratic Member of the House Subcommittee on Aviation. We conducted our work in two segments to address these issues. In January 1996, we reported on the certification process, through which the Department of Transportation (DOT) and the Federal Aviation Administration (FAA) authorize airlines to begin operations.<sup>1</sup>

This report addresses (1) the safety performance of new airlines (airlines having 5 or fewer years of operating experience)<sup>2</sup> compared with that of established airlines (airlines with more than 5 years of experience) in terms of accidents, incidents, and FAA-initiated enforcement actions and (2) the frequency with which FAA inspects new airlines compared with its

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<sup>1</sup>See Certification of New Airlines: Department of Transportation Has Taken Action to Improve Its Certification Process (GAO/RCED-96-8, Jan. 11, 1996).

<sup>2</sup>We selected 5 years as the analysis period because it provides insight into the early years of an airline's development. The period analyzed was January 1990 through December 1994 (this period provided the most recent data available at the time of our analysis). We discussed our definition of new airlines with officials of FAA, DOT, and the National Transportation Safety Board, none of whom raised any objection or concern. For additional information on the data included in this report, see the Objectives, Scope, and Methodology section in app. I.

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inspections of established airlines. In addition to our analysis of new airlines, we also assessed the status of FAA's efforts to correct long-standing problems that limit the effectiveness of its overall safety inspection program. Finally, this report discusses publishing airline-specific safety data for use by the traveling public.

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## Background

Before commencing operations, new airlines must obtain two separate authorizations from DOT—"economic" authority from the Office of the Secretary of Transportation (OST) and "safety" authority from FAA. Within OST, the Air Carrier Fitness Division is responsible for assessing whether applicants have the managerial competence, disposition to comply with regulations, and financial resources necessary to operate a new airline. FAA's Flight Standards Service uses a multiphase process to determine whether an applicant's manuals, aircraft, facilities, and personnel meet federal safety standards.

Once airlines begin actual operations, FAA is responsible for monitoring the operations, primarily by conducting safety inspections. FAA conducts two types of inspections: routine and special. Routine inspections are generally spot checks performed by individual inspectors on a periodic basis. FAA's special inspections complement routine inspections by providing more comprehensive evaluations of airlines' operations.

To analyze the safety performance of new airlines, we used three sets of data—data on accidents from the National Transportation Safety Board (NTSB), FAA's data on incidents, and FAA's data on enforcement actions initiated against airlines. We discussed the selection of these data sets with officials from FAA, DOT, and NTSB, who agreed that they were appropriate for our analysis. However, it should be noted that all three have limitations. Specifically, some of NTSB's files on accidents did not definitively specify the airline that was operating the aircraft; FAA's data on incidents may be subject to some underreporting; and the data on the number of enforcement actions initiated, while complete, may reflect differences among FAA field offices in the emphasis they placed on initiating enforcement actions. We reviewed and made refinements to these data, where appropriate, to address these concerns.

NTSB, the official source of information on airline accidents, defines accidents as events in which individuals are killed or suffer serious injury, or the aircraft is substantially damaged. By NTSB's definition, accidents can range from fatal crashes in which the aircraft is destroyed and all crew and

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passengers aboard are killed, to events in which only one person suffers a broken bone and the aircraft is not damaged, to still others in which there is substantial aircraft damage, but no fatalities or serious injuries.

FAA generally defines incidents as occurrences other than accidents associated with the operation of an aircraft that affect or could affect the safety of operations. Among the commonly recorded types of incidents are engine malfunctions, system failures, landing gear collapses, and losses of directional control. Other types of incidents include collisions with various structures, such as runway lights, fences, wires, or poles; fires; and in-flight turbulence resulting in damage to the aircraft or less serious personal injury.

FAA may initiate enforcement actions in response to apparent or alleged violations of the Federal Aviation Act or federal aviation regulations. The actions that can be taken under FAA's compliance and enforcement program include administrative actions, such as warning notices and letters of correction, and legal enforcement remedies, such as revoking, suspending, or amending an airline's operating authority. Examples of violations that can lead to enforcement actions range from an airline's failure to perform proper aircraft maintenance to a pilot's failure to maintain the altitude directed by air traffic control. Another example is a pilot who possesses a valid pilot certificate but inadvertently pilots an aircraft without the certificate in his or her possession.

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## Results in Brief

Our analysis showed that during their first 5 years of operations, new airlines, on average, had higher accident, incident, and enforcement action rates than established airlines. This does not mean, however, that new airlines do not provide safe transportation to the traveling public. Our analysis demonstrates the need for better targeting FAA's limited inspector resources. For years, we and others have reported on numerous problems with the inspection program in such areas as inspector training and the oversight of aging aircraft. To its credit, FAA has made some progress to correct its problems, and recent initiatives by DOT and FAA, if implemented, should go a long way toward strengthening the program.

Although the available data show that both new and established airlines experience accidents infrequently, we found that, on average, new airlines had higher accident rates than established airlines during their early years of operations. From 1990 through 1994, new airlines had an accident rate of 0.60 per 100,000 departures, compared with the established airlines' rate

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of 0.36 per 100,000 departures. NTSB's definition of accident includes events ranging from major aviation catastrophes to much less serious occurrences. As a result, the use and interpretation of accident data require caution. Of the 201 accidents that occurred from 1990 through 1994, 45 involved fatalities, and 5 of those 45 involved new airlines.

There were 2,879 incidents and 3,982 FAA-initiated enforcement actions during the same period, thus providing much more information for analyzing safety trends. It should be noted that new airlines begin operations with fewer departures compared to established carriers (complete data are shown in app. II). As a result, as with accident data, caution must be exercised in the interpretation of incident and enforcement data. Rates based on relatively few departures are susceptible to large fluctuations and may not accurately predict longer-term performance. Nevertheless, new airlines experienced an average of 8.1 incidents per 100,000 departures, which was 52 percent higher than the established airlines' average of 5.4 incidents per 100,000 departures. Included in these data are the airlines that had no incidents—about half of the new airlines and one-fifth of the established airlines. During their second and third years of operations, new airlines, as a group, experienced elevated incident rates that were twice the average rates of established airlines. For example, the average incident rate for new commuter airlines in their third year of operations was 11.6 incidents per 100,000 departures, twice the average incident rate for established commuter airlines. For new large airlines, the average incident rate more than tripled between their first and second years to 12.5 incidents per 100,000 departures, more than twice the average rate for established new airlines.<sup>3</sup>

New airlines, as a group, also had higher rates of FAA-initiated enforcement actions. FAA initiated 14.9 enforcement actions per 100,000 departures for new airlines, more than twice the rate of enforcement actions initiated against established airlines (7.3 per 100,000 departures). New airlines experienced their highest number of FAA-initiated enforcement actions during their first 3 years. However, most of the enforcement actions initiated during the period were concentrated among a relatively small group of new airlines, and over 40 percent of the new airlines had no enforcement actions initiated against them.

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<sup>3</sup>For the purposes of this report, we separated the airlines into two groups—ones that use large aircraft ("large airlines"), defined as having a seating capacity of more than 30 persons or a maximum payload capacity of more than 7,500 pounds. Most of these are jet aircraft. We refer to the others as "commuter airlines," generally those that operate smaller aircraft. For additional information on how we categorized the large and commuter airlines, see app. I.

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FAA officials told us that they did not know why new airlines as a group experienced higher incident and enforcement rates, especially during their early years of operations. However, they theorized that new airlines may encounter more incidents because their fleets expanded faster than their organizational ability to absorb growth, train their staffs, and maintain their fleets. Other factors can also be a cause for concern and may warrant closer scrutiny. These include precarious financial conditions (which some new airlines encountered) or the level at which major functions, such as maintenance, are contracted out, which can lead to a loss of control or oversight—a concern that FAA recently acknowledged in its review of ValuJet Airlines.

FAA's national inspection guidelines in effect during the period of our review did not call for new airlines to be targeted for increased surveillance. In actual practice, from January 1990 through December 1994, FAA field offices inspected new large airlines, as a group, about 3 times as often on average as large established airlines, and it inspected new commuter airlines at about the same frequency on average as established commuters. However, no clear pattern in the inspection rates distinguished those airlines that had relatively high rates of incidents and enforcement actions from those that had few or no such problems. Some airlines with high incident and enforcement rates were inspected less frequently than the average, while other airlines with no accidents, incidents, or enforcement actions were inspected more frequently than the average.

For nearly a decade, we have reported on numerous shortcomings in FAA's aviation safety inspection program, some of which still exist. These include insufficient training of FAA safety inspectors, the inadequacy of aviation safety databases, and the need to improve the oversight of aging aircraft.<sup>4</sup> For example, as early as 1987, we identified the need for FAA to develop criteria for targeting safety inspections to those airlines which have characteristics that may indicate safety problems. We also noted that targeting is important because of the magnitude of FAA's inspection responsibilities.<sup>5</sup>

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<sup>4</sup>See Related GAO Products at the end of this report for a list of prior GAO reports and testimonies on the problems in FAA's inspection program.

<sup>5</sup>FAA employs about 2,500 aviation inspectors to oversee about 7,300 scheduled commercial aircraft, more than 11,100 charter aircraft, about 184,400 active general aviation aircraft, about 4,900 repair stations, slightly more than 600 schools for training pilots, almost 200 maintenance schools, and over 665,000 active pilots.

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Although FAA has taken steps to better target its inspection resources to the areas with the greatest safety risks, these efforts are still not complete. In 1991, FAA began developing the Safety Performance Analysis System (SPAS), which draws on information from a number of safety-related databases to better establish priorities for FAA's inspections. However, the system is not expected to be fully operational until 1999. Furthermore, some databases that may provide source data for SPAS contain incomplete, inconsistent, and inaccurate data. FAA has developed, but not yet implemented, a data quality improvement strategy to ensure that these source databases used for SPAS provide reliable information. Until the reliability of these databases is improved, the new targeting system will not realize its full potential to target FAA's resources to high-risk aviation activities. Moreover, once the reliability of the data is improved, they could be used to publish airline-specific safety information to help the traveling public in making transportation decisions.

Even with a resource-targeting system, FAA's inspectors must be properly trained to effectively carry out their responsibilities. In 1989, we reported that FAA's aviation safety inspectors were not receiving needed training.<sup>6</sup> On April 30, 1996, we testified that this problem continued, as some inspectors told us that they had not been trained on the specific types of aircraft that they were responsible for inspecting. We also testified that FAA's funding of technical training had been reduced by 42 percent from fiscal year 1993 through fiscal year 1996.<sup>7</sup> Moreover, the training problem could become worse in the future as FAA attempts to hire additional inspectors during a period of constrained budgets.

In the aftermath of the ValuJet accident, DOT and FAA undertook a number of initiatives related to FAA's inspection program. Specifically, on May 14, 1996, the Secretary of Transportation, in a memorandum for the President, outlined efforts to (1) accelerate the hiring of safety inspectors, (2) strengthen FAA's data collection and tracking systems, and (3) review FAA's inspection operations, including inspector training and assignments. On June 18, 1996, the FAA Administrator initiated a safety review that addressed, among other things, the certification of new airlines, resource targeting to address safety risks, newly certificated airlines' operations and growth, and inspector training and resources. This effort culminated in a September 16, 1996, report entitled FAA 90 Day Safety Review, which

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<sup>6</sup>Aviation Training: FAA Aviation Safety Inspectors Are Not Receiving Needed Training (GAO/RCED-89-168, Sept. 2, 1989).

<sup>7</sup>Aviation Safety: Targeting and Training of FAA's Safety Inspector Workforce (GAO/T-RCED-96-26, Apr. 30, 1996).



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addressed a number of long-standing problems and made over 30 recommendations. These initiatives, if properly implemented, have the potential to significantly improve the efficiency and effectiveness of FAA's safety inspection program.

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## Accident, Incident, and Enforcement Action Rates

The available data show that both new and established airlines experience accidents infrequently. Nevertheless, from 1990 through 1994, new airlines had an average accident rate of 0.60 per 100,000 departures compared with the established airlines' average rate of 0.36 per 100,000 departures.<sup>8</sup> However, NTSB's definition of accident can range from fatal crashes in which the aircraft is destroyed and all crew and passengers aboard are killed, to events where there is substantial damage to the aircraft but no fatalities or serious injuries, and to still others where only one person may suffer a broken bone, but the aircraft suffers no substantial damage. As a result, the use and interpretation of accident data require caution. Of the 201 accidents that occurred in 1990 through 1994, 45 involved fatalities, of which 5 involved new airlines.

Both new and established airlines had a higher number of incidents and enforcement actions from 1990 through 1994, thus providing much more information for analyzing safety trends. During 1990 through 1994, there were a total of 2,879 incidents and 3,982 enforcement actions. Both new large and commuter airlines experienced higher average rates of incidents and enforcement actions, as a group, than established large and commuter airlines. In particular, for new airlines, the rates of incidents and enforcement actions peaked during their early years of operations. However, there was some clustering of these events among the new airlines. More than half of the new airlines had no incidents during the period of our analysis, and 42 percent of the new airlines had no enforcement actions initiated against them. Thus, while these rates provide useful information for analysis, it would not be appropriate to conclude that new airlines provide unsafe service. (Detailed information on new airlines' and established airlines' departures, accidents, incidents, FAA-initiated enforcement actions, and their respective rates is contained in app. II.)

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<sup>8</sup>We analyzed data for all new and established airlines that provided scheduled domestic service during 1990 through 1994 and that reported data to DOT. We excluded air taxis and other nonscheduled airlines. Our universe of 262 airlines comprised 29 new large airlines, 60 large established airlines, 50 new commuters, and 123 established commuters. During the review period, 20 new airlines reached their sixth year of operations and were then analyzed as established airlines.

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## Accidents

In 1990 through 1994, NTSB reported 201 accidents by commercial airlines that provide scheduled service. Most airlines—both new and established—had no accidents during 1990-94. For example, among the 29 new large airlines in our review, 3 had accidents; the other 26 had no accidents during the 5-year period. Similarly, of the 50 new commuters, 7 had accidents. Of the 203 established airlines, 69 had accidents. The remaining 134 had no accidents.

Of the 201 accidents, 45 involved fatalities. These accidents ranged from 1 accident in which 132 people on board the aircraft were killed to 12 separate accidents in which 1 person was killed; in 8 of those 12 accidents, the person killed was not on board the aircraft. In one case, for example, an airline employee was killed after walking into a rotating propeller blade. The remaining 156 accidents involved serious injury and/or substantial aircraft damage.

New airlines experienced 13 of the 201 total accidents and 5 of the 45 fatal accidents. The new airlines' accidents resulted in a rate of 0.60 per 100,000 departures, while the established airlines' accidents resulted in a rate of 0.36 per 100,000 departures.<sup>9</sup> More specifically, new large airlines had an accident rate of 1.35 per 100,000 departures, while large established airlines had a rate of 0.30 per 100,000 departures. In contrast, new commuters had an accident rate of 0.48 per 100,000 departures, while established commuters had a rate of 0.46 per 100,000 departures.

Aware that the current definition of accident does not distinguish among the varying degrees of accidents' severity, NTSB and FAA have undertaken an effort to develop new subclassifications of aviation accidents. One option that has been explored is to define accidents according to the significance of damage, recording and grouping data accordingly. However, according to officials in FAA's Office of Accident Investigations and NTSB's Office of Research and Engineering, the results of the joint effort have not yet been completed, and no completion date has been set.

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## Incidents

During 1990 through 1994, new large and commuter airlines had incident rates that were, on average, 52 percent higher than those of established airlines (overall, a rate of 8.1 incidents per 100,000 departures compared

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<sup>9</sup>The number of accidents attributed to new and established airlines do not total to 201 for two reasons: (1) NTSB's accident information may have contained ambiguous data on the operator of the aircraft involved or (2) the airline may not have reported departure data for the period in which the accident occurred. Without departure data for the airline, we were unable to compute airline-specific accident rates, and consequently excluded the accident from our totals.

with a rate of 5.4 incidents per 100,000 departures for established airlines). For new large airlines, the incident rate was over twice that of large established airlines (a rate of 11.5 incidents per 100,000 departures compared with a rate of 5.1 incidents per 100,000 departures for large established airlines). The average incident rate for new commuters during 1990 through 1994 was also higher than that of established commuters, although the difference was not as great. (See table 1.)

**Table 1: Summary of Incidents and Incident Rates for New and Established Airlines, January 1990 Through December 1994**

Category of airline	Number of incidents		Incident rate per 100,000 departures	
	New	Established	New	Established
Large	34	1,721	11.50	5.13
Commuter	142	982	7.61	5.80
<b>Total</b>	<b>176</b>	<b>2,703</b>	<b>8.14</b>	<b>5.35</b>

Source: GAO's analysis of FAA's and DOT's data.

As with our analysis of accidents, these rates represent the combined experiences of the airlines in each of the different categories over the entire 5-year period. Of the new airlines, 38 (48.1 percent) experienced at least one incident sometime during 1990-94, while the other 41 experienced no incidents. Of the new airlines that experienced incidents, the incident rates ranged from 2.8 to 666.7 incidents per 100,000 departures.<sup>10</sup> Of the 203 established airlines, 162 (79.8 percent) had one or more incidents during the same period, while the other 41 experienced no incidents.

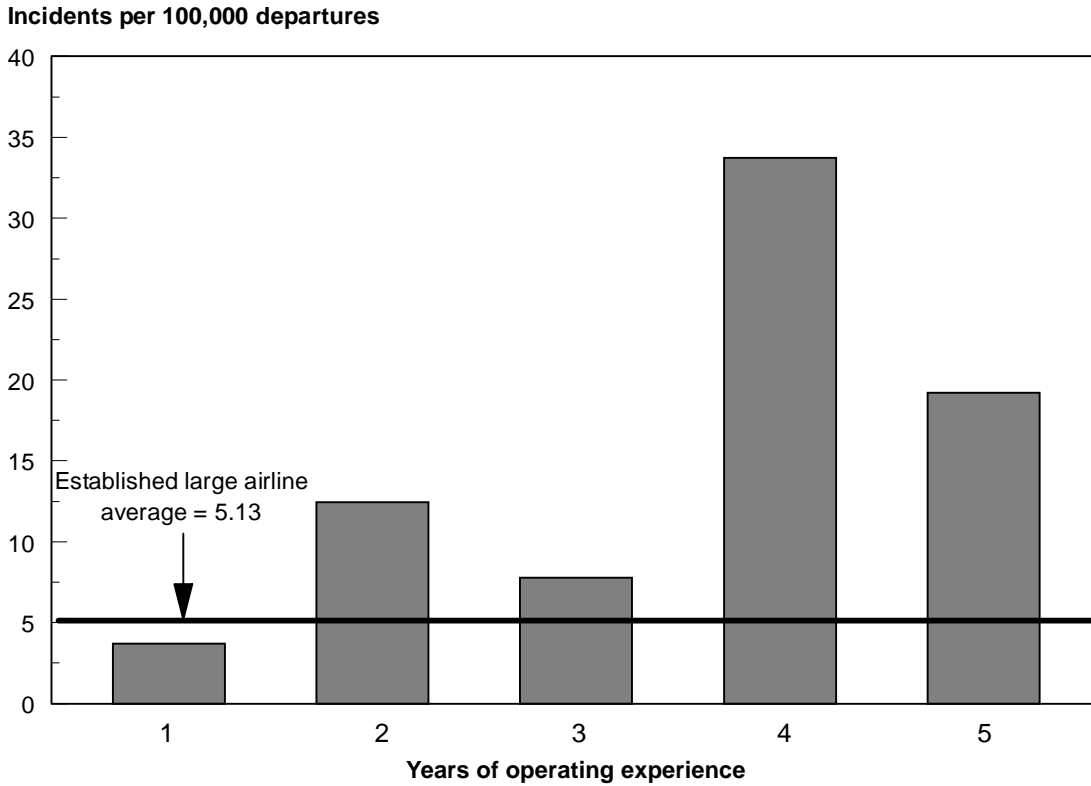
At certain times during their first 5 years of operations, new airlines that experienced incidents had rates that greatly exceeded the average rates for established airlines. For new large airlines, these times were during their second, fourth, and fifth years of operations. For example, the rate for new large airlines more than tripled between their first and second years of operations. Of the 18 new large airlines that had their second year of operations sometime during 1990 through 1994, 7 (38.9 percent) had incidents. The other 11 second-year new airlines had no incidents.

<sup>10</sup>The rate at the high end of the range (666.7 incidents per 100,000 departures) was for an airline that had very few departures. Specifically, that airline had one incident but only 150 departures. Other airlines that had relatively high incident rates also had a relatively low number of departures. Consequently, we aggregated the data for new large and commuter airlines into groups to deal with the statistical effects of this phenomenon.

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In commenting on a draft of this report, DOT noted that one adverse event for a new airline with a limited number of departures can significantly affect accident, incident, or enforcement rates. We agree that because new airlines have fewer departures, the rates at which they experience problems must be viewed with caution. Nevertheless, our review included the entire data sets of departures, accidents, incidents, and enforcement actions for new and established airlines for a 5-year period, and thus these data are important pieces of information in FAA's efforts to oversee the airline industry. The purpose of our analysis of these data was to assess analytically whether there were differences between new and established airlines overall that might warrant FAA's increased oversight of new airlines. Figure 1 shows the change in the incident rates for new large airlines over their first 5 years of operations and compares them with the average rate for large established airlines.

Figure 1: Average Incident Rates for New Large Airlines and Large Established Airlines, by Years of Experience

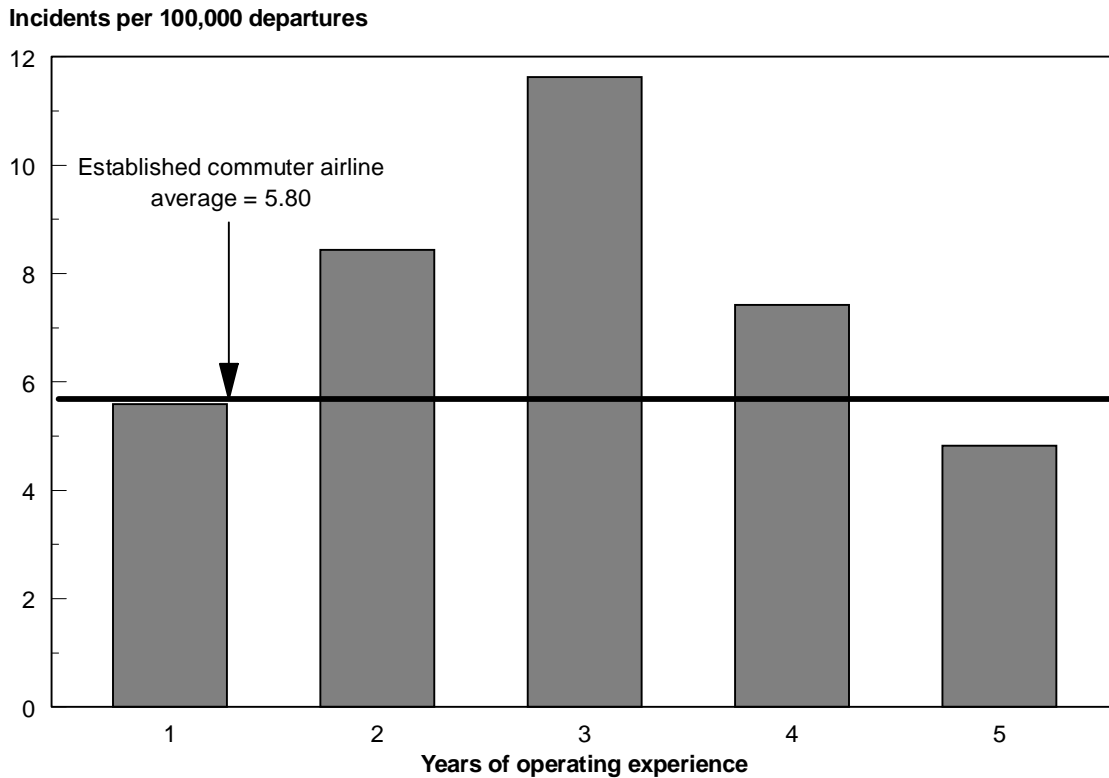


Source: GAO's analysis of DOT's and FAA's data.

For new commuters, the average incident rate during their first year of operations was about the same as for established commuters. But by their third year of operations, new commuters had an incident rate that was twice as great as the rate for established commuters (11.6 versus 5.8 per 100,000 departures) and more than twice the rate they experienced in their first year of operations. (Of the 23 new commuters that operated for at least 3 years during 1990 through 1994, 10 experienced incidents in their third year.) During the new commuters' fourth and fifth years of operations, the incident rate declined. Figure 2 shows the change in the

incident rates for new commuters over their first 5 years of operations and compares them with the average rate for established commuters.

Figure 2: Average Incident Rates for New and Established Commuters, by Years of Experience



Source: GAO's analysis of DOT's and FAA's data.

Our analysis did not specifically identify the reasons why new airlines experienced higher levels of incidents during certain periods of their first 5 years of operations. We discussed the results of our analysis with FAA officials. They said that they were unaware of these trends—they had not done an analysis similar to ours for new airlines—nor were they aware of any other studies addressing this issue. Nevertheless, they theorized that

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new airlines may encounter more incidents because their fleets expanded faster than their organizational ability to absorb the growth, train their staff, and maintain their fleets. Other factors can also be a cause for concern and may warrant closer scrutiny. These include precarious financial conditions (which some new airlines encountered) or the level at which major functions, such as maintenance, are contracted out, which can lead to a loss of control or oversight—a concern that FAA recently acknowledged in its review of ValuJet Airlines.

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## Enforcement Actions

FAA's compliance and enforcement program is designed to promote compliance with both statutory and regulatory requirements. Under this program, the agency may initiate enforcement actions in response to apparent or alleged violations of the laws governing federal aviation or of federal aviation regulations.

Enforcement actions may be initiated on the basis of FAA's inspection results or on information provided by other sources such as air traffic controllers or employees in the airline industry. Enforcement actions include administrative actions, such as warning notices and letters of correction; legal enforcement remedies, such as amending, suspending, or revoking airlines' operating certificates; and punitive actions, such as imposing civil (financial) penalties and temporarily suspending certificates. For example, FAA may pursue civil penalties against an airline that operates aircraft that are not airworthy, repairs equipment using unacceptable methods, or violates regulations on the transportation of hazardous materials. When an immediate safety need exists, FAA inspectors can also issue an emergency revocation order—the most severe action that can be taken against a domestic airline—to prevent an airline from conducting flight operations.

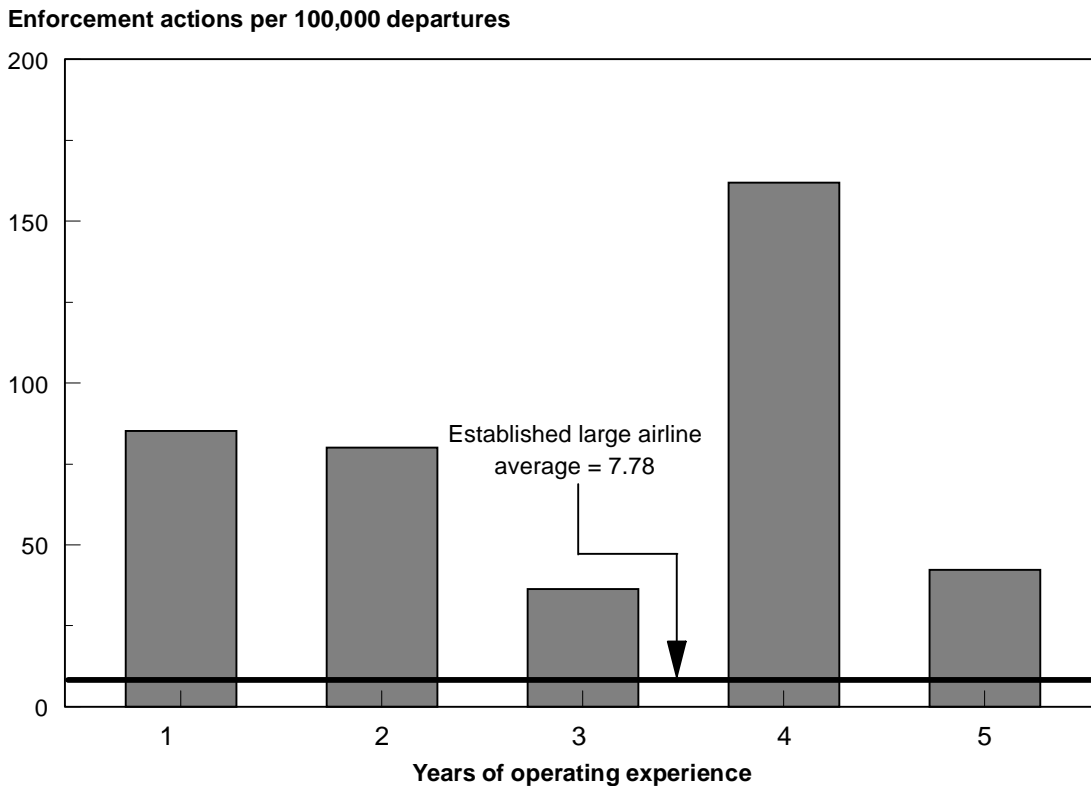
In 1990 through 1994, FAA initiated twice the rate of enforcement actions against new airlines as a group than it initiated against established airlines.<sup>11</sup> FAA initiated 14.8 enforcement actions per 100,000 departures against new airlines and 7.3 per 100,000 departures against established airlines. In addition, just as both new large and commuter airlines experienced elevated rates of incidents during their early years of operations, they also experienced higher rates of enforcement actions during their early years of operations.

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<sup>11</sup>According to FAA, a lag as long as 2 to 3 years may occur between the time that an enforcement action is opened and the case is closed. Accordingly, we used actions initiated rather than cases closed as our measure because cases initiated in 1994 may not be closed.

FAA initiated considerably higher rates of enforcement actions against new large airlines, as a group, than it did against large established airlines. In 1990 through 1994, new large airlines had 8 times more enforcement actions than their established counterparts—an average of 64.3 actions initiated against them per 100,000 departures compared with 7.8 actions per 100,000 departures for large established airlines. Figure 3 shows the change in the rate of enforcement actions initiated against new large airlines during their first 5 years of operations.

**Figure 3: Average Annual Enforcement Actions That FAA Initiated Against New Large Airlines During Their First 5 Years of Operations**



Source: GAO's analysis of DOT's and FAA's data.



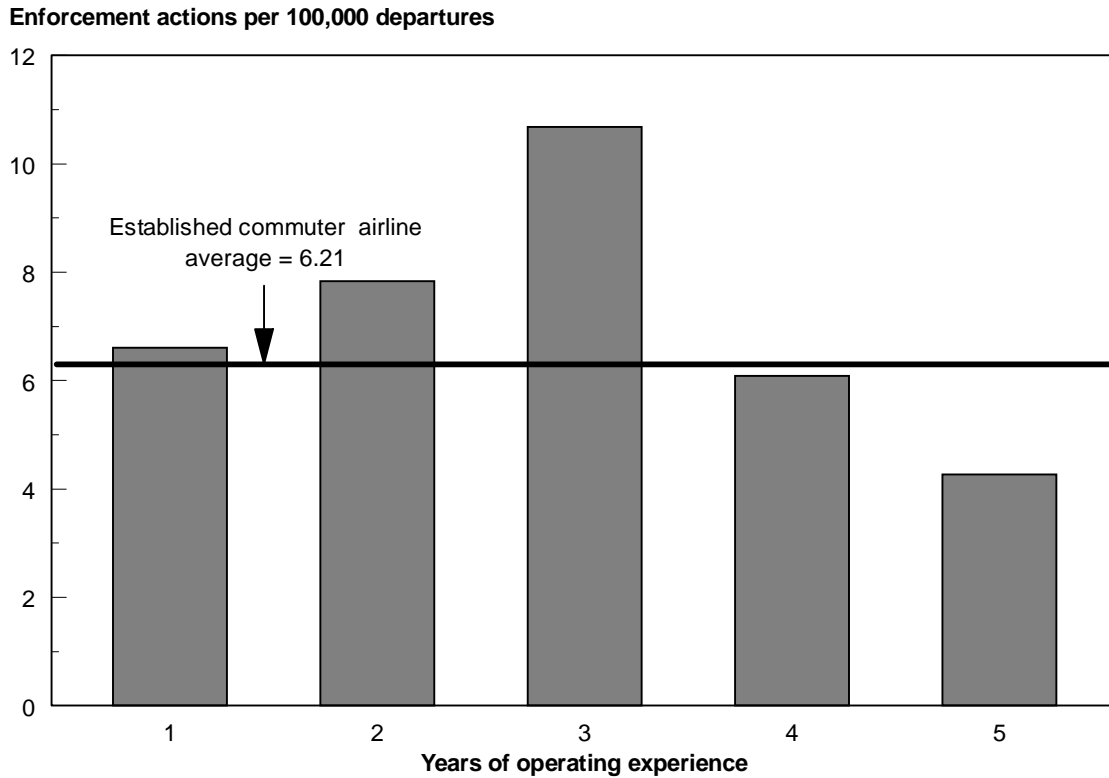
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Most of the enforcement actions that FAA initiated against new large airlines were concentrated among relatively few airlines. Of the 190 total enforcement actions initiated against new large airlines during the period, FAA initiated 141 (74.2 percent) against 10 airlines and 49 against 11 other airlines. FAA initiated no enforcement actions against eight airlines that were new airlines during the period.

FAA initiated relatively fewer enforcement actions against both new and established commuters, and the difference in the average number of enforcement actions initiated was smaller. In 1990 through 1994, FAA initiated an average of 7.0 enforcement actions against new commuters per 100,000 departures compared with 6.2 against established commuters per 100,000 departures.

As with incident rates, new commuters tended to experience rising rates of enforcement actions until after their third year of operations. Figure 4 shows the incidence of FAA-initiated enforcement actions during the new commuters' first 5 years of operations. FAA initiated an average of 10.7 enforcement actions against new commuters during their third year of operations—more than 70 percent higher than the average rate for established commuters. During the new commuters' fourth and fifth years of operations, the rate of enforcement actions initiated declined markedly.

**Figure 4: Average Annual Enforcement Actions That FAA Initiated Against New Commuters During Their First 5 Years of Operations**



Source: GAO's analysis of DOT's and FAA's data.

Similar to the pattern observed for new large airlines, most of the enforcement actions were initiated against relatively few new commuters. Of the 130 total actions initiated against new commuters in 1990 through 1994, FAA initiated 106 (81.5 percent) against 10 airlines; the other 24 enforcement actions were divided among another 15 airlines. FAA initiated no enforcement actions against the remaining 25 new commuters.

FAA's data reveal that most enforcement cases initiated against scheduled airlines resulted in administrative actions, rather than other actions. Of the

total 2,286 enforcement cases that had been initiated in 1993 for which data on final action are available, 1,538 (67.3 percent) concluded with an administrative action, 84 (3.7 percent) concluded with a civil penalty, 79 (3.5 percent) concluded with a certificate suspension, and 18 (0.8 percent) concluded with a revocation. In another 567 cases (24.8 percent), FAA took no action.

## FAA's Policies Did Not Target New Airlines for Increased Surveillance

FAA is responsible for promoting safety in air transportation, and the airlines are responsible for operating their aircraft safely in compliance with the requirements in title 14 of the Code of Federal Regulations that cover the aircraft and its systems, maintenance, and personnel and training. FAA oversees the airlines' programs by monitoring the safety of all operating airlines and conducting periodic inspections.

FAA's national inspection guidelines in effect during the period of our review, which set priorities and established a minimum standard for the number and type of inspections, did not call for new airlines to be inspected any differently from established airlines. However, the guidelines grant latitude to FAA's regional and district offices to identify the areas that they determine to be important in the interest of safety. This discretionary surveillance allows inspectors and their supervisors at FAA's field offices to develop work programs that can be tailored to their particular environments and be balanced against such competing priorities as accident investigations.

Over the years, FAA has targeted specific airlines and areas of commercial airline operations for increased surveillance on the basis of a variety of factors. For example, FAA has used an increased frequency of noncompliance with federal aviation regulations, an increased frequency of incidents by individual airlines, the deteriorating financial conditions of individual airlines, and non-airline-specific attributes (such as aging aircraft) to target its surveillance activities. However, FAA has not compared the performance characteristics of new airlines, as a group, with those of established airlines to determine whether new airlines should be targeted for increased surveillance. In general, we found that in 1990 through 1994, FAA's field offices inspected new large airlines, as a group, more frequently than large established airlines. On average, for large airlines, FAA conducted one inspection for every 20.3 new airline departures and one for every 65.5 established airline departures. For new commuters FAA conducted, on average, one inspection for every 113.1 departures and for established commuters, one inspection for every 107.8

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departures. However, there was considerable variation in the relative frequency with which FAA inspected individual airlines. At the extremes, the data showed that a few airlines received more than one inspection for every departure, while a few others made hundreds of flights between inspections.

FAA's inspection effort also varied widely among the new airlines that had the greatest average annual number of departures. Of the 10 new large airlines with the highest average number of departures, inspection rates ranged from once every 8 departures to once every 92 departures. Similarly, of the 10 new commuters with the highest average number of departures, the data indicate that FAA's inspection rates ranged from once every 38 departures to once every 340 departures.

We also found no clear pattern between inspection rates and the airlines' rate of incidents or FAA-initiated enforcement actions. For example, among the 17 new large airlines responsible for 85 percent of the incidents and enforcement actions in 1990 through 1994, the frequency of inspections varied from one inspection for every two departures to one inspection for every 66 departures. Similarly, among the 13 new commuters that accounted for approximately 80 percent of the incidents and enforcement actions initiated against that group, the frequency of inspections varied from one inspection for every 21 departures to one inspection for every 188 departures. On the other hand, some airlines that had had no accidents, incidents, or enforcement actions initiated against them were inspected by FAA once every several hundred departures. One other, however, was inspected every two departures. More specifically, of the seven new large airlines that were inspected less frequently than the average for all new large airlines, one—ValuJet—had an incident rate that was 40 percent higher than average, but it was inspected only about one-third as frequently as all new large airlines through calendar year 1994. For new commuters, 8 of the 17 that were inspected less frequently than average had incident or enforcement action rates that were higher than average. FAA officials told us that the low inspection rates for new airlines with relatively high problem rates may be due to the fact that some new airlines, particularly new commuters, may serve airports that are not closely located to the field office where their inspectors are assigned.

The recent disclosures about safety problems at ValuJet Airlines and FAA's oversight of ValuJet illustrate the need for FAA to closely monitor new airlines. ValuJet began operations in October 1993 with 2 aircraft and expanded its operations to 47 aircraft about 2 years later. In October 1994,

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FAA conducted a detailed inspection of ValuJet and found 35 violations of FAA's air safety regulations. The two most serious violations—flying an aircraft with broken forward and aft cargo door locks and flying an aircraft over 140 flights with a leaking hydraulic line—resulted in a fine of \$8,500. In September 1995, FAA conducted another detailed inspection of ValuJet and found 58 violations, including the absence of a continued analysis and surveillance program, conflicts between the airline's general maintenance manual and the federal aviation regulations, and the conduct of maintenance with unapproved procedures.

In February 1996, FAA initiated a "special emphasis program" for ValuJet. The May 6, 1996, preliminary report on this effort identified 130 findings on several aspects of ValuJet's operations, including flight operations training, crew qualifications, manuals and procedures, and maintenance. After the May 11, 1996, crash, which killed all 110 passengers and crew, FAA intensified its special emphasis review through an intensive 30-day review of ValuJet and its fleet. That review led to a June 1996 consent order, under which ValuJet agreed to suspend its operations. FAA's announcement of ValuJet's agreement cited multiple quality assurance shortcomings, systemwide maintenance deficiencies, the inability to establish the airworthiness of aircraft, and a lack of engineering capability. On August 29, 1996, FAA returned ValuJet's operating certificate, permitting it to resume operations if the airline was found managerially and financially fit by DOT. On the same day, DOT issued an order tentatively finding ValuJet fit, willing, and able to provide domestic scheduled air service. Under agreement with FAA, upon returning to service, ValuJet would operate a substantially smaller fleet, starting with up to nine aircraft and adding up to six more within the following days. ValuJet resumed limited flight operations on September 30, 1996.

FAA's 90 Day Safety Review recognized that FAA's surveillance system does not differentiate between established airlines and newly certificated airlines and stated that additional surveillance during the first several years of operations is warranted. The safety review recommended a heightened level of surveillance of newly certificated airlines for at least the first 5 years of the companies' operations.

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## Long-Standing Problems Limit Effectiveness of FAA's Inspection Program

To do its job effectively, and because its resources are limited, FAA must target its inspectors to the areas of greatest risk. To do so, FAA needs to have performance-based criteria to gauge various aspects of aviation safety, and the criteria or measures of safety must be underpinned by reliable data. Even if FAA inspectors are targeted to the areas of greatest risk, they must be adequately trained to effectively carry out their responsibilities. For nearly a decade, we have reported on long-standing shortcomings in these two areas. Although FAA has agreed with most of our recommendations and taken actions to implement them, until all of these problems are effectively resolved, the effectiveness of FAA's inspection program will be limited.

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## Targeting System Requires Reliable Data

In 1987, we reported on the need for FAA to develop criteria for targeting safety inspections to airlines with characteristics that may indicate safety problems.<sup>12</sup> In 1991, FAA began designing a resource-targeting system called the Safety Performance Analysis System, but it is not yet fully operational. As of August 1996, SPAS was in place and undergoing operational tests at 47 field offices. FAA expects the next version of SPAS to be available to inspectors in late 1997 and the system to be fully operational in 1999.

When fully operational, SPAS could rely on over 25 databases within FAA, other government agencies, and the aviation industry, including, potentially, the Improved Accident/Incident Data Subsystem and the Enforcement Information Subsystem. The current SPAS version uses four: the Program Tracking and Reporting Subsystem (in which inspection results are entered), the Vital Information Subsystem (which contains key data on such items as airlines, pilot and mechanic schools, and repair stations), the Service Difficulty Reporting Subsystem (which contains data on instances of abnormal and potentially unsafe mechanical conditions aboard aircraft), and a non-FAA database of information and analyses on financial credit risks.

Building on inspection results and other data, SPAS is intended to assist FAA in applying its limited inspection resources to those entities and areas that pose the greatest risk to aviation safety. The system is also expected to highlight particular types of aircraft or particular airlines for increased surveillance (inspection) or oversight if they are experiencing problems at rates that exceed the averages for that group. Specifically, if problems in a

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<sup>12</sup>See Department of Transportation: Enhancing Policy and Program Effectiveness Through Improved Management (GAO/RCED-87-3, Apr. 13, 1987).

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particular inspection category are found at rates exceeding 50 percent of the average experience for that group, the SPAS will trigger “advisory” notifications to the inspector that he or she should look into the situation. If problems are found at rates exceeding 100 percent of the average, the system will trigger a notice of “concern” (alert) to the principal inspectors, who are to respond with a written plan of action.

In a 1995 report, however, we concluded that SPAS will not be effective if the quality of its source data is not improved.<sup>13</sup> Specifically, we reported that SPAS may rely on data from numerous databases that contain incomplete, inconsistent, and inaccurate data. To address these concerns, we recommended that FAA develop and implement a comprehensive strategy to improve the quality of those data. FAA agreed to this recommendation and stated that such a strategy would be developed by the end of 1995.

In August 1996, FAA reported that this strategy would not be completed until October 1996. The strategy is to provide clear and measurable data quality objectives, accurate assessments of the quality of the current data in each database (including an analysis and possible redirection of FAA’s existing data quality improvement initiatives), milestones for attaining the stated quality objectives, and estimates of the resources required. An FAA official said that implementation would begin immediately afterward. Until FAA implements its data quality improvement strategy, problems with data quality may limit SPAS’ usefulness and prevent it from realizing its full potential to target resources to higher-risk activities.

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## Inspectors Must Be Adequately Trained

Although FAA management officials told us that inspectors generally have the experience and basic training necessary to accomplish their mission, we and others have reported for several years that FAA’s aviation safety inspectors are not receiving needed training. For example, in 1989 we reported that (1) pilot flight checks were being made by operations inspectors who had not received recurrent flight training and whose qualifications to make pilot flight checks had expired and (2) airworthiness inspectors received only about 50 percent of the training that was planned for them. Recognizing that some of its employees had received expensive training they did not need to do their jobs while others did not receive essential training, in 1992 FAA developed a centralized process to determine, set priorities for, and fund its technical training

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<sup>13</sup>Aviation Safety: Data Problems Threaten FAA Strides on Safety Analysis (GAO/AIMD-95-27, Feb. 8, 1995).

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needs. This centralized process is intended to ensure that funds are first allocated for the training that is essential to fulfilling FAA's mission. In accordance with this process, each FAA entity has developed a needs assessment manual tailored to the entity's activities and training needs. In addition, FAA is also providing training through such alternative methods as computer-based instruction, interactive classes televised via satellite, and computer-based training materials obtained from manufacturers. Although these initiatives can help improve the efficiency of FAA's training programs, we testified in 1996 that the adequacy of inspector training continues to be a concern.<sup>14</sup>

During the course of our work on new airlines, we interviewed 37 FAA inspectors who were involved with the initial certification or continuing surveillance of new airlines. Although the results of these interviews are not projectable to the universe of inspectors, they do indicate a continuing concern among FAA safety inspectors about the adequacy of the training they receive. Sixteen of the inspectors said they had gaps in training that affected their effectiveness in doing their jobs. For example, one inspector requested training on Airbus aircraft when the airline he inspected began using that aircraft, but he did not receive the training until 2 years after the airline went out of business. In another case, a maintenance inspector told us he was responsible for inspecting several commuter airlines but had never attended maintenance training school for the types of aircraft he inspects. Instead, FAA sent the maintenance inspector to training on Boeing 727s and composite materials, which were not related to the aircraft he was responsible for. Finally, several inspectors told us that despite their responsibility to approve global positioning system receivers, a navigational system increasingly being used in aircraft, they have had no formal training on this equipment.

We also reported that in fiscal years 1993 through 1996, decreases in FAA's overall budget have significantly reduced the funding available for technical training. FAA's overall training budget decreased from \$147 million to \$85 million (42 percent) during this period. FAA's reduced funding for technical training has occurred at a time when it had received congressional direction to hire over 230 additional safety inspectors in fiscal year 1996. Because new staff must be provided with initial training to prepare them to perform their duties effectively, the cost of this training, combined with overall training budget reductions, may further

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<sup>14</sup>Aviation Safety: Targeting and Training of FAA's Safety Inspector Workforce (GAO/T-RCED-96-26, Apr. 30, 1996).



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constrain FAA's ability to provide training to its existing inspectors in the future.

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## Inspection Program Identified for Increased Management Oversight

The Federal Managers' Financial Integrity Act of 1982 (FMFIA) requires that executive agencies prepare an annual statement on the adequacy of internal controls based on assessments conducted in accordance with Office of Management and Budget (OMB) Circular A-123. FMFIA and the circular require that the agency's annual statement on internal controls include a description of any material weaknesses (and related plans for corrective actions) identified as part of the internal control assessment process. Under OMB Circular A-123, agency managers are requested to use Inspector General reviews and GAO reports to help them identify and correct deficiencies in management controls. In addition, the circular states that the agency should pay particular attention to the views of the agency's Inspector General in identifying and assessing the relative importance of deficiencies in management controls. According to OMB's guidelines, management control weaknesses are material when the weaknesses meet one or more of the following criteria, among others: Weaknesses are significant enough to be reported to the President or the Congress; resources are not being used consistently with the agency's mission; reliable and timely information is not being obtained, maintained, reported, and used for decision-making; and a failure to report a known deficiency may reflect adversely on the agency.

In December 1993, the DOT Inspector General stated that FAA's oversight and inspection program represented both a material weakness and a high-risk area reportable to the President and the Congress. The Inspector General cited several GAO and Inspector General reports as the basis for this conclusion and identified the need for FAA to (1) target inspection resources to areas posing the greatest risks, (2) accomplish planned/targeted inspections, (3) perform quality inspections, (4) record deficiencies and ensure that they are corrected, (5) resolve inspection staff imbalances and retrain or refocus inspectors where necessary, and (6) enforce certification requirements relating to aviation parts. The Secretary of Transportation's 1993 FMFIA report to the President stated that the DOT Inspector General and GAO had identified deficiencies in some program areas administered by the FAA (e.g., Aviation Inspection and Airport Security) and that, taken as a whole, the deficiencies that were identified may constitute "material weaknesses" in a "high-risk" area. The report, however, did not identify FAA's oversight and inspection program as a "high-risk" area. The Secretary stated that FAA was actively reviewing all

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of the issues within the context of FMFIA reporting requirements and that these issues would be reflected in future FMFIA reports, as appropriate.

In December 1994, the Inspector General again identified FAA's aviation oversight and inspection activities as a "high-risk" area and recommended that the Secretary of Transportation include FAA's safety oversight and inspection activities as a "high-risk" area in DOT's 1994 FMFIA Report to the President and the Congress. The FAA Administrator, however, disagreed with the Inspector General's position, stating that there was an insufficient basis to conclude that the FAA's safety and inspection program was a "material weakness" as defined by FMFIA. The Secretary of Transportation's 1994 FMFIA report to the President stated that he continued to be concerned about ensuring that the aviation oversight and inspection program meets the highest standards, but did not designate this program as "high risk," concluding that no new areas of "material weakness" were reported that year.

For 1995, the DOT Inspector General did not specifically cite FAA's aviation oversight and inspection activities in her December 1995 letter to the Secretary on FMFIA issues. However, she stated that past and ongoing work indicated that significant management weaknesses existed in many of the Department's safety programs and recommended that safety oversight be reflected in the Secretary's FMFIA report as a "problem area." An official of the DOT Inspector General's office told us that a "problem area" is not as serious a designation as a "high risk" or "material weakness." The Secretary's 1995 FMFIA report, however, did not discuss safety oversight. Beginning August 1, 1996, OMB no longer requires agencies to designate "high-risk" areas in their FMFIA reports. Agencies will still be required, however, to report any "material weaknesses" in their internal controls. However, as discussed in the following section, DOT and FAA have recently undertaken a number of initiatives that, taken together, have the potential to address these concerns.

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## Recent Initiatives Address Long-Standing Problems

In a May 14, 1996, memorandum for the President, the Secretary of Transportation outlined several initiatives to strengthen FAA's inspection operations. These initiatives included accelerating the hiring of additional aviation safety inspectors; examining FAA's computer systems and developing a comprehensive strategy for upgrading FAA's computer tracking and data systems; and conducting a comprehensive review of FAA's inspection operations, including reviewing inspector training and work assignments.

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Between May 28 and June 7, 1996, FAA's Flight Standards Service conducted a self-assessment that looked at various issues, including the effectiveness of inspector training. A number of recommendations to improve training resulted from the process, including defining requirements for the currency and recurrent training needs of safety inspectors. FAA plans to implement all of these recommendations within 2 years.

On June 18, 1996, the FAA Administrator initiated a safety review on "lessons learned" from FAA's oversight experience with ValuJet—the FAA 90 Day Safety Review. On September 16, 1996, FAA's Deputy Administrator issued a report that addressed the certification of new airlines, resource targeting to address safety risks, newly certificated airlines' operations and growth, contracting out, inspector training and guidance material, and inspector resources. The report made over 30 recommendations and included proposed implementation strategies.

For example, the report noted that FAA could improve its resource targeting to address safety risks and that the only way to significantly improve aviation safety is through changing FAA's methods of assessing risk and using new analysis techniques on more complete data. The report said that using systems such as SPAS will allow FAA to more effectively use inspection, surveillance, and enforcement resources where they are most likely to improve safety.

While recognizing that the inspector workforce is central to FAA's ability to ensure compliance and maintain a high level of safety, the report also acknowledged that inspector levels have historically been understaffed. It also recognized that FAA's training programs do not always provide the frequency of training or meet the specific needs identified by employees, managers, and industry. It included recommendations to ensure that FAA's resources and training are adequate to meet safety requirements.

As noted in the 90 Day Safety Review, an effective inspection program requires a stable source of financing. The recently signed Federal Aviation Reauthorization Act of 1996 creates a National Civil Aviation Review Commission that will analyze financial needs and safety trends and make specific recommendations for change. Recent experience with the lack of authority to collect aviation excise taxes underscores the need to develop a long-term financing solution for FAA that will ensure adequate funding of aviation inspectors and required training.

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Similarly, the report concluded that no guidance directs FAA to maintain heightened surveillance during a new airline's formative years, when it may be the most unstable. The report recommended heightened levels of surveillance of newly certificated airlines during the first 5 years of the companies' operations and periodic reviews of new airlines that assess management, financial, and operational capabilities.

The Administrator endorsed the recommendations and called for the development of a strategy and timetable to implement the recommended actions. Once implemented, he wrote, these actions will enhance FAA's ability to target resources more strategically and to respond more rapidly to changes in the aviation industry.

Following the crash of TWA Flight 800 on July 25, 1996, the President established a commission headed by the Vice President (commonly known as the Gore Commission) to review aviation security and safety. The Commission is scheduled to issue its final report early next year.

In our opinion, these initiatives, taken together, have the potential to address several of FAA's long-standing problems.

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## Publishing Airline-Specific Safety Data

DOT regularly publishes certain consumer-related information on individual airlines—such as information on on-time performance and lost luggage. Consumer advocates, academics, and some Members of Congress have expressed an interest in having FAA publish airline-specific safety data. The aviation system safety indicators that FAA already publishes, such as accident rates, incident rates, near mid-air collisions, and pilot deviations, are aggregated rather than published on an individual airline basis.

The FAA Administrator and other FAA officials have raised concerns about the potential negative effect of publishing airline-specific safety data. For example, under the Flight Operations Quality Assurance (FOQA) initiative, FAA is encouraging the airlines to monitor and analyze flight data recorder information to determine aviation system weaknesses before they become incidents or accidents. Because the airlines might react negatively to how such data would be used, FAA officials have said that airlines might be hesitant to share such information, which would impair FAA's efforts to improve the system's overall safety. We recognize FAA's desire to obtain such information from the airlines on a voluntary basis. However, FAA's mission to promote air safety argues that it should have access to whatever data that can help it to better improve air safety. If the airlines

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do not choose to share such data voluntarily, FAA could pursue the appropriate regulatory or legislative remedies to gain such access.

Before publishing airline-specific safety data, FAA would need to address a number of issues. First, FAA would need to develop a consensus among the affected and interested parties (airlines, passengers, aviation safety system analysts, etc.) on the most appropriate criteria for measuring airline safety performance. Second, FAA would need to gather and analyze the data and develop a monitoring system to verify the completeness and accuracy of the data. Third, FAA would need to take appropriate measures, including enforcement actions, where necessary to ensure that airlines comply with data requirements.

While such an endeavor is a formidable task, the benefits could be substantial. It would not only allow FAA to publicly disclose airline-specific safety data to help the public in making transportation decisions but, just as importantly, better equip FAA to identify and preemptively act on emerging aviation safety trends. FAA's current effort to develop a strategy to improve the quality of SPAS databases is an important step that can help solidify the foundation on which an airline-specific safety analysis and a public reporting system would potentially be based.

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## Conclusions

New airlines face a formidable challenge in beginning and sustaining operations, managing growth, and developing their management and maintenance infrastructures. The recent disclosures about ValuJet and FAA's oversight of this airline reinforce this point. Our analysis of new airlines over a 5-year period shows that, on average, they experienced higher rates of incidents and FAA-initiated enforcement actions than established airlines, particularly during their early years of operations. While such information can be useful for better targeting FAA's inspection resources, it does not mean that new airlines are unsafe.

FAA's policies that were in effect during the period of our review did not call for new airlines to be monitored any differently from established airlines, and actual inspection rates varied widely among new airlines—some airlines with high incident and enforcement action rates were being inspected less frequently than airlines with few or no such problems. We believe that the basic challenges of starting a new airline, and the overall results of our analysis, argue for closely monitoring the performance of new airlines during their first several years of operations and conducting increased or comprehensive inspections of those airlines

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with elevated rates of safety-related concerns. The recent disclosures about ValuJet reinforce this argument. FAA's 90 Day Safety Review recommended heightening the level of surveillance of newly certificated airlines for at least the first 5 years of the airlines' operations. This recommendation is consistent with our observations and, if properly implemented, would largely address our concerns in this area.

On a broader scale, serious problems that hamper the effectiveness of FAA's aviation safety inspection program have remained unresolved for nearly a decade. While FAA has taken steps to better target its inspection resources and has evaluated safety inspector training and work assignments, concerns in those areas have persisted for years and a number of unresolved issues remain.

DOT and FAA have recently undertaken a number of initiatives to address these and other problems, with the FAA 90 Day Safety Review making over 30 recommendations for improvement. We believe that these initiatives have the potential to significantly improve FAA's inspection program, but only if they are effectively implemented. We believe that, to be effective, DOT's and FAA's implementation strategy must be underpinned by (1) clear goals and objectives with measurable performance elements, (2) a monitoring and evaluation element to measure progress, and (3) a reporting mechanism to keep the Secretary of Transportation and the Congress informed about progress and problems.

Resource constraints resulting from budgetary reductions in such areas as safety inspector training provides a continuing challenge for FAA. Evaluating the use of and managing existing resources as efficiently as possible is important given the current tight budget situation. Such evaluations could also provide the basis for reprogramming funds to meet critical safety-related needs, or to justify the need for additional resources should they be found necessary.

Public concern about the safety of the nation's aviation system has escalated over the last several months as a result of the ValuJet and TWA crashes, and several groups have expressed interest in having FAA publish airline-specific safety data. While FAA would have to address a number of issues—including gaining consensus on safety parameters, obtaining and verifying data, and ensuring that airlines comply with requirements—before publishing such data, we believe that the time has come for FAA to begin the process that can lead to publishing such data. One step in this process would involve NTSB's and FAA's ongoing effort to

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refine the definition of accident, but the completion date for this effort has not been established.

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## Recommendations

We recommend that the Secretary of Transportation instruct the Administrator of FAA to (1) closely monitor the performance of new airlines, particularly during the early years of operations, and conduct increased and/or comprehensive inspections of those new airlines that experience elevated rates of safety-related problems; (2) evaluate the impact of recent budget reductions on FAA's critical safety-related functions, including—but not limited to—inspector training, and report the results to the Congress through the appropriations process; and (3) study the feasibility of developing measurable criteria for what constitutes aviation safety, including those airline-specific safety-related performance measures that could be published for use by the traveling public.

Furthermore, to ensure the timely and effective implementation of the recommendations included in FAA's 90 Day Safety Review, we recommend that the Secretary of Transportation require the Administrator of FAA to establish (1) clear goals and objectives addressing the safety review's identified problem areas; (2) measurable performance criteria to assess how the goals and objectives are being met; and (3) a monitoring, evaluation, and reporting system so that FAA's implementation of the recommendations contained in FAA's 90 Day Safety Review can be reported to the Secretary and the Congress on a regular basis.

We also recommend that the Chairman of NTSB and the Administrator of FAA jointly establish a date for completing the ongoing reevaluation of the definition of accident.

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## Agency Comments and Our Evaluation

DOT and FAA generally agreed with our findings, conclusions, and recommendations. However, they raised concerns about the statistical foundation of the report. Specifically, they noted that the number of accidents, incidents, and departures for new airlines is small in comparison to the number for established airlines and produces substantial negative bias in comparing accident and incident rates for new and established airlines. We agree that accident and incident rates based on relatively few departures are susceptible to large fluctuations and may not accurately predict longer-term performance, and we have noted that prominently in the report. However, our calculations included 100 percent

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of these events and not just a sample and therefore show the actual rates as of the period of our analysis. The analysis that is of concern to DOT and FAA provides additional evidence on how FAA might want to target inspection resources and, therefore, does not impact any of our conclusions or recommendations.

We have made a number of changes to the report on the basis of the events that have occurred since the draft was provided to DOT for comment on September 6, 1996, as well as DOT's written comments. Most notable among these events was FAA's publication of its 90 Day Safety Review on September 16, 1996. That review confirmed the validity of the major issues discussed in our report—the need to closely monitor the performance of new airlines during their early years of operations, as well as the need to better target FAA's resources, improve data quality, and ensure that FAA's resources and training programs are adequate to meet safety requirements.

Our September 6, 1996, draft of this report contained a proposed recommendation calling for FAA's aviation safety inspection program to be designated an area of material weakness in DOT's Federal Managers' Financial Integrity Act report. In light of the fact that FAA's 90 Day Safety Review recognized the long-standing concerns that gave rise to our proposed recommendation and made over 30 recommendations that, if properly implemented, have the potential to correct these problems, we have deleted that recommendation from our final report. However, we believe there is a need for continued vigilance on the part of DOT, FAA, and the Congress to ensure that the recommendations in the 90 Day Safety Review are effectively implemented in a timely manner. Consequently, we have added a recommendation that calls for FAA to report periodically to the Secretary of Transportation and the Congress on its progress in implementing the recommendations from the 90 Day Safety Review.

A copy of DOT's comments is included as appendix III.

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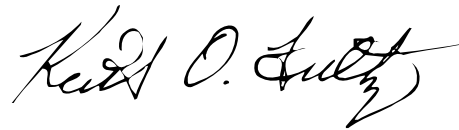
We conducted our review from August 1995 through September 1996 in accordance with generally accepted government audit standards. A detailed discussion of our objectives, scope, and methodology appears in appendix I.

We will send copies of this report to the Secretary of Transportation; the Administrator, FAA; the Chairman, NTSB; the Director, Office of



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Management and Budget; and other interested parties. We will also make copies available on request. This report was prepared under the direction of John H. Anderson, Jr., Director, Transportation Issues, who can be reached at (202) 512-2834 if you have any questions. Other major contributors to this report are listed in appendix IV.



Keith O. Fultz  
Assistant Comptroller General

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**Abbreviations**

BTS	Bureau of Transportation Statistics
DOT	Department of Transportation
EIS	Enforcement Information System
FAA	Federal Aviation Administration
FMFIA	Federal Managers' Financial Integrity Act
FOQA	Flight Operations Quality Assurance
GAO	General Accounting Office
NTSB	National Transportation Safety Board
OMB	Office of Management and Budget
OST	Office of the Secretary of Transportation
PTRS	Program Tracking and Reporting Subsystem
SPAS	Safety Performance Analysis Subsystem

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# Objectives, Scope, and Methodology

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The former Chairman, Subcommittee on Aviation, House Committee on Public Works and Transportation, asked us to examine, as the second segment of work addressing issues concerning the Federal Aviation Administration's (FAA) oversight of new airlines, the agency's efforts to ensure that new airlines meet safety standards. As agreed with the Subcommittee's staff, we also addressed this report to the current Chairman and Ranking Democratic Member of the Subcommittee on Aviation.

To address this issue, we focused on three questions: Did new airlines perform differently from established airlines during the 5-year period between January 1, 1990, and December 31, 1994, with regard to accidents, incidents, and enforcement actions?<sup>1</sup> At what frequency does FAA inspect new airlines compared with established airlines? And what impediments hinder the effectiveness of FAA's overall safety inspection program?

Before we were able to answer the first question, we had to determine which airlines were "new airlines." We defined a new airline as one that provided scheduled domestic air service for 5 or fewer years at any time from the beginning of 1990 to the end of 1994. For example, an airline that began service in 1994 would be considered a new airline, since its first year of operations was within the study period. Similarly, an airline that began operating in 1986 would also be considered a new airline in our analysis of 1990 data, because that airline's fifth year of operations occurred in 1990. However, beginning with the analysis of 1991 data, that same airline's operations would then be included in the comparison group of established airlines—those that had provided scheduled domestic service for more than 5 years during the 1990-94 period. Thus, we considered any airline that began scheduled operations between January 1986 and December 1994 to be a new airline during relevant portions of the 1990-94 period.

This definition of new airline differs from that normally applied in other aviation safety research. Those studies have tended to define new airlines as being airlines that began interstate operations following the Airline Deregulation Act of 1978. However, airlines such as Southwest Airlines that began interstate operations immediately after that act have now been operating for nearly two decades. We believe that a review that focuses more on airlines with considerably fewer years of experience would provide more insight into the safety performance of new airlines. We

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<sup>1</sup>We selected the period 1990 through 1994 for the analysis because those were the latest years for which we could obtain complete data for all accidents, incidents, and enforcement measures across all of the databases used.

discussed our definition of new airlines with FAA, the Department of Transportation (DOT), and the National Transportation Safety Board (NTSB), none of whom raised any objection or concern.

To determine which specific airlines should be designated as new airlines and which should be designated as established airlines, we reviewed records from DOT's Airline Fitness Division within the Office of the Secretary of Transportation (OST), the Bureau of Transportation Statistics (BTS), and FAA to develop a list of airlines subdivided into large and commuter new airlines and large and commuter established airlines. First, we obtained historical information from OST's files on airlines that it had found "fit" and to which DOT had issued operating authority. We initially included as new airlines those that OST had recertificated following a substantial change in their operations. Second, we used industry financial and operating records from BTS to help determine the year in which airlines began scheduled operations, and divided the airline list into "new" and "established" by the year indicated in the records.<sup>2</sup> Because none of the automated databases we analyzed recorded any specific distinction between scheduled commuter airlines and on-demand air taxi services (i.e., chartered airlines), we relied on FAA officials to provide this distinction. As a result, we eliminated on-demand airlines from our list. However, some commuters that operated as both commuters and on-demand airlines at different points during our 5-year period are included among our group of established commuters. BTS and FAA verified our airline lists.

At FAA's suggestion, we made two additional adjustments to our list of new airlines. First, we reclassified as established airlines those airlines that DOT had newly authorized to provide scheduled service at some point between 1986 and 1994 but which had earlier operated as on-demand air taxis. Second, we reclassified as established airlines those that DOT had recertificated following a substantial change of operations. FAA suggested that those airlines should be considered established because they had essentially maintained an unbroken chain of operations from a previous status.

To determine which airlines to categorize as "large" or as "commuters," we analyzed information from OST, BTS, and FAA. OST and BTS use definitions of large and commuter aircraft that differ from FAA's. According to DOT's regulations, a large certificated airline is one that holds a certificate issued

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<sup>2</sup>Some airlines, though certified for operations by DOT, do not begin operating for several months afterwards. Others never fly; after a year of not having begun operations, those airlines may have their certifications revoked by DOT for dormancy.

under section 401 of the Federal Aviation Act of 1958 and that operates aircraft designed to have a maximum passenger seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds, or that conducts international operations. Small certificated airlines and commuter airlines (“commuters”) generally operate only aircraft with 60 seats or fewer or a payload capacity of 18,000 pounds or less. FAA’s definitions follow the distinction made by parts 121 and 135 of the Federal Aviation Regulations, which basically define an aircraft as “large” or as a “commuter” depending upon whether or not it seats more than 30 passengers.

While we relied on FAA to indicate exactly which airlines it considered to be commuters, our distinction between large and commuter airlines was also consistent with DOT’s definitions. This occurred because FAA’s list of commuter airlines included not just those that operated “part 135” aircraft exclusively, but also airlines that operated “part 121” aircraft (“split certificate” airlines). According to information from FAA, those airlines’ part 121 aircraft were turboprop aircraft, such as the De Havilland Dash-8, that may seat between 36 and 56 passengers. FAA’s list of large airlines included only airlines that exclusively operated large aircraft. Most of those large airlines operated jet aircraft in 1994.

As a result, we analyzed data for all new airlines and established airlines that provided scheduled domestic service during the 1990 through 1994 period and that reported data to DOT. We excluded air taxis and other airlines providing nonscheduled service. Our universe of 265 airlines comprised 29 new large airlines, 60 large established airlines, 50 new commuters, and 123 established commuters. During the review period, 20 new airlines reached their sixth year of operations and were then analyzed as established airlines.

To answer the first question regarding the airlines’ experiences with accidents, incidents, and enforcement actions, we analyzed three different sets of data. First, to analyze data on all airline accidents that occurred from 1990 through 1994, we reviewed information from NTSB, the official source of information on airline accidents. Some of NTSB’s accident data included ambiguous information about the airline operator’s identity. To resolve the uncertainty, we reviewed more extensive information on each accident in question. Still, of the 201 accidents that occurred from 1990 through 1994, for 8 accidents we were unable to determine with certainty which company operated the aircraft involved. For example, NTSB’s files include information on a commuter airline accident in January 1991

involving US Air Express. However, more than one airline company conducts business as US Air Express, and because NTSB did not record the airline's designator code, which FAA assigns to individual operators, we were unable to assign the accident to any specific company.

Second, we analyzed FAA's data on aviation incidents that occurred during the period. FAA records data on various airline incidents, which the agency defines as an occurrence other than an accident associated with the operation of an aircraft, that affects or could affect the safety of operations. To improve the data's reliability and the relevance of the analysis, we excluded certain categories of incidents clearly outside the control of the airline, such as birds' being ingested into jet engines and lightning strikes. We made these changes at the suggestion, and with the assistance, of FAA.

Third, we analyzed data on enforcement investigations initiated from FAA's Enforcement Information System (EIS). EIS includes information on all enforcement actions taken by FAA, whether administrative or legal. FAA's Assistant Chief Counsel processes reports requiring legal enforcement action or referral for possible criminal investigation and prosecution. Because such actions may take years to conclude (for example, FAA closed its last enforcement actions against Eastern Air Lines in August 1995, although Eastern ceased operations in January 1992), we used the actions initiated to measure enforcement activity.

We did not assess the reliability of the incident or enforcement data. However, we discussed the issue with FAA officials, who told us that while there may be omissions in these data, they were the best available for the purposes of our review. For example, the officials told us that although FAA's incident data may be subject to some underreporting, those data were preferable to NTSB's airline safety incident data, because NTSB exercises great discretion in deciding which events to investigate. Similarly, the data on the number of enforcement actions initiated, while complete, may be underreported because of differences in how FAA field offices implement the agency's enforcement program. That is, confronted with similar sets of factual circumstances, some field offices may recommend that FAA initiate an enforcement action while others would not.

To provide the basis for comparing the number of accidents, incidents, and enforcement actions across airlines, we divided all such data points by a base of 100,000 (domestic) departures, a common comparative measure

of aviation safety. According to FAA and NTSB, since most accidents occur during arrival or departure, the number of departures is considered to be the best normalizing variable. We obtained the departure data from BTS, which received those data directly from individual airlines. However, we did not independently verify the data sent by the airlines or review BTS' procedures for handling those data. Also, in our calculations of the various rates for each group of airlines, we included data on accidents, incidents, and enforcement actions only if an airline also reported departure data for that year. For example, Eastern Air Lines stopped reporting departure data to BTS in 1991; however, FAA's data indicate that it initiated an enforcement action against Eastern in 1992. Our calculations of the enforcement rate for large established airlines did not include that 1992 action against Eastern.

We analyzed accidents, incidents, and enforcement actions of new airlines by years of operating experience. Such an analysis compares the records of airlines with the same number of years of operations, regardless of the calendar year in which the observation occurred. For example, we compared airlines within their second year of operations, whether that year was 1990 or 1993, against those with fewer and more years of experience. This method focuses on examining the airline's records over time, as the airlines gain operating experience.

To answer the second question on the relative level of surveillance applied to new airlines and established airlines during the 1990-94 period, we compared the number of inspections of new airlines to the number of inspections of established airlines, normalized for departures in each year. We obtained those data from FAA's Program Tracking and Reporting Subsystem (PTRS). We have long reported on problems with the data in FAA's safety inspection management system.<sup>3</sup> Because of continuing concerns about the reliability of the data on inspection results, we used the PTRS data only to determine the number of inspections done, and not their outcomes. We also reviewed the national program guidelines for airline surveillance and spoke to responsible FAA officials to determine whether FAA distinguished between new and established airlines in its surveillance and inspection efforts.

To answer the third question, we reviewed GAO products, both reports and testimonies published over the last decade, reporting on many aspects of

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<sup>3</sup>See, for example, *Aviation Safety: FAA's Safety Inspection Management System Lacks Adequate Oversight* (GAO/RCED-90-36, Nov. 13, 1989), *Aviation Safety: Problems Persist in FAA's Inspection Program* (GAO/RCED-92-14, Nov. 20, 1991), and *Aviation Safety: Data Problems Threaten FAA Strides on Safety Analysis System* (GAO/AIMD-95-27, Feb. 8, 1995).



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FAA's aviation safety inspection program. To assess FAA's progress in addressing the problems that were discussed in those reports and testimonies, we reviewed documentation that monitors the extent of FAA's implementation of GAO's recommendations.

After completing our analysis, we discussed our preliminary findings with officials of FAA and NTSB. We also provided a draft of our report to DOT for its review and comment. The agency's letter in response is reproduced in appendix III. We performed our work primarily at FAA headquarters in Washington, D.C., from August 1995 through September 1996 in accordance with generally accepted government auditing standards.

# Departures, Accidents, Incidents, and FAA-Initiated Enforcement Actions for Large and Commuter New Airlines and Established Airlines

Category of airline	Years of operating experience	Rates per 100,000 departures						
		Departures	Accidents	Incidents	Enforcement actions	Accidents	Incidents	Enforcement actions
<b>New large</b>	1	27,030	0	1	23	0.00	3.70	85.09
	2	112,435	1	14	90	0.89	12.45	80.05
	3	115,325	0	9	42	0.00	7.80	36.42
	4	14,826	2	5	24	13.49	33.72	161.88
	5	26,021	1	5	11	3.84	19.22	42.27
	<b>Subtotal</b>	<b>295,637</b>	<b>4</b>	<b>34</b>	<b>190</b>	<b>1.35</b>	<b>11.50</b>	<b>64.27</b>
<b>Established large</b>	<b>Subtotal</b>	<b>33,539,748</b>	<b>102</b>	<b>1,721</b>	<b>2,610</b>	<b>0.30</b>	<b>5.13</b>	<b>7.78</b>
<b>New commuter</b>	1	196,631	1	11	13	0.51	5.59	6.61
	2	331,735	1	28	26	0.30	8.44	7.84
	3	421,158	4	49	45	0.95	11.63	10.68
	4	377,405	2	28	23	0.53	7.42	6.09
	5	539,073	1	26	23	0.19	4.82	4.27
	<b>Subtotal</b>	<b>1,866,002</b>	<b>9</b>	<b>142</b>	<b>130</b>	<b>0.48</b>	<b>7.61</b>	<b>6.97</b>
<b>Established commuter</b>	<b>Subtotal</b>	<b>16,943,588</b>	<b>78</b>	<b>982</b>	<b>1,052</b>	<b>0.46</b>	<b>5.80</b>	<b>6.21</b>
<b>All new airlines</b>	1	223,661	1	12	36	0.45	5.37	16.10
	2	444,170	2	42	116	0.45	9.46	26.12
	3	536,483	4	58	87	0.75	10.81	16.22
	4	392,231	4	33	47	1.02	8.41	11.98
	5	565,094	2	31	34	0.35	5.49	6.02
	<b>Total</b>	<b>2,161,639</b>	<b>13</b>	<b>176</b>	<b>320</b>	<b>0.60</b>	<b>8.14</b>	<b>14.80</b>
<b>All established</b>	<b>Total</b>	<b>50,483,336</b>	<b>180</b>	<b>2,703</b>	<b>3,662</b>	<b>0.36</b>	<b>5.35</b>	<b>7.25</b>

Note: Includes departure, accident, incident, and enforcement action data for deregulated all-cargo airlines and commercial operators of aircraft when those operations or events occurred during operations under either 14 C.F.R. 121 or 14 C.F.R. 135.

Source: GAO's analysis of data from DOT, FAA, and NTSB.

# Comments From the Department of Transportation



U.S. Department of  
Transportation

Assistant Secretary  
for Administration

400 Seventh St., S.W.  
Washington, D.C. 20590

October 16, 1996

Mr. John Anderson  
Director, Transportation Issues  
U.S. General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Anderson:

Enclosed are two copies of the Department of Transportation's comments concerning the U.S. General Accounting Office draft report titled, "Aviation Safety: New Airlines Illustrate Long-Standing Problems in FAA's Inspection Program," RCED-96-175. These final comments reflect the results of the continuing dialog between GAO and the Department as part of the normal course of the comment process.

Thank you for the opportunity to review the draft report. If you have any questions concerning our reply, please contact Martin Gertel on 366-5145.

Sincerely,

A handwritten signature in cursive script, appearing to read "Melissa Spillenkothen".

Melissa Spillenkothen

Enclosure

Now GAO/RCED-97-2.

**U.S. Department of Transportation  
Comments On the General Accounting Office  
Draft Report  
Aviation Safety: New Airlines Illustrate  
Long-Standing Problems in FAA's Inspection Program  
RCED-96-175**

Now GAO/RCED-97-2.

The Department of Transportation welcomes GAO's analysis of the challenges posed in providing effective oversight for new commercial airlines. Since the airline industry was deregulated, the private sector has taken substantial initiative to provide the American public with more opportunities to fly to more cities in a highly competitive environment that has resulted in substantial savings to the flying public. The innovative nature of new entrant airlines in particular has furthered the evolution of airline operations in ways that offer new opportunities, new efficiencies, and new challenges for the FAA. The FAA aviation safety inspection program has provided effective safety oversight of the commercial airline industry as evidenced by the 1.5 million passengers that arrive safely at their destinations every day. We agree that oversight of new airlines can be further strengthened so that it continues to be effective as airlines evolve. The Department and FAA are moving to accomplish this objective.

As the commercial aviation industry is continuously growing and changing, FAA must continually adjust its efforts so that its limited inspection resources can function as effectively as possible. The optimal targeting of resources has been the object of continuing study by the FAA, GAO, and others. This GAO report contains important insights. These insights generally coincide with the perspectives of the FAA safety workforce, and have already proven useful in shaping our efforts.

On June 18, 1996, Administrator Hinson commissioned a 90-Day Safety Review task force, headed by the Deputy Administrator. This task force was created to examine FAA's management oversight of commercial airlines engaged in substantial outsourcing of maintenance and training functions, as well as examining the flexibility with which FAA inspection resources can be deployed effectively in response to varied fleet mixes, rapid growth, or other changes by a certificate holder. Many of these issues are particularly germane to new air carriers. The 90-Day Review had the advantage of learning from many of the insights GAO gained and shared with FAA. The final 90-Day Review makes a number of recommendations to further strengthen FAA's oversight of the airline industry, some of which are paralleled by recommendations of the GAO study.

The 90-Day Review report recommended that the FAA increase the oversight of new entrant airlines. Comprehensive surveillance plans will be required for newly certificated air carriers. These plans will require an increased level of surveillance for a 5-year period subsequent to initial certification. Other recommendations, which

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**Appendix III  
Comments From the Department of  
Transportation**

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uniquely affect newly certificated air carriers include: 1) the creation of an expert national certification team to assist FSDOs with the certification of new entrants; 2) follow-up OST fitness reviews and in-depth FAA safety reviews led by the national certification team; 3) managed, safe growth of newly certificated air carriers through the use of operations specifications that enumerate the approved number of aircraft, aircraft types, and scope of operations; 4) more specific requirements for newly certificated air carriers to adhere to the manufacturer's maintenance program, time intervals, and maintenance processes; and 5) a new policy requiring air carriers to maintain a current Statement of Compliance.

The Department and FAA generally concur with the report's findings, conclusions, and recommendations, although we have a number of concerns about the statistical foundation of the report. We are pleased that GAO was able to take into consideration actions taken pursuant to the recommendations of the 90-Day Review in reaching the conclusions of its study. We also appreciate the language throughout the report that cautions the uncertainties inherent in the sparse data set available for new entrant airlines. New entrant airlines almost invariably start life with few operations. Thus the data samples for accidents and incidents experienced by new entrant airlines contain a small number of events -- sometimes only one -- and the number of recorded departures in a year may be far fewer than the 100,000 used as a basis for normalizing. The limited data produce analytical results of inadequate validity to be considered as representative of all new entrant airlines. As a result, a single new entrant incident could produce a substantial negative bias in comparing these less certain rates for new entrants with those of established airlines where there are more accidents, incidents, and millions of departures over the 5 year period studied by GAO.

The GAO report correctly highlights the finding that many new entrant airlines had exemplary safety records throughout the period of study. Disaggregated data show that 52 percent (41 of 79) of new entrants had unblemished records, experiencing no incidents or accidents during the 5-year study period, and 21 percent (17 of 79) experienced only one incident. These statistics clearly portray the exceptional influence that the small group of carriers, 27 percent (21 of 79), that experienced more than one incident had on GAO's analytical results. In addition, we also appreciate the emphasis by the GAO report that the indication from the aggregated new entrant airline statistics must not be construed as meaning that all new entrants have safety deficiencies. By so doing, the GAO avoids inappropriately biasing the safety expectations of the traveling public against new carriers. Finally, we appreciate the draft report's recognition of all the recent actions taken by FAA, the Department and this Administration, including the 90 Day Safety Review and the Gore Commission, to ensure that the commercial airline industry receives vigorous and effective oversight as we move into the future. The Department and the FAA intend to vigorously pursue the 90-Day Review recommendations to completion, and we welcome the continuing attention of the GAO as that effort proceeds.

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**Appendix III  
Comments From the Department of  
Transportation**

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As part of our efforts, FAA has moved to ensure that inspectors have the training needed to effectively accomplish their assignments. During a recent one-day "stand-down," FAA completed a comprehensive review of all inspector work assignments and training requirements. During this process, FAA obtained direct feedback from its inspector workforce on training effectiveness, current data collection and tracking systems, and recommendations to further improve the inspection process. One result of this effort is a new airworthiness training course to provide inspectors with the latest information on new technologies. On September 30, FAA started providing this training to inspectors at six field offices each week.

We have stated that even one commercial aviation accident is unacceptable, and this administration has clearly identified its goal as zero accidents. FAA is enumerating a detailed action plan to continue our progress towards that goal. As noted in the 90-Day Safety Review, an effective inspection program requires a stable source of financing. The recently signed Federal Aviation Reauthorization Act of 1996 creates a "National Civil Aviation Review Commission," that will analyze financial needs and safety trends and make specific recommendations for change. The Act also provides new user fee authority that may spur alternatives to existing excise taxes. The recent experience with the inability to collect aviation excise taxes highlights the need to develop long-term, stable financing solutions that will ensure adequate funding of aviation inspectors and required training.

We will continue to seek new ways to enhance operations and increase effectiveness. We agree that continuing vigilance is needed to ensure optimal targeting of FAA resources to oversee new entrants and all airlines in a changing aviation industry.

# Major Contributors to This Report

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Charles Barchok, Jr.  
Gerald L. Dillingham  
Peter J. Espada  
Curtis L. Groves  
Julian L. King  
Steven C. Martin

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# Related GAO Products

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Aviation Safety: Targeting and Training of FAA's Safety Inspector Workforce (GAO/T-RCED-96-26, Apr. 30, 1996).

FAA Budget: Issues Related to the Fiscal Year 1996 Request (GAO/T-RCED/AIMD-95-131, Mar. 13, 1995).

Aviation Safety: Data Problems Threaten FAA Strides on Safety Analysis System (GAO/AIMD-95-27, Feb. 8, 1995).

Aviation Safety: FAA Can Be More Proactive in Promoting Aviation Safety (GAO/T-RCED-95-81, Jan. 12, 1995).

Aviation Safety: FAA's Efforts to Improve Oversight of Foreign Carriers (GAO/T-RCED-95-33, Oct. 4, 1994).

FAA Technical Training (GAO/RCED-94-296R, Sept. 26, 1994).

Aviation Safety: Unresolved Issues Involving U.S.-Registered Aircraft (GAO/RCED-93-135, June 18, 1993).

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

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

Aviation Safety: Additional Actions Needed for Three Safety Programs (GAO/T-RCED-92-90, Aug. 4, 1992).

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

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

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

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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).

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

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

Staffing, Training, and Funding Issues for FAA's Major Work Forces  
(GAO/T-RCED, 90-42, Mar. 14, 1990).

Aging Aircraft: FAA Needs Comprehensive Plan to Coordinate Government and Industry Actions (GAO/RCED-90-75, Dec. 22, 1989).

Aviation Safety: FAA's Safety Inspection Management System Lacks Adequate Oversight (GAO/RCED-90-36, Nov. 13, 1989).

Meeting the Aging Aircraft Challenge: Status and Opportunities  
(GAO/T-RCED-90-2, Oct. 10, 1989) and (GAO/T-RCED-89-67, Sept. 27, 1989).

Aviation Training: FAA Aviation Safety Inspectors Are Not Receiving Needed Training (GAO/RCED-89-168, Sept. 14, 1989).

Aviation Safety: FAA Has Improved Its Removal Procedures for Pilot Examiners (GAO/RCED-89-199, Sept. 8, 1989).

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(GAO/RCED-88-61, Mar. 18, 1988).

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**Related GAO Products**

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Aviation Safety: Needed Improvements in FAA's Airline Inspection Program Are Under Way (GAO/RCED-87-62, May 19, 1987).

Department of Transportation: Enhancing Policy and Program Effectiveness Through Improved Management (GAO/RCED-87-3, Apr. 13, 1987).

Compilation and Analysis of the Federal Aviation Administration's Inspection of a Sample of Commercial Air Carriers (GAO/RCED-85-157, Aug. 2, 1985).

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