

**Before the Subcommittee on Aviation,  
Committee on Transportation and Infrastructure  
U.S. House of Representatives**

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## **Federal Aviation Administration**

# **Further Actions Are Needed to Reduce Runway Incursions**

**Statement of  
The Honorable Kenneth M. Mead  
Inspector General  
U.S. Department of Transportation**



Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to discuss runway incursions - a significant safety issue. Runway incursions are incidents on the runway that create a collision hazard, some with very serious consequences. Our testimony is based on our report of this date. This is our third report on this safety issue since 1998. Reducing runway incursions has been on the National Transportation Safety Board's (NTSB) annual "Most Wanted" list of transportation safety improvements since 1990.

Just last month a serious runway incursion happened at Dallas-Fort Worth International Airport. A cargo plane mistakenly taxied onto an active runway directly in the path of an American Airlines jet, with 60 passengers onboard, rolling down the runway. The American Airlines jet flew over the cargo plane missing it by less than 100 feet. Judging by close calls such as this incident, we have been extremely fortunate that runway incursions have not resulted in a tragic accident involving extensive loss of life.

For the past several years, FAA has placed substantial management focus on reducing runway incursions. Despite this focus, the number of runway incursions continues to increase year after year. Last year there were 431 runway incursions, an average of more than one a day. Our work found that two significant factors have constrained FAA's progress. First, FAA has not done enough to provide technologies to airports with continued runway incursion problems. Second, the Runway Safety Program Director has little authority to ensure that initiatives undertaken by employees responsible for runway safety are completed.

FAA issued its Runway Safety Report last week. In the report, FAA cited that the number of runway incursions in 2000 increased by 110 over the previous year. FAA also stated that it was encouraged that 81 percent of the runway incursions that occurred over the past 4 years were relatively minor and posed little chance of a collision.

This observation should not obscure the fact that the remaining 19 percent, or 256, runway incursions involved close calls. Close calls are those runway incursions that barely avoid a collision or pose a significant potential for a collision. We are concerned that close calls have not gone down. It is important to recognize that over the last 4 years, 161, or 63 percent of the close calls, involved at least one commercial aircraft, where the potential loss of life is much greater.

Today our testimony will cover three points.

***First, FAA has placed significant management focus on reducing runway incursions, but runway incursions continue to increase.*** FAA has had three plans since 1991 that included such things as improving markings, signs, and lighting; training vehicle operators; and establishing uniform procedures for airport surface movement in low visibility conditions. Funding for runway safety increased from \$18.6 million in fiscal year (FY) 1999 to \$52.6 million in FY 2001, and the FAA Administrator made reducing runway incursions a top agency priority. However, FAA has experienced significant turnover in a key position - the Director of Runway Safety. Over the last 5 years, there have been six Runway Safety Directors.

Despite significant management focus, it is apparent that FAA's efforts, along with those of the aviation industry and airports, are not sufficient. The number of runway incursions continues to go in the wrong direction. Runway incursions increased 48 percent, from 292 in 1997 to 431 in 2000. *The number of runway incursions in 2000 were 74 percent higher than FAA's goal of having no more than 248 runway incursions.*

***Second, airports with continued runway incursion problems need technology.*** Since 1991 FAA has been developing, evaluating, and testing the Airport Movement Area Safety System (AMASS) for 34 of the largest airports. AMASS is a software enhancement to the ASDE-3 radar<sup>1</sup> designed to alert air traffic controllers of impending conflicts on the runway. AMASS has experienced cost increases and schedule delays due to software development problems, human factors issues, and operational problems. As illustrated in the following chart, AMASS is 6 years behind schedule and \$86 million over cost projections made in 1993.

<b>Plan</b>	<b>Baseline Cost</b>	<b>Last Installation Date</b>
1993	\$59.8 M	1996
1997	\$74.1 M	2000
As of May 2001	\$146.0 M	2002

This month FAA commissioned its first two systems at the San Francisco and Detroit airports. However, there remains uncertainty as to how well AMASS will work and whether FAA's deployment schedule at additional airports will

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<sup>1</sup> ASDE itself was delayed from 1995 to 1999 due in part to disagreement with the contractor over contract terms, and site selection and preparation problems.

be met. AMASS has experienced problems with providing false alerts to air traffic controllers, which in itself can create a safety problem.

Further, FAA has not provided small to medium airports with low-cost technologies to reduce runway incursions. FAA plans to provide 25 small to medium airports with Airport Surface Detection Equipment (ASDE-X) technology to help air traffic controllers prevent runway accidents, but commissioning ASDE-X at all sites will not be completed until FY 2007.

FAA's major technology efforts have focused on helping air traffic controllers prevent accidents, although pilot errors continue to be the leading cause of runway incursions. FAA must expedite technologies such as in-cockpit moving map displays and Automatic Dependent Surveillance-Broadcast (ADS-B) that have the most potential for reducing runway incursions. These technologies create a redundancy (*a "second set of eyes"*) by including pilots in the loop to help them see where they are and where others are on the runway. These technologies are currently being demonstrated at the Memphis airport. However, FAA officials do not think ADS-B technology will be ready for commissioning and full operational use for another 2 to 5 years, depending on how long it takes to certify ADS-B for safe operation.

The use of these technologies must be expedited. FAA should accelerate its process to certify new equipment to expedite these technologies. FAA should also issue an Advanced Notice of Proposed Rulemaking to obtain comments from the airline industry and general aviation community on implementing in-cockpit moving map displays and ADS-B.

***Third, to help reverse the upward trend in runway incursions, strong senior official oversight and accountability is needed to ensure follow-through on planned initiatives.*** Improvements in program oversight are needed because initiatives are not completed on time, completed initiatives are not evaluated to determine if they are working, and regional efforts are not periodically assessed to ensure that progress is being made to reduce runway incursions at airports.

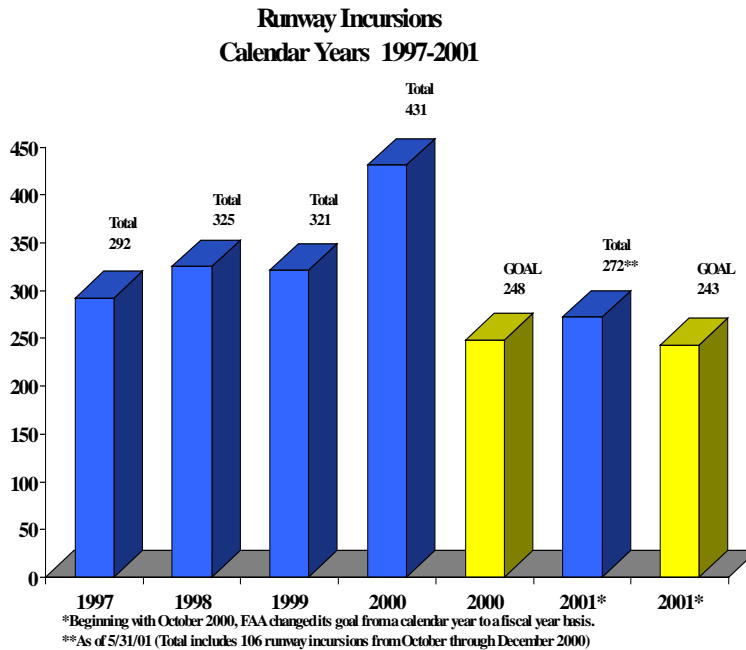
An important factor constraining strong program oversight is that the Runway Safety Director has little authority to ensure that employees from other lines of business are fully supporting the Runway Safety Program mission. The Director should have a mechanism to provide input on individual performance appraisals and bonuses for those employees responsible for reducing runway incursions. Such mechanisms are needed to hold people involved with runway safety accountable for completing initiatives within established milestones.

This would be consistent with FAA's efforts to establish itself as a performance-based organization.

***Further actions are needed by FAA to reduce runway incursions.*** In our report to FAA, we recommended that FAA take several steps that are vital to making progress in reducing runway incursions. FAA agreed with our recommendations to reevaluate the AMASS deployment schedule, reexamine airport needs for a full ASDE-X system, and determine if technological solutions are needed for airports that are not receiving any technology. These actions, when implemented, should help FAA make progress in reducing runway incursions.

FAA's response for expediting new technologies and strengthening the Director's authority over the Runway Safety Program is ambiguous, and it is not clear to us what milestones, if any, apply to implementing these recommendations. We will be requesting the FAA Administrator to reexamine these issues and provide specific milestone dates to implement our recommendations.

## *Vital Statistics Show Continued Increases in Runway Incursions, Many Involving Close Calls With Commercial Aircraft*



Runway incursions increased 48 percent from 292 in 1997 to 431 in 2000. *This number was 74 percent higher than FAA's goal of having no more than 248 runway incursions by the end of 2000.*

As of May 31, 2001, the number of runway incursions for FY 2001 was already 272<sup>2</sup>, surpassing FAA's goal of 243 for FY 2001, with 4 months remaining in the fiscal year.

- Runway incursions caused by pilot errors represent 60 percent of the runway incursions in 2000 and continue to be the leading cause of runway incursions. Pilot errors, known as pilot deviations, occur when a pilot violates Federal Aviation Regulations. For example, a pilot deviation occurs when a pilot fails to follow air traffic controller instructions to stop short of an active runway, causing another aircraft to abort its departure or arrival.

<sup>2</sup> This number includes 106 runway incursions from October to December 2000.

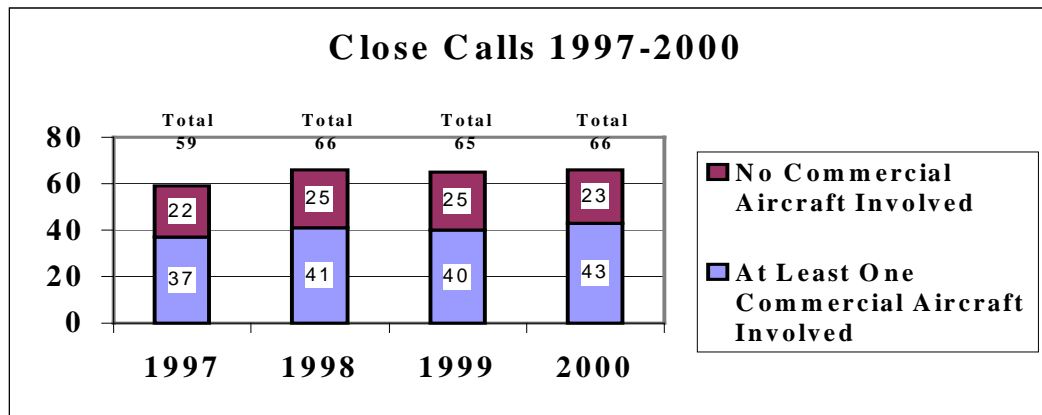
- The following chart shows the top 10 airports with the most runway incursions over the past 4 years.

**Top 10 Airports With the Most Runway Incursions  
From 1997 through 2000**

Overall Rank	LOCATION	Number of Runway Incursions				TOTAL
		1997	1998	1999	2000	
<b>1</b>	<b>Los Angeles</b>	<b>3</b>	<b>12</b>	<b>10</b>	<b>8</b>	<b>33</b>
<b>2</b>	<b>St. Louis</b>	<b>8</b>	<b>9</b>	<b>7</b>	<b>6</b>	<b>30</b>
3	Orange County	8	3	9	7	27
4	North Las Vegas	2	4	3	17	26
<b>5</b>	<b>Long Beach</b>	<b>7</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>25</b>
<b>6</b>	<b>Dallas-Ft. Worth</b>	<b>8</b>	<b>5</b>	<b>7</b>	<b>3</b>	<b>23</b>
<b>7</b>	<b>San Francisco</b>	<b>6</b>	<b>4</b>	<b>7</b>	<b>4</b>	<b>21</b>
8	San Diego/Montgomery Field	1	5	5	9	20
9	Ft. Lauderdale Executive	3	3	5	9	20
<b>10</b>	<b>Phoenix</b>	<b>4</b>	<b>7</b>	<b>3</b>	<b>6</b>	<b>20</b>

Note: The highlighted airports are among the 32 busiest U.S. airports.

- From 1997 through 2000, there were about 60 to 65 close calls a year, over 1 per week. As illustrated in the following chart, close calls are not going down.



- Sixty-three percent or 161 of these close calls involved at least 1 commercial aircraft. When commercial aircraft are involved, the potential loss of life due to a runway accident is much greater.

***FAA Has Placed Significant Management Focus on Reducing Runway Incursions, But Runway Incursions Continue to Increase.***

FAA has taken many steps to reduce runway incursions. FAA has had three plans since 1991 that included over 260 actions to reduce runway incursions. Actions included such things as improving markings, signs, and lighting, and training vehicle operators. FAA also made procedural changes such as requiring pilots to read back their clearances before entering an active runway and establishing uniform procedures for airport surface movement in low visibility conditions.

In the past 2 years, we have been encouraged by FAA's substantial efforts to reduce runway incursions.

- The FAA Administrator made reducing runway incursions a top agency priority and appointed the Director of Runway Safety as the single point of contact for all runway safety activities.
- In 2000, FAA conducted nine regional runway incursion workshops, a Human Factors symposium, and a Runway Safety National Summit.
- FAA issued a National Blueprint to reduce runway incursions that included, together with selected initiatives from its 1998 Action Plan, 10 initiatives<sup>3</sup> most likely to reduce runway incursions in the near term.
- In October 2000, FAA appointed nine new full-time Regional Runway Safety Program Managers. These managers plan to direct evaluations on runway safety at 167 airports this year, over 140 more than last year.

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<sup>3</sup> These initiatives included reviewing pilot/controller communications phraseology, providing runway incursion training for pilots and controllers, implementing a technology assessment program, and improving airport surface operations and markings.



- FAA developed a new process to identify and investigate those incursions where there was an increased risk of collision.

Despite these efforts, runway incursions increased 48 percent from 292 in 1997 to 431 in 2000. *This number was 74 percent higher than FAA's goal of having no more than 248 runway incursions by the end of 2000.*

FAA issued its Runway Safety Report last week. In the report, FAA cited that the number of runway incursions increased by 110 over the previous year. FAA also stated that it was encouraged that 81 percent of the runway incursions that occurred over the past 4 years were relatively minor and posed little chance of a collision.

This observation should not obscure the fact that the remaining 19 percent or 256 runway incursions involved close calls. Close calls are those runway incursions that barely avoid a collision or pose a significant potential for a collision. We are concerned that close calls have not gone down. It is important to recognize that over the last 4 years, 161, or 63 percent of the close calls involved at least one commercial aircraft, where the potential loss of life is much greater.

***Airports With Continued Runway Incursion Problems Need Technology***

Airports with continued runway incursion problems have had to rely on non-technological solutions, such as improving airport markings and lighting, and providing additional training to pilots and vehicle operators to reduce runway incursions.

Although FAA has been working on a variety of technological solutions over the past 10 years, some airports that have a high number of runway incursions will not see these technologies for as much as 6 years unless FAA takes action to expedite the programs. Further, some airports are not scheduled to receive any technological assistance in this area.

➤ FAA has been developing, evaluating, and testing the Airport Movement Area Safety System (AMASS) since 1991 to alert air traffic controllers at 34 of the largest airports of impending conflicts on the runway. While FAA commissioned its first 2 systems at the San Francisco and Detroit airports this month, there is uncertainty as to how well AMASS will work at the remaining 32 sites. AMASS, a software enhancement to the ASDE-3 radar, has had a history of problems with false targets, such as when an aircraft is shown in conflict with another aircraft that does not exist. These false targets generate false alerts to controllers. We cannot expect

controllers to rely on AMASS if there are excessive false alerts while they are controlling air traffic.

- Smaller airports also need technologies to reduce runway incursions and prevent accidents. FAA plans to provide 25 small to medium airports with Airport Surface Detection Equipment (ASDE-X) technology to help air traffic controllers prevent runway accidents, but ASDE-X will not be commissioned at all sites until FY 2007. However, some small airports with continued runway incursion problems are not scheduled to receive any technology to reduce runway incursions (see the Exhibit).
  
- FAA's major technology efforts, AMASS and ASDE-X, have been focused on helping air traffic controllers prevent accidents, although pilot errors continue to be the leading cause of runway incursions. Technologies such as in-cockpit moving map displays and Automatic Dependent Surveillance-Broadcast (ADS-B) satellite technology must be expedited. These technologies have the most potential for reducing runway incursions because they create a redundancy (*a "second set of eyes"*) by including the pilot in the loop to help detect and alleviate potential runway incursions and accidents. However, FAA officials do not think ADS-B technology will be ready for commissioning and full operational use for another 2 to 5 years, depending on how long it takes to certify ADS-B for safe operation.

***Strong Senior Official Oversight and Accountability Is Needed to Reduce Runway Incursions***

An important factor constraining FAA's efforts to reverse the upward trend in runway incursions is the lack of accountability for completion of actions to reduce runway incursions. While FAA's Runway Safety Program Director is the single point of contact for all runway safety activities, the Director has little authority to ensure initiatives undertaken by various FAA lines of business are completed. FAA needs to provide the Director, who is under Air Traffic, authority to ensure that employees from other lines of business complete tasks to reduce runway incursions on time. FAA needs to develop a mechanism to hold people involved with runway safety accountable, such as directing the Runway Safety Program Director to provide input on individuals' performance appraisals and bonuses. This would also be consistent with linking bonuses to meeting performance goals under the Government Performance and Results Act. Additionally, FAA should also consider realigning the Runway Safety Program under FAA's Deputy Administrator office to elevate the program importance above all lines of business.

Mr. Chairman, this concludes our statement. I would be pleased to answer any questions.

EXHIBIT

**Airports With a Total of 10 or More Runway Incursions  
From 1997 to 2000**

Overall Rank	LOCATION	LOC ID	1997	1998	1999	2000	TOTAL	AMASS*	ASDE-X**
1	Los Angeles	LAX	3	12	10	8	33	Aug-01	
2	St Louis	STL	8	9	7	6	30	Jul-01	
3	Orange County	SNA	8	3	9	7	27		X
4	North Las Vegas	VGT	2	4	3	17	26		
5	Long Beach	LGB	7	4	6	8	25		
6	Dallas-Ft Worth	DFW	8	5	7	3	23	Sep-02	
7	San Francisco	SFO	6	4	7	4	21	Jun-01	
8	San Diego/Mont.	MYF	1	5	5	9	20		
9	Ft Lauderdale Exec	FXE	3	3	5	9	20		
10	Phoenix	PHX	4	7	3	6	20		X
11	Newark	EWR	2	8	3	5	18	Nov-01	
12	Merrill Field	MRI	7	2	0	8	17		
13	Chicago O'Hare	ORD	3	4	6	4	17	Sep-01	
14	Boston	BOS	1	4	3	8	16	Oct-01	
15	Cleveland	CLE	6	6	3	1	16	Oct-01	
16	Midway	MDW	2	5	5	4	16		X
17	San Jose	SJC	4	5	2	5	16		X
18	Deer Valley	DVT	6	5	2	2	15		
19	Daytona Beach	DAB	2	3	6	3	14		
20	Minneapolis	MSP	6	2	3	3	14	Jan-02	
21	San Antonio	SAT	4	4	4	2	14		X
22	Teterboro	TEB	4	2	3	5	14		
23	Atlanta	ATL	2	2	6	3	13	Jul-01	
24	Las Vegas	LAS	2	5	4	2	13	Jul-02	
25	Concord	CCR	0	1	3	7	11		
26	Detroit Metro	DTW	2	6	1	2	11	Jun-01	
27	J F Kennedy	JFK	4	2	5	0	11	Feb-02	
28	LaGuardia	LGA	3	3	2	3	11	Oct-02	
29	Milwaukee	MKE	1	4	3	3	11		X
30	Providence	PVD	0	2	5	4	11		X
31	Santa Barbara	SBA	2	1	2	6	11		
32	Centennial	APA	1	3	4	2	10		
33	Burbank	BUR	4	3	1	2	10		X
34	Flying Cloud	FCM	2	2	4	2	10		
35	Crystal	MIC	1	3	4	2	10		
36	Philadelphia	PHL	1	5	1	3	10	Jul-02	
37	Salt Lake City	SLC	2	1	3	4	10	Sep-01	

\* AMASS commissioning dates. AMASS was commissioned this month at San Francisco and Detroit airports.

\*\*The exact dates for commissioning ASDE-X has not been determined

**Note: The highlighted airports are not currently scheduled to receive any technology.**