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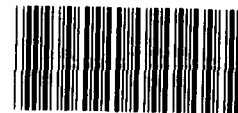
**Testimony**

Before the Subcommittee on Government Activities and  
Transportation, Committee on Government Operations,  
House of Representatives

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**AVIATION SAFETY**

**Slow Progress, Uncertain  
Future Threaten FAA  
Program To Measure Safety**



146299

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Madam Chair and Members of the Committee:

I am pleased to be here this morning to discuss our preliminary observations of the Federal Aviation Administration's (FAA) efforts to develop safety indicators--red flags, if you will--to enable FAA to better identify areas in which exposure to risk may be increasing. The results of this review will be updated and expanded upon in a follow-up report. To set the stage, I would like to open with a statement made in 1988 by the FAA Administrator in office when the Safety Indicators Program began.

I cannot emphasize enough the need within FAA for timely, accurate, and comprehensive aviation safety information. The FAA simply cannot fulfill its responsibility for ensuring the safety and efficiency of the national aviation system without such information. . . . The lack of any apparent correlation between the various data bases makes it difficult to define and measure the overall safety of the nation's airspace.

Reliable safety measurement is an integral part of FAA's mission; meaningful, timely, accurate data are essential to an organization's ability to manage proactively--in FAA's case, to help prevent accidents rather than respond only after the fact. Indeed, the National Transportation Safety Board (NTSB) has cited major accidents that might have been prevented had FAA "possessed stronger . . . data management and analysis capabilities."

Many others have recognized the need for better aviation safety measurement. A 1987 Senate Appropriations Committee report directed FAA to develop a set of indicators to measure the safety performance of the air traffic control system consistently over time. You, Madam Chair, have also been a strong proponent of safety indicators. Others, including ourselves, the Office of Technology Assessment, and the Aviation Safety Commission, have criticized FAA's ability to perform safety-related analyses and manage safety information. Even FAA's own National Aviation Safety Data Center has labeled FAA's existing systems and analytical methodologies "antiquated and inefficient," resulting in "significant variations in data timeliness, accuracy, and comprehensiveness."

Madam Chair, despite these concerns, FAA--for several reasons--has made little progress in implementing a safety indicators program. In particular, management commitment and effective user involvement in the program have been lacking. While user involvement appears to be improving, prospects for the program's future remain in question because of long term funding uncertainties and the unreliability of source data. While we have recently been informed of new FAA initiatives under

consideration to come to terms with these problems, sustained management support and attention will still be necessary if FAA is to realize the potential benefits that this program can offer.

THE SAFETY INDICATORS PROGRAM:  
A BRIEF DESCRIPTION

FAA will tell you that even without a safety indicators program per se, the agency continually monitors factors bearing on safety and compiles safety-related data. We do not dispute this. Yet its current systems, by its own admission, are severely limited. Today FAA uses standalone systems that were not designed to share data, much less permit any insightful analysis.

The Safety Indicators Program is intended to correct this situation. Through it, FAA-wide indicators of safety will be established, existing data bases will be integrated, and computer tools will perform statistical analyses that will enable FAA analysts to make meaningful correlations among key safety indicator data--information on which preventive action, if called for, can be taken.

The program's roots can be traced back to 1987, when the Senate Appropriations Committee directed FAA to develop safety indicators for air traffic operations. The following year the former administrator built on this direction and established an FAA-wide safety indicators program. In 1989 and 1990, FAA's Safety Indicators Division, with contributions from the aviation community, formulated a program strategy that included goals and a plan for accomplishing them. Since then, FAA has been working to implement this plan.

FAA's Safety Indicators Program has two basic components: development of safety indicators themselves (categories of safety measurement for the aviation system), and development of a computer analysis tool with which to obtain information from numerous standalone data bases for analysis. The principal anticipated users of safety-indicator data include the appropriate FAA program offices, the FAA Administrator, and the Congress. Some data may also be available to the aviation industry and the general public, in a limited fashion still to be determined.

The program is being managed by FAA's Office of Safety Analysis, which includes the Safety Indicators Division and the National Aviation Safety Data Center. It falls under the Associate Administrator for Aviation Safety, whose office is currently undergoing reorganization. The Office of Safety Analysis is distinctly separate from the offices that will be the indicators' primary users, operational units such as Air Traffic, Airway Facilities, and Flight Standards.

Almost \$6 million has been spent in the past 3 years on the development of safety indicators and the supporting computer analysis tool. During this same time period, FAA has allocated, on average, just under 4 full-time staff positions per year to this effort, along with outside contract employees.

INEFFECTIVE USER INVOLVEMENT  
HAS HAMPERED PROGRAM PROGRESS

After 4 years, the Safety Indicators Program has made minimal progress. Potential users of the safety indicators have yet to agree on the type of indicators needed to meaningfully measure aviation safety. In addition, user acceptance of the prototype computer analysis tool has been slow, and the tool's development has been delayed.

Safety Indicator Development

FAA is planning to develop safety indicators in five major categories: Air Traffic, Flight Operations, Aircraft Certification, Airports, and Security. Of these, only the first, Air Traffic, has made some headway. The second, Flight Operations, has barely begun. FAA had planned to publish draft Flight Operations indicators by September 1991; as of now these are 7 months late, and FAA is currently revising its estimate of when this work will be completed. Publication of the concept definition for the remaining three categories of indicators-- Aircraft Certification, Airports, and Security--was planned for September 1990; this work, however, has yet to begin, and FAA has not yet decided whether concept definition will be part of its future approach.

Even in the Air Traffic category, no safety indicators have yet been agreed upon. One reason for this slow progress is that the Safety Indicators Division did not effectively involve users in the development process. While potential users were supposed to contribute to the indicators' design and development, their early involvement was minimal. Prior to development of the draft indicators, Air Traffic and Airway Facilities liaisons were interviewed to identify safety data bases being used and ideas for appropriate safety indicators. However, the Safety Indicators Division did not involve the users in formulating the specific candidate indicators; in fact, users were only asked to comment after the draft indicators were published in December 1990. According to the new Associate Administrator for Aviation Safety, users felt that their participation in the development of the indicators was inadequate. A wide difference of opinion as to what constitutes acceptable measures of safety was soon apparent, delaying final acceptance of the Air Traffic indicators. After 16 months, FAA is close to reaching final approval on only 4 of the 48 indicators in this category. Of the

remaining 44 indicators, 9 have been dropped, while 35 are still under negotiation.

An example of an indicator that was dropped is the "Air Traffic Contributed Accident Rate," which would have measured, per 1 million operations, the degree to which controller error contributes to accidents. An example of an indicator still under negotiation is the percentage of full-time, permanent air traffic controllers rated at the full performance level. Other examples of indicators include near-midair collision rate, controller operational error rate, and pilot deviation rate.

### Computer Analysis Tool

An automated analysis tool will be the critical link between the safety indicators and the raw data, providing integrated information and analysis for use in decisionmaking. This tool is being developed by FAA's National Aviation Safety Data Center--an entity established in 1988 because of concerns over the unreliability of FAA safety-related data. In order to be able to adequately analyze safety-indicator data, the center has initiated a prototype management information system to judgmentally extract data for analysis from a number of data bases, and turn them into usable, meaningful statistics for proactive management use. This prototype is to evolve into a fully capable computer analysis tool over the next few years.

To date, the data center has successfully extracted and translated into usable formats data from FAA's three Air Traffic data bases that track airspace incidents (i.e., pilot deviations, operational errors, and near-midair collisions). Some milestones have already been missed--such as accessing data bases other than the three from Air Traffic--due to lack of funding. Another challenge that remains will be accessing data bases outside the Air Traffic Service, such as data bases applying to the remaining four categories of safety indicators.

Ineffective user involvement has also slowed development of the computer analysis tool. Until recently, Air Traffic and Airway Facilities personnel have had no structured feedback mechanism with which to express their views on this system; not surprisingly, user acceptance of the prototype has been a problem. Operational users were given their first opportunity to provide feedback in February of this year in one large meeting; no other meetings have been scheduled, although we have been told that more are planned.

UNRELIABLE DATA AND UNCLEAR MANAGEMENT  
COMMITMENT WILL AFFECT PROGRAM'S FUTURE

While user involvement has been increasing, unreliable data and uncertainties about top-level management commitment to the program remain problem areas that will bear directly on the program's future success.

The Safety Indicators Program will rely heavily on FAA's existing safety-related data. However, for years we and others have warned about the unreliability of these data bases, and the situation remains unchanged to this day. In our 1988 report to you on the feasibility of assessing safety records of individual airlines, we concluded that none of FAA's incident data bases could provide a satisfactory basis for developing indicators of safety because the data were unreliable, incomplete, and inconsistent. In a 1990 letter to then-Administrator James Busey, we stressed the need for validating the data's correctness and completeness before incorporation into any management information system, especially a program of safety indicators. In response, FAA's Director, Office of Safety Analysis, agreed, stating that improving data quality would require "long-term, sustained effort." Even last year, Madam Chair, we reported that FAA's data base designed to provide information for planning and overseeing its inspection program is incomplete and inaccurate. Without reliable data in this area, FAA cannot determine with assurance whether inspection priorities have been achieved, whether follow-up activities are accurate or are being completed in a timely manner, and whether inspection resources are being effectively used.

Internal FAA evaluations and Department of Transportation Inspector General reports have also raised this issue. In a 1988 memorandum, former-Administrator Allan McArtor acknowledged that FAA lacked a focal point for safety data, that management of safety data was fragmented within the agency, and that FAA components' ability to provide accurate, comprehensive, and speedy information varied significantly. A 1989 memorandum to the Administrator from the Assistant Inspector General for Auditing mentioned that FAA could not vouch for the accuracy or timeliness of statistics derived from its Enforcement Information System. Finally, even industry has complained: a 1988 letter from a major airline called "for the most part worthless" FAA's data on accidents/incidents and its data on serious aircraft malfunctions.

Inconsistencies among data bases that the Safety Indicators Program will use is also a concern. For example, while both NTSB and FAA keep accident data, problems such as lack of uniformity in data formatting and term definition lead to information that sometimes varies between the two data bases. Data on the number of commuter carrier accidents in a given year, for example, can

differ, depending upon which data base is queried. Reconciliation of disparities of this kind has been delayed due to insufficient funding, according to the manager of FAA's data center.

Madam Chair, such funding shortfalls raise the question of FAA's commitment to the Safety Indicators Program. While establishment of the program was called for in a congressional committee report, it has not received a warm welcome in FAA's Air Traffic Service. Cooperation from the operational offices--which have not been convinced that this program offers anything that they cannot themselves generate--although improving, has been limited. To foster better cooperation, the Administrator's commitment to the Safety Indicators Program will have to be clearly and unmistakably demonstrated. The Safety Indicators Program is currently operating under a pending FAA order that has yet to be signed. In light of the interdependence among the indicators office as the program developer and the operational units as its users, a clear statement of their respective responsibilities and authority is critical--yet lacking. The new Associate Administrator for Aviation Safety voiced the opinion that in the past management did not fully understand the program, and as a result, commitment was lacking.

One measure of agency commitment is, of course, funding. Long-term funding for development of a fully capable automated support tool for analyzing safety data is tenuous. In the past the program has had to compete for monies with other entities under FAA's Office of Aviation Safety. An alternative funding mechanism is FAA's capital investment plan, under which the funding source is earmarked, making continued support more likely. In fiscal year 1993 the program was considered for inclusion in the capital investment plan, but was ultimately dropped because of higher priorities. The project is again being considered for inclusion under the capital investment plan, for fiscal year 1994.

#### FAA IS REEVALUATING ITS APPROACH TO SAFETY INDICATORS

Just last week, Madam Chair, FAA officials informed us that the agency now recognizes that management commitment and effective user involvement have been lacking in the program, yet are essential to its success. FAA is reevaluating its approach with regard to the Safety Indicators Program; the Associate Administrator for Aviation Safety is considering the establishment of an executive-level task force that, through a specified time period of intensive focus, will identify appropriate indicators in each of the five categories. Most important, this new approach includes the active participation of a senior FAA manager with the authority to approve adoption of

the indicators for his or her particular program area. An implementation plan that this group would write would then follow. This change is seen, then, as a means of jump-starting a program that has been stalled.

#### CONCLUSION: ONE CANNOT MANAGE WHAT ONE CANNOT MEASURE

No one questions that the most important area of FAA management focus is safety. And while FAA is doing much, every day, to ensure the safety of the millions of Americans who fly, the fact remains that it cannot approach safety proactively until it commits to a system that can accept and analyze crosscutting data. Such a system must include reliable data that, through a dependable computer analysis tool, can provide managers with validated indicators that measure degrees of safety--indicators that can warn of needed remedial action.

#### RECOMMENDATIONS

As FAA begins to focus increased attention on the Safety Indicators Program, the agency should recognize the need for a revised program plan that is formally endorsed by the FAA Administrator. Accordingly, we recommend that the Secretary of Transportation direct that the Administrator, FAA, develop a detailed program plan that

- provides for effective user involvement throughout the process of developing indicators and the supporting computer analysis tool,
- provides the requisite funding base for meeting program milestones, and
- addresses the need for ensuring the integrity of source data.

The plan should also define the approach for developing the indicators, specify the respective responsibilities and authority of the program developers and users, cite measurable goals and associated milestones, and cite the resources needed for meeting them.



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

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

Aviation Safety: Measuring How Safely Individual Airlines Operate (GAO/RCED-88-61, Mar. 18, 1988)

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

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